

THE SUCCESS OF THE "SUPER-QUAD" (See Inside)

Popular Wireless

Every Thursday
PRICE
3d.

No. 483. Vol. XIX.

INCORPORATING "WIRELESS"

September 5th, 1931.



THAT SET OF YOURS!

Are your friends criticising it?
Is it as good as you think it is?

It will pay you to
READ AND ENJOY "P.W."
and keep abreast of radio progress

WHAT'S INSIDE THIS WEEK?

An Article by

**CAPTAIN
ECKERSLEY**

on

**HOME TRUTHS
FOR
LISTENERS**

**CONSTRUCTING
THE A.C.
"POP-VOX"**

**STATIONS
WORTH
HEARING**

**SHORT-WAVE
NOTES**

**LOUD-SPEAKER
TONE VALUES**

RADIO NEWS OF THE WEEK
etc., etc., etc.



CAN BE ACHIEVED
WITH THESE

LEWCOS
Regd.

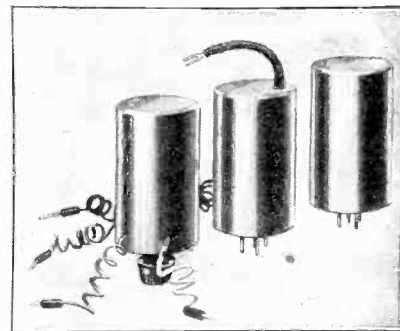
COMPONENTS
WHICH ARE SPECIFIED FOR
THE "SUPER QUAD"
RECEIVER DESCRIBED IN
THIS ISSUE.

*See article in this issue entitled
"The Success of the 'Super Quad.'"*

The extraordinary selectivity of LEWCOS Super-Het Coils was recently demonstrated at Brookmans Park to the press when the National transmission was cut out in one degree of 180 degree dial and the Regional transmission received clear of any interference.

THE LONDON ELECTRIC WIRE
COMPANY AND SMITHS LIMITED,
CHURCH ROAD, LEYTON, LONDON, E.10.

Telephone : Leytonstone 3636 (10 lines).
Telegrams : "Lewcos, London."

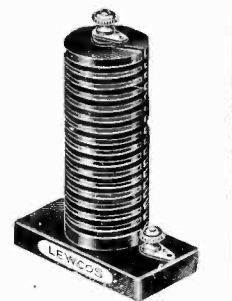


The LEWCOS Super-Het Coil Kit (Reference S.H.K. No. 3) (protected by provisional Patent Specification).
PRICE 37/6

LEWCOS
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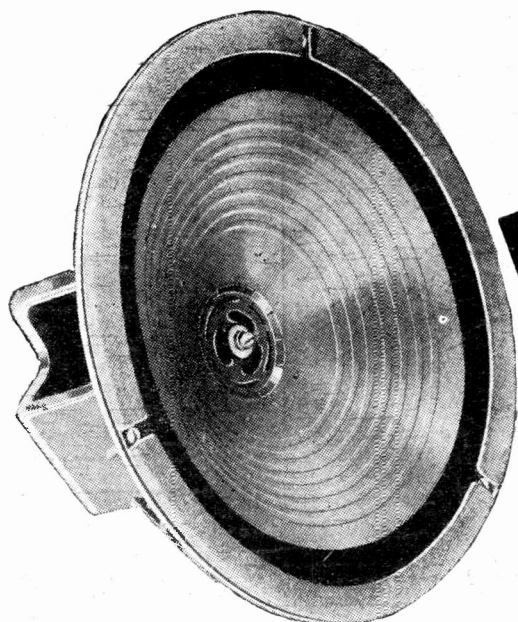
SPAGHETTI RESISTANCES

The LEWCOS SPAGHETTI RESISTANCES are obtainable in all standard sizes, ranging in price from 9d. to 1/6



The LEWCOS H.F. Choke is recognised as standard by all experts.
PRICE 7/9

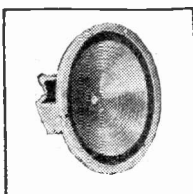
LEWCOS RADIO PRODUCTS FOR BETTER RECEPTION
VISIT OUR STAND No. 27 (National Hall) AT THE RADIO EXHIBITION



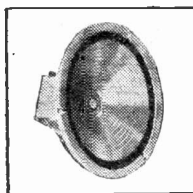
NEW R.K.'S

PRICES NOW FROM 3/6

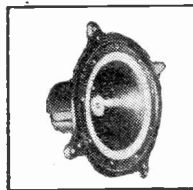
Minor Permanent Magnet Model—A moving-coil speaker to work from a small output valve. Capable of handling outputs up to 2 watts. Performance is comparable with the Senior R.K. Price £2-10-0.



Minor D.C. Model—Similar to permanent magnet Minor, but suitable for 200 volts mains field excitation. Price £1-11-6.

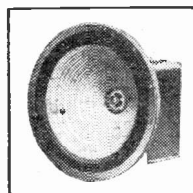


1931/2 Senior Permanent Magnet—Incorporates the highest grade cobalt steel magnet, and 10" corrugated cone. New Reduced Price £5-12-6.



1931/2 Models. Senior A.C. Model—10" corrugated cone. Incorporates Westinghouse metal rectifier. New Reduced Price £7-15-0.

Senior D.C. Model—Similar to A.C. model, but without metal rectifier and suitable for mains field excitation. New Reduced Price £5-5-0.



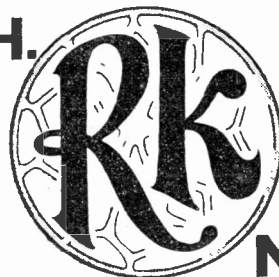
Minor Permanent Magnet R.K.—in fumed oak cabinet. Price £3-17-6. In special walnut cabinet, Price £4-4-0. Dimensions of cabinet 14" high, 13" wide, 7 1/2" deep.



R.K. reproduction is the ambition of every radio enthusiast. Now—that ambition can be realised. The 1931 range of redesigned R.K. moving coil speakers is released to the public!

In this new range, from the "Minor" D.C. Model at 3/6 to the "Senior" A.C. Model at £7.15.0, there is an R.K. to suit your purpose and pocket. Come and see the new R.K.'s at the **RADIO EXHIBITION, STAND NO. 21** or ask your dealer for a demonstration.

B.T.H.



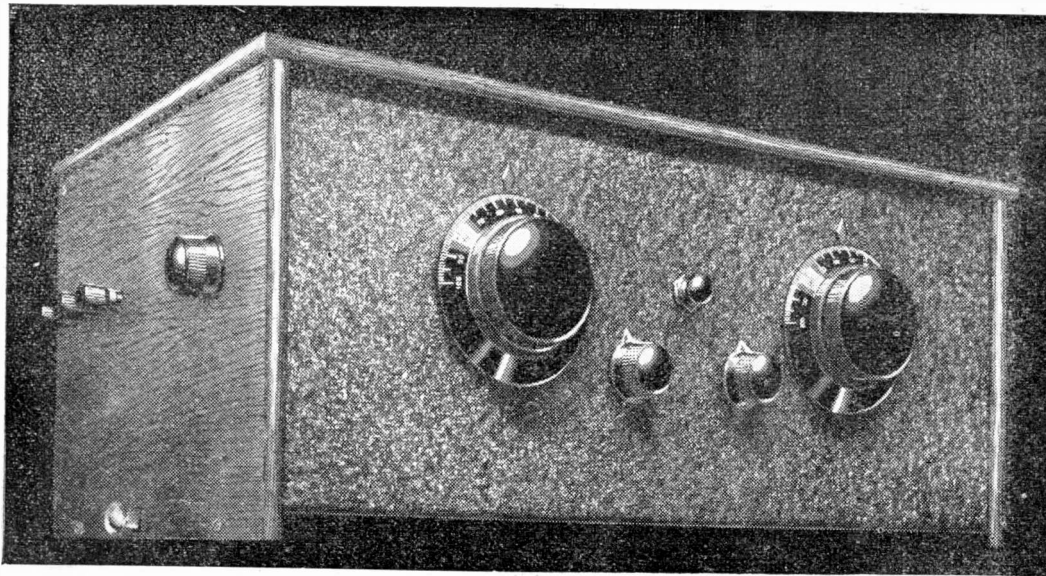
MOVING COIL LOUDSPEAKERS



THE EDISON SWAN ELECTRIC CO. LTD.
Radio Division:
155 Charing Cross Road, London, W.C.2.
Branches in all the Principal Towns.

W.159

EDISWAN RADIO PRODUCTS



NEW!

—more powerful—more selective—
even better all-round performance

Here is an entirely new standard of Radio value—a powerful 3-valve, Screened Grid Receiver for the amazingly low price of £6.15.0—the Cossor Empire Melody Maker Model 234.

This remarkable Receiver incorporates all the most up-to-date developments in Set design. It uses the very latest types of the famous Cossor Valves. As a result it possesses outstanding performance.

Its selectivity is remarkable—its range is enormous. Even when used close to a Regional transmitter it will

cut out its powerful transmission like magic and bring in the programme you want to hear—all the main European stations are within its reach. Its performance is equal in every way to that of the most costly 3-valve S.G. Receiver.

Yet in spite of its efficiency it is so simple that you can easily assemble it yourself—no Wireless knowledge is necessary. Merely bolt the components on to the drilled, all-metal base plate, connect a few wires and it is ready for use. Get full details of this outstanding Set—Use the Coupon.

Cossor

EMPIRE

Melody Maker

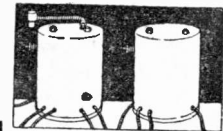
Model 234

HIRE PURCHASE TERMS

You can obtain the Cossor Empire Melody Maker for only 15/- down and nine monthly payments of 15/-.

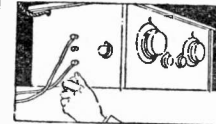
To Messrs. A. C. Cossor, Ltd., Highbury Grove, London, N.5
Please send me free of charge one of your Constructional Charts which tells me how to build the Cossor Empire
Name.....
Address.....

P.W. 5/9.31.



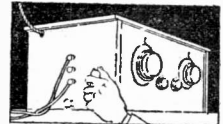
COMPLETELY SCREENED COILS

The coils used in the Cossor Empire Melody Maker are completely screened in metal "pots," entirely eliminating direct pick-up, thus further improving selectivity.



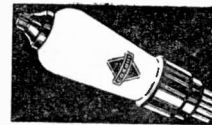
EXTERNAL WAVE-CHANGE SWITCH

Wave Change Switching is effected by operating the switch at the end of the cabinet—"in" for long—"out" for short.



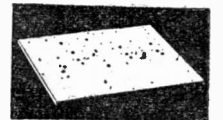
SERIES AERIAL CONDENSER

The variable Series Aerial Condenser permits adjustment of selectivity to give the fine tuning necessary to cut out powerful local stations.



COSSOR METALLISED SCREENED GRID VALVE

Even better performance is ensured by the use of a Cossor Metallised Screened Grid Valve with its record low inter-electrode capacity and its ability to eliminate stray coupling effect between anode and nearby components.



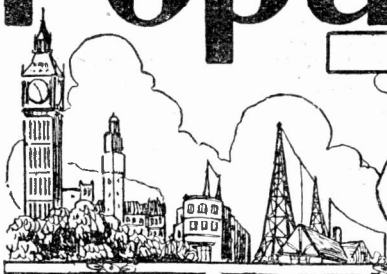
ALL-METAL BASEPLATE

Construction is simpler than ever, due to the Metal Base Plate, which is supplied with every hole drilled, thus automatically positioning every component.

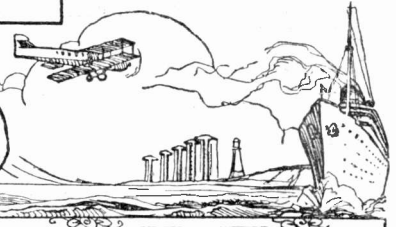


Popular Wireless

LARGEST NET SALES



Scientific Adviser:
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 Chief Radio Consultant:
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THE "NAUTILUS"
 THOSE KILL-JOYS
 RADIO AND RAIN
 QUEEN'S HALL FOR ALL

RADIO NOTES & NEWS

BOBBIE BLUEGUM
 SYMPHONY SEASON
 GRAMOPHONE NOTE
 ENGLISH ELOQUENCE

Exhibition Notes.

I VENTURE to put forward three non-technical suggestions for the consideration of the Radio Exhibition authorities, the first of which is that they would score a huge success with the young fry, the future buyers, if they were to hand out at the doors special carriers for the transport of free samples, souvenirs and catalogues.

Next, how very popular and useful would be a private conference room wherein husbands and wives and/or parents and kids, can settle whether the new set is to be a transportable, portable, radio-gram, table model, "console" type or a set complete with hooks for attaching television extension some day.

And finally, what about a baby park in the charge of Newfoundland doggies?

A Word to the Ambitious.

TO those who have "been through the mill" of set-making and now feel like tackling a more ambitious engineering job this autumn I recommend the "Extenser" Five, a "last word" long-distance-getter, which is fully described in the September "Wireless Constructor." There's something to get your teeth into!

In the same issue is a full constructional article about the "Gangster," an S.G. Three which makes you sit up when it begins to sort out wireless waves. Generally speaking, if you haven't yet saupled the "Constructor"—y'orter.

The "Nautilus."

SEE p. 701, August 15th. Mystery solved. The call-letters W S E A are the official ones for C.W. telegraph traffic: K 7 X 1 is used for telephony on the amateur wave-band.

Several readers send confirmations of this, and T. R. D. himself writes again, rubbing it in. So now, boys, listen for Mr. Ray Meyers on 40 metres, K 7 X 1.

I thank J. N. S. (Belfast), J. N. (Glasgow), and J. J. N. (Newton Le Willows) for their letters; also

W. J. P. (Bidford-on-Avon) who adds, in reply to J. E. S. (Bagshot) that he has picked up C T I A A (Lisbon), the wavelengths used corresponding to the frequencies seven thousand and fourteen-thousand kilo-cycles. Write to Abilis Nunes Dos Santa, Junior; Avenida Antonio Augusto D'Aguiar 144, Lisbon, Portugal.

Anyone heard V E 9 G W?

The "Nautilus" (Stop Press).

HARDLY had the words left the nib before more "nautili" came tumbling in, all anxious to convince me. I am convinced on both sides! J. A. N. (Malton).

who is also G 2 K O, worked two-way telephony with the "Nautilus" on July 26th, half an hour after the Sub. worked G 2 T K of Hull. J. M. M. (Edinburgh) heard the Sub., and A. S. (Rochdale) and J. H. T. (Newark) both heard him working G 2 T K.

So that is that, and I hope that many of you will keep strict watch on the "Nautilus" and pick up his promised message from the North Pole, and by the way, I wonder what some of the old-time Polar explorers would think of it all! Zepps flying above the Pole, and subs. swimming under it!

Those Kill-Joys.

THAT Italy, the acknowledged home of romance, should kick out her women announcers because Italians addressed so many love-letters to them, is positively incomprehensible.

I learn in a general sort of way, that the Dictator is not insensible to charms of the fairer sex. Why, then should the radio people be so frightfully Benedictine or Trappist?

Why not use the announcing business as a means of swinging off some of the superfluous Italian girls on the wifeless fascisti. Or, to be less romantic, why don't they merely burn the love-letters and let the pore gals earn their living?

Radio and Rain.

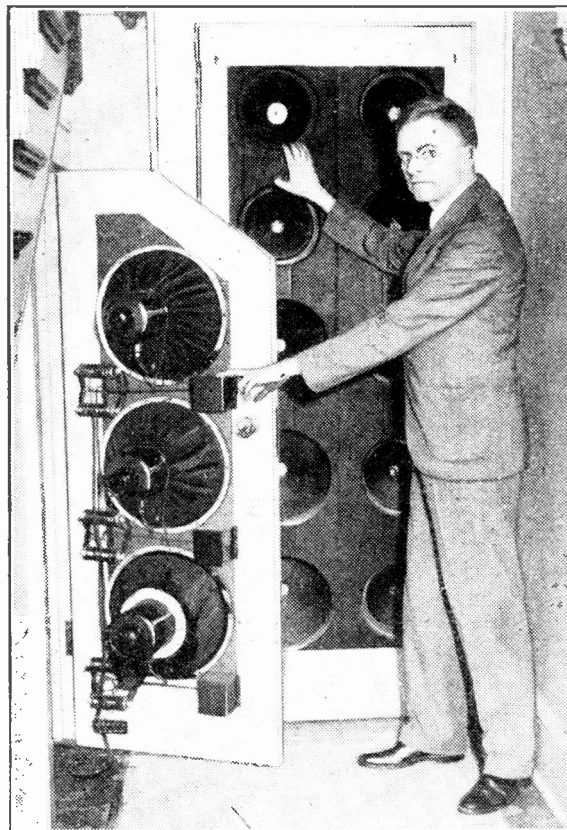
I FONDLY imagined that all the people who blame radio for causing the sort of weather they don't like had been either converted or silenced. But alas! they are still bombarding editors with their theories.

Someone who has the nerve to sign himself "Radio Engineer" has written to the "Daily Dispatch" declaring his belief that radio makes it rain. He says that he noticed that when a certain transmitting station started up the showers began, and that when it stopped so did the showers. Man controls the weather at last! Television will cause snowstorms!

Mr. J. W. Spink tells the "Daily

(Continued on next page.)

A GLUTTON FOR LOUD SPEAKERS!



He is an American inventor, Captain Ranger, and the speakers are attached to his wonder organ which "plays" all notes electrically.

NEWS—VIEWS—AND INTERVIEWS (Continued)

Herald" that this rainy sort of weather "began with broadcasting." I seem to remember a drought which occurred not very long ago!

Queen's Hall for All.

WELL, you either join the crush there or listen-in—you simply cannot ignore it. The B.B.C. says: "Wagner on Mondays and Beethoven on Fridays has become a public tradition, while the alternating Bach and Brahms on Wednesdays have so far proved their popularity in the past that Wednesdays will be similarly disposed this season." Promenade, 2s. (payment at doors only); Balcony (unreserved), 3s.; Grand Circle (numbered and reserved), 5s. and 7s. 6d.; Season Tickets (Promenade only), 35s. Go once and be a Queen's Hall "fan" for ever!



Honour to Faraday.

THE Faraday Centenary Exhibition will be held at the Royal Albert Hall from Sept. 23rd to Oct. 3rd, when amongst other things there will be shown some of the earliest radio apparatus from Marconi's private collection. In connection with this celebration there will be a "do" at the Queen's Hall on Sept. 21st, and the speeches and an orchestral concert will be broadcast, as likewise will the opening proceedings at the Albert Hall on Sept. 23rd.

"Bobbie Bluegum."

A HAPPY idea has been evolved by the Australian Broadcasting Company—the formation of "Bobby Bluegum's Name Club." The rules of the club are simply that the members shall write to their sick friends, but at the same time they must promise to "try and be the fellow your mother thinks you are, always speak the truth, and whenever cross, to sing or whistle." By (blue) gum! If radio can influence boys to live up to that it will be a world force indeed!



Symphony Concert Season.

THE B.B.C. 1931-32 season of Symphony Concerts opens at Queen's Hall on Oct 14th and between that date and May 4th, 1932, twenty-three concerts will be given. But what a peculiar allocation of conductors!

Adrian Boult collars twelve of these concerts—or perhaps I ought to say that he is "told off" to conduct twelve. Of the remaining eleven, Sir Landon Ronald and Sir Henry Wood get one apiece; the other nine are allotted to foreigners. Extraordinary distribution, I think!

However, as a low-brow, I don't much care who waves the little stick at the orchestra.

The Bayreuth Relay.

I DIDN'T listen for very long to the relay of Act 3 of "Tristan and Isolde" from Bayreuth on August 18th, because Queen's Hall was playing Cesar Franck's one and only symphony, which I would not miss for anything. But I hung on long enough to judge of the quality, and by thunder! it was rare.

Not a breath of background or of line noise. The playing might have been done at Savoy Hill, so photographic was the reproduction.

SHORT WAVES.

Caller: "Your 'usband ain't listenin'-in, Mrs. Parrish. 'E's fast asleep."
Mrs. P.: "Yes, 'e sleeps with them 'ead-phones on every night, and nothin' 'll wake 'im until they say, 'Good-night, everybody, and close down.'—'Punch.'"

RADIO POLITENESS.

The Geneva police have issued the following official notice, addressed to local wireless users:

"Wireless-users! You who love music, from whatever country it comes, enjoy it plentifully, with intoxication, but do not oblige your neighbours to hear, when they wish to rest, concerts which charm you. Do not expose the loud speakers on balconies or in gardens. After 10 p.m. have the courtesy to close your windows, and then indulge luxuriously in all sorts of music, gay or sad, classic, popular, or of the dance variety. But do not impose it on neighbours who do not desire it." (See you!)

VERSE AND WORSE.

The wind blew hard, and Sir John Cursem's hat
Right into the Thames did sail.
He said . . . (Well, the B.B.C. missed a
chance
To broadcast the knight-in-gale).
"Daily Mirror."

It has been suggested that, instead of broadcasting the roaring of lions and other such "noisy noises," a real change and rest for listeners might be provided by the broadcasting of the deathly silence of an Arctic night.

SWITCH OFF!

"Oh, yes, my dear; he's got wireless eyes!"
"Wireless eyes?"
"Yes. You see, he's got a broad cast in them."—Sheffield Weekly Telegraph."

The B.B.C.'s backbone is its engineers and announcers, sure enough. And the chaps who thought of the "Escape" talks, of course. I wonder what the Gov'nors do?

Technical Note.

A READER who describes himself as "An Enthusiastic 'P.W.'er," kindly directs my gaze to a report of the bust-up at the Yorkshire Power Company's place, at Selby, when a large transformer met some lightning and gave it best. "When struck," wrote the reporter or sub-editor, who is evidently a radio "fan," "the transmitter had 1,300 gallons of oil in it."

Very careless of some one; the amount of oil in a transmitter is, as a rule, less than that. The aforesaid transmitter is alleged

to have had a range of 33,000 volts to 11,000 volts. No mention is made of its wave-length, but one supposes that this was 20 amps! Or perhaps less than that—say five ohms!

Gramophone Note.

I HAVE not said much about my gramophone life for some time, because what with the garden, hiking, next door's baby wot can't sleep well, and the attractions of radio, there has not been a noticeable amount of gramophoning in our hut lately. However, I am able to announce that after passing through all the various phases of the enthusiast—fibres, permanents, thorns, sword-bladed, spear-edged, etc.—I have come to rest with common, low-down steel needles, one per side. As for records, the only notable occurrence has been the acquisition of the "Death of Minnehaha," out of "Hiawatha," sung and played by the Albert Hall people. Heap big medicine! (H.M.V.)



Pray don't imagine that I am trying to compete with Mr. Stone, though.

Can You Beat It?

OUR Mr. Crawfin writes, hastily, on a postcard—a picky postcard of Bungay High Street—to inform us that his bees have shown a marked improvement since the Sabbath Bach orgy ceased. Hum! Looks as though his bees are due to have a relapse.

Crawfish adds that the Queen is somewhat fretful, and what would we advise him to do. That's elementary! Introduce her to a stag-beetle who wants lessons in dancing!

Mr. Crawful adds, in a postscript, that he has no connection with the iron bedstead, sleeping only on a mahogany four-poster. That's a relief!

English Eloquence.

THERE'S a yarn going round about Broadcasting House which I think I ought to pass on, though I won't vouch for its accuracy. Here it is, anyway.

One morning, recently, a huge navy let a heavy stone fall square on his mate's toe (corn and all)! Taking a deep breath the aforesaid mate let out such a fluent flow of expletives that it fairly flabbergasted everybody within earshot.

And an admiring B.B.C. gentleman in spats, standing near, turned and said to his companion:

"Now if we could only put that over in the English Eloquence series!"

ARIEL.



HOME TRUTHS FOR LISTENERS

BY CAPT. P. P. ECKERSLEY M.I.E.E.



In this article our Radio Consultant-in-Chief deals in his own inimitable way with the results obtainable from commercial receivers. He suggests a scheme whereby the public would know exactly what to expect from factory-built sets.

THE outstanding problem in the design of receiving sets seems to be how to combine easily understood operation and competitive cost.

It is a problem that seems well-nigh insoluble. An ignorant public (no insults meant—they must be ignorant of wireless), with a desire to listen to broadcast programmes, finds that it can buy apparatus round about five pounds, and is informed it will “pick up” foreign stations galore.

Killing the “Decent” Set.

The conscientious technician tries to give his public a performance which, in his opinion, must be limited by price considerations. The “get-rich-quick” exploiter does not care what performance his sets give provided they make a noise and “pick up” these famous foreign programmes, and sell.

The really decent set, giving a limited performance, does not sell while the cheap set is bought; after a week or so it is usually left, tuned to the local station, making an offensive noise.

The development of wireless has been terribly hindered by the commercial necessity of having to tell a customer that he can “pick up” foreign stations. Some brave manufacturers have, as a matter of fact, made local stations sets, but the success of their venture is, I believe, not yet definitely assured.

Now I feel that something practical and definite might be done to assist manufacturer and buyer alike. The public ought to be told that “distance costs money.” It is necessary to tell the public the truth.

A Suggestion.

Suppose the trade associations and the B.B.C. got together to prepare a buyers’ guide. This would be widely distributed through the wireless shops, would be printed in the “Radio Times” and would receive publicity in the technical journals and the lay press.

The pamphlet would read this way:

“You have perhaps made up your mind to buy a wireless receiver or you may be giving up your old receiver to buy a new one. The signatories of this pamphlet

want to help you with some advice, not, of course, upon the make of set, but as to its type.

“We want first to dispel the widely-held illusion that distant or foreign stations can, in general, be received with the same clarity and quality as the local station. Nevertheless, there are certain foreign stations that give sufficiently clear reception as to afford real pleasure to those who listen to their reproduction.

“Local” and “Distance” Receivers.

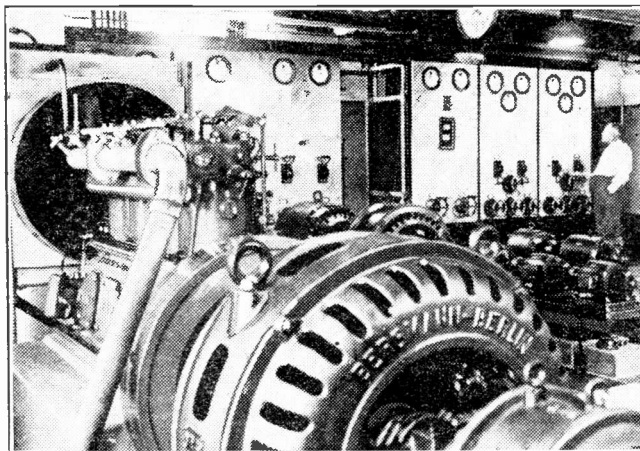
“The design of a receiving set to pick up these few worth-while stations is more complicated and therefore more costly than if the set is made to pick up the local station or stations only. While it may be true that a cheap set will receive foreign programmes, it will not and cannot receive them well.

reasonable cost, give a quality of reproduction worthy of the transmission.”

Something like that. You will see the enormous benefit to the technician, the seller and the public. The technician can really set about giving a decent performance for each category: A local set with a tuning circuit only adapted for fields of above 2 millivolts per metre; a tuning circuit which can be set by the local trader for the best local alternatives; a switch-off “Regional” “National”; a concentration upon “straight-line” detection and amplification and a really first-class performance in quality of reproduction for those who cannot bear knob twiddling.

The designer of the elaborate set will insist upon a stable super-heterodyne or a properly ganged 2 H.F., a filter to cut out heterodynes, a single-handle tuner, and two volume controls. There would, only naturally, be different degrees of elaboration in both types, competition as to cabinets quality, appearance, etc., etc., but the principle of clear division between types would enormously help the designer.

A NEW STATION FOR GERMANY.



The new Commercial Radio Station at Berlitz near Berlin, is nearing completion. It is to be used as a receiving station for the whole of Germany’s overseas communications. Above you see a photograph of the power room.

“We think, therefore, you must make up your mind whether you will choose a more elaborate set and be able to pick up some foreign stations, or buy a local set which will give you mostly only local programmes.

“Manufacturers are agreed to market their models according to category, and it would be to their interest and yours if you would demand either a local set or the distant set.

“Distant listening, to give the listener pleasure, demands internal elaboration to achieve simple operation; the ubiquitous set, therefore, must have a higher first cost than the local set. The local set can be designed purely for purpose, others, at

Asking for Trouble.

It is pathetic, I think, to see and to handle the ghastly compromise sets marketed, in nine cases out of ten to-day, on a pure price competition, performance statement basis.

I find I cannot understand the functions of the handles, reaction is fortuitous and surprising, quality varies even on the local station, according to a hair’s-breadth adjustment, the “pick-up” of distant stations is remarkable but incoherent, and this flashy little bag of tricks is finally a present to someone’s maiden aunt (with instruction book: “Take out of their card-

board boxes valves labelled XYZ/38 and ZYX/83, and place the former in the socket found on the shelf midway on the left-hand side of the set when the back (held by 8 knurled headed countersunk screws) is removed. Care should be taken”)

I expect anyone could find a hundred reasons why my suggestions should not be adopted and how damaging it would be to progress to inform the public of the truth. But you who have no interest in these matters, you, the keen constructor, anxious that others should possess the results you with your knowledge can achieve, you surely are in sympathy?

FOREIGN stations really have begun to come in now, almost every night seeing additions to the log. Well, the more the merrier, or, as a friend of mine prefers to put it—the more the many-er.

Just in case, though, the long-distance man should begin to gloat too soon, I must remind him that it is more than likely that we shall have one or more setbacks between now and the end of September. As a rule, these bad periods do not last more than two or three days, but in wireless you never can tell—that is what makes it so interesting.

Reception on Long Waves.

The long waves require little comment since, except at times when the weather is thundery and atmospherics are therefore troublesome, all of the familiar stations can be heard. One, though, that I have not heard for some time, though I expect to pick him up very soon, is Reykjavik, Iceland's big 21-kilowatt broadcaster.

It is worth while trying for him when conditions are favourable—if he is coming through you will find him just above Kalundborg's settings. Another which I have never received very well, though I used to hear him very fairly during the winter, is Lahti.

This Finnish station is rated at 54 kilowatts, and one would expect to have almost as good reception from him as one gets from the 40-kilowatt Motala. Unless you have a very selective set you should try for him at times when Huizen and Radio-Paris

STATIONS WORTH HEARING

Some practical distant-programme notes compiled by a special contributor who nightly searches the ether in order to obtain really up-to-the-minute information for "P.W." readers.

are not working, for it is only 7 kilocycles away from each of these big stations.

Down at the bottom of the medium wave-band matters continue to improve, and there are many stations really worth tuning in if only it were not for the frequent and horrible heterodynes that one finds.

These are caused mainly by the illicit wanderings of French and Swedish stations, and it is quite surprising to find how much trouble even a 250-watt can cause when he starts roaming. However, reception between about 220 and 260 metres is distinctly interesting since it enables the enthusiast to indulge in the sport of dodging the heterodyne.

Dodging Heterodyned Stations.

He will find station after station coming in with respectable strength, and he has to go on until he discovers one which is completely free from a heterodyne whistle. Konigsberg, Cork, Nurnberg, Beziers, Gleiwitz, Toulouse P.T.T., Horby, Leipzig, Moravska-Ostrava, Lille, Rennes, Bratislava and Copenhagen are low-wave stations that are worth attention.

Going up to the region of 300 metres and above, there are many interesting stations ready to be logged and worthy of the efforts

resting to see when they first make reappearance this autumn.

Of the more powerful semi-received stations I can recommend notice Heilsberg on 276.5 m., Kc 293 m., Hilversum on 298.8 m., B on 349 m., Lwow on 381 m., Berlin ben on 418 m., Madrid Union R 424 m., Prague on 487 m., and A..... 501 m.

Abbreviations for Your Log.

Prague is showing a big improvement just now, and most of the others are making much more frequent appearances in the log.

Speaking of logs, by the way, may I remind you to adopt during the coming season in your wireless diary abbreviations that I find very useful. "V.G." stands for full loud-speaker strength—that is, with the output valve fully loaded.

"G" means good loud-speaker volume, the programme being audible in any part of an average living-room. "M" signifies moderate loud-speaker strength. Below this come "F" for fair and "W" for weak. "H" stands for heterodyned. "J" for completely jammed and "S" for spark interference.

OUR record-breaking month of August has certainly not been too kind to us, even from the radio point of view, although radio conditions have not, perhaps, been so thoroughly wicked as the weather. We may hope, however, for a better period from now until the end of November, if my previous logs provide anything to go by. The "autumn" period seems to provide some good DX reception, whatever the year as a whole may be like.

There has been so little "on the air" that is worthy of note that I propose to keep more to the technical side this week.

Worth mentioning is a letter from "G. T.," of Ormskirk, who praises the S.G. detector for short-wave work in no uncertain language. He uses a circuit given in "P.W." some time back, obtaining reaction from the screen of the valve, and finds it good.

Delightful Reaction Control.

The chief advantage is the delightfully smooth reaction control (effected by the usual variable condenser, and not by variation of volts). This, coupled with the great sensitivity, make "G. T." proclaim that he would not exchange it for all the triodes in existence.

Seeing that "G. T." to quote his own words, "raises his hands in supplication" for some remarks on hand-capacity effects, I may as well mention some experiments of mine on the subject.

I recently scrapped my metal-box receiver and reverted to one with an ebonite panel

SHORT-WAVE NOTES



News and views regarding an exciting and fascinating wave-band.

By W. L. S.

and baseboard, also leaving out the S.G. stage. The combined effect of these changes, as might be imagined, was a sudden arrival of the father of all hand-capacity troubles! I could not get near the L.T. switch, let alone the dials, without chasing signals right out of audibility.

The use of the usual copper foil behind the panel made things considerably worse. *Everything* was live, even the earth terminal!

Finding, however, that the cathode pin on the detector valve, although earthed like the rest of the stuff, was relatively "dead," I extended the foil underneath the baseboard, taking care that it passed immediately under both the valve holder and the coil.

This improved things enormously, and anyone but myself would probably have been satisfied. To put the finishing touch on things, I connected everything that had to go to earth on to the nearest possible point on the foil.

This was done by taking a series of bolts through the baseboard from the foil, and soldering connections on the tops of them. The result of this piece of work was the absolute and complete absence of any troubles from "H.C."

I can now handle anything on the panel, and also the 'phones and cords, when receiving the weakest of signals down to 15 metres, and there is not the *slightest* change. On 10 metres there is a small amount of trouble, but, then, 10 metres always *was* entirely different from any other wave.

Perhaps this experience of mine will help "G. T." and others. The old, old hint of "tuning" the earth-lead by means of a series condenser might also be borne in mind.

Aeroplane Short-wavers.

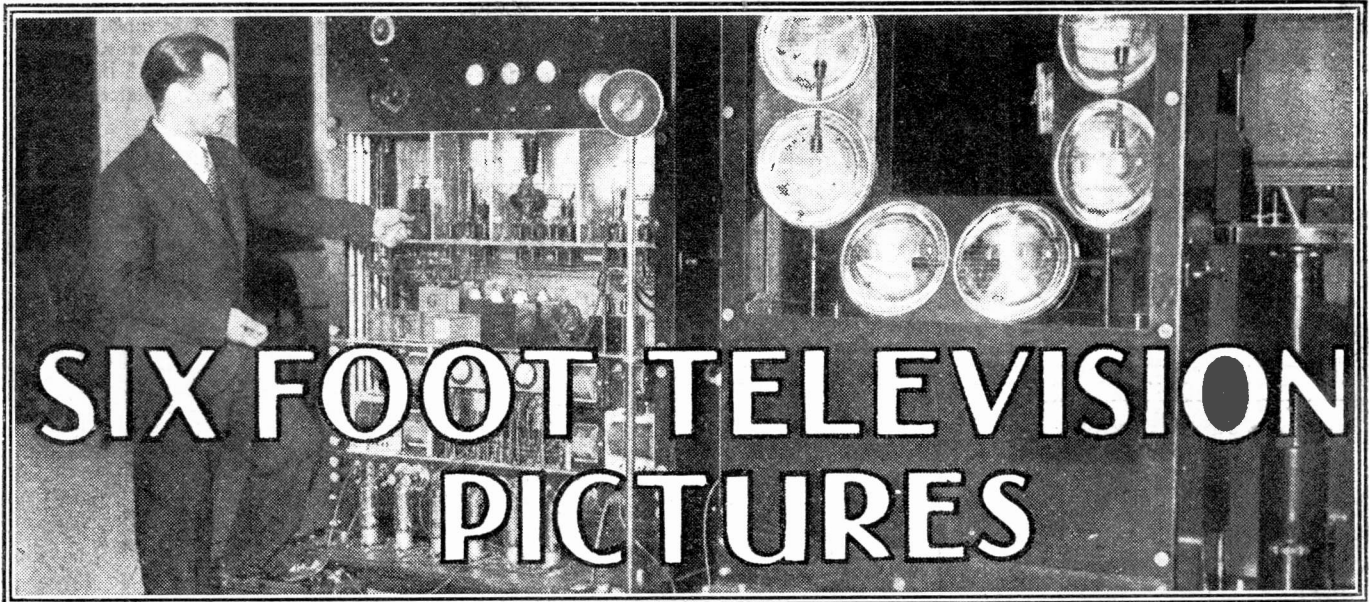
Another point brought up by readers is the identity of stations like "Buffalo," "Buttercup," and so on. I believe these are R.A.F. aerodromes carrying out short-wave telephony experiments with planes in flight.

I have heard "Ferret" and "Firefly Yellow Three" hard at it on about 80 metres on several occasions. Incidentally, if you are close to an aerodrome, it is not advisable to oscillate hard on these gentle-m.e.i. or you will probably cause them some severe interference.

Did anyone, by the way, hear any short-wave signals from the Graf Zeppelin during the recent visit? I was out with a portable, with the idea of sitting as near her transmitting aerial as possible, but search was fruitless!

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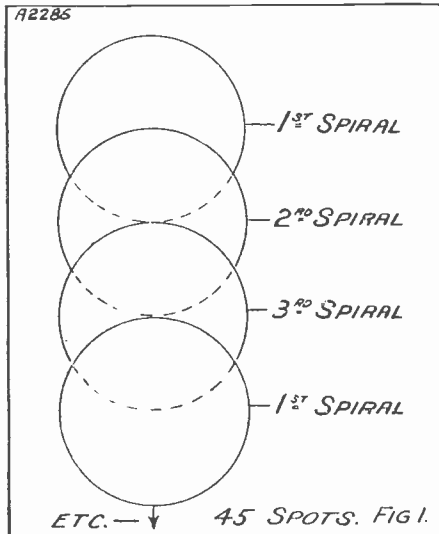
IT is now some time since students of television the world over came to the conclusion that, in order to possess real entertainment value, the present "peep-hole" type of television receiver will have to be replaced by a type of instrument which can project brilliant images on to a screen having several square feet of area.

That this fact is recognised by television workers themselves is evidenced by the fact that nearly all of them are now devoting much time and energy to image projection apparatus.

Full of Enthusiasm.

The latest worker to demonstrate along these lines is U. A. Sanabria, a 25-year-old Chicago experimenter. His name has cropped up from time to time in connection with television matters for several years past, but I was never able to gather much information, either directly or indirectly, about his apparatus and results, and I must confess that I have, in the past, been inclined to dismiss him as being of negligible importance.

DEVELOPING DETAIL



The holes of each spiral half-overlap those of the previous one. (See Fig. 2.)

 By A. DINSDALE, M.I.R.E.
 The description of a demonstration,
 and the gear used during it, in
 which surprisingly large and clear
 television pictures were produced
 on a screen.

It was with considerable interest, therefore, that I responded to a recent invitation to witness a demonstration of his 6-ft. screen apparatus at the New York offices of the Shortwave and Television Corporation, of Boston.

The chief engineer of this concern is Hollis S. Baird, who is also 25 years old and has done much creditable work on television. Baird and Sanabria have just agreed to work in collaboration with each other, though independently in their own respective laboratories.

During the first part of the demonstration, images only 2-ft. square were shown on a large semi-transparent glass screen. These images were very brilliant, the colour being the characteristic neon red. After a few minutes the screen was moved farther away from the receiver projector, which was then re-focused and started up again.

Cinema Style.

This time images 6-ft. square were shown and we all had to move back as far as the limits of the room would allow. By means of a triple lens turret on the transmitter, three views of the subject could be shown: (1) a very close-up of the face only; (2) head and neck; (3) head and bust.

The degree of detail in each case was truly remarkable, being comparable, I should say, to similar views exhibited by the average home cinema projector. The degree of screen illumination, I should judge, was about half that of a cinema theatre screen. The transmitter and receiver were separated by a distance of about 100 feet, and they were connected together by wire cables.

Judging from the phenomenal amount of detail visible in the images, I was quite prepared to be told that some equally phenomenal number of image lines was being employed. Judge my surprise, therefore, when Sanabria informed me that he was using only 45 lines.

I was equally surprised to learn that the speed of transmission was only 15 pictures per second. So long as you kept your head still, and there was no rapid movement on the part of the subject, there was scarcely any of that annoying and eye-straining flicker which I have learned to expect, even with 72-line images and a transmission speed of 20 per second.

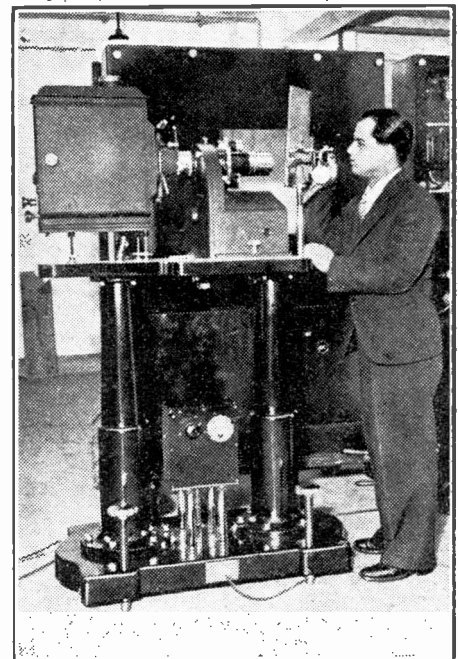
A Real Test.

As a supreme test for detail and realism, a plain, transparent glass bottle of plain water was held up before the transmitter and shaken about. The high lights on the bottle were very realistically portrayed, and the appearance of the water sloshing about within the bottle was exactly as it should be.

There were no spurious high lights or shadows in any of the images, and the edges

(Continued on next page.)

A LIGHT-SPOT PROJECTOR



The apparatus at the transmitter which "scans" the artists with a spot of light

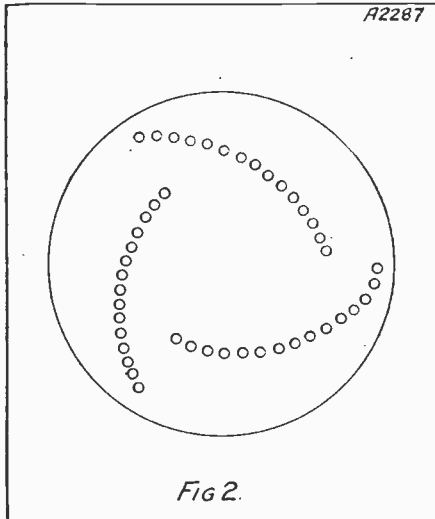
SIX-FOOT TELEVISION PICTURES

(Continued from previous page.)

were clear cut, without any evidence of the usual blurring due to aperture distortion.

As a final test, a card was held up before the transmitter on which were printed a number of thin black lines. As was subsequently proved, by stopping the transmitting disc and allowing stationary light

AVOIDING "STRIP EFFECT"



By having three spirals of holes instead of the usual one ribbon or strip effect commonly encountered in other systems is obviated.

spots to fall on the card, each line had a width only one twentieth the diameter of the light spots. And yet those lines could clearly be seen on the receiving screen.

Sanabria declared that he could enlarge the images up to 10-ft square without

undue loss, but explained his inability to do so that day because it was impossible to make the room completely dark, and also the room was not long enough to enable the assembled guests to get far enough away from the screen.

To all outward appearances, there is nothing unusual about Sanabria's transmitter, which is of the flying spot type. The light source is a 1,000-watt gas-filled incandescent lamp. The light spot, after passing through the scanning disc and objective, strikes a mirror set at an angle of 45° which bends the light spot round 90° on to the subject being televised.

Method of Scanning.

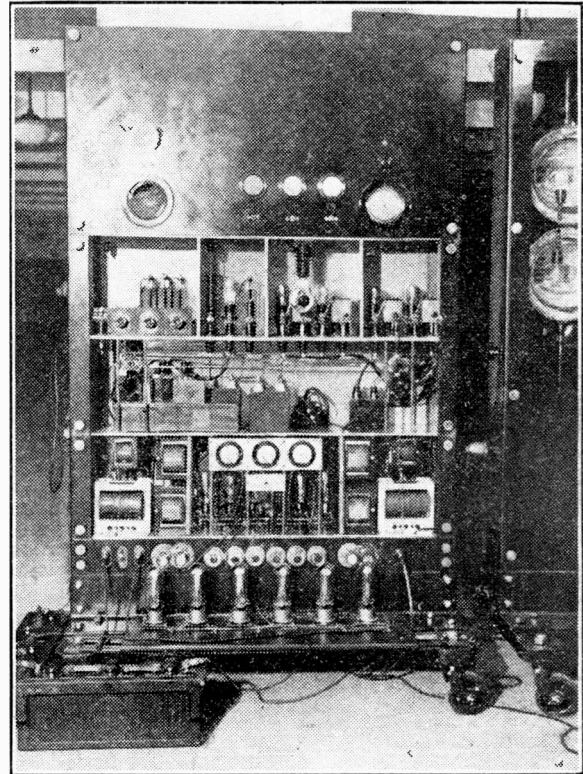
In front of the subject there are mounted the usual photo-electric cells, of which there are eight—two above, two below, and two on each side of the subject. In contra-distinction to usual American practice, these cells are quite small (no bigger than an ordinary receiving valve), and each one is set at the focus of a large spherical mirror.

The unusual feature of Sanabria's transmitter is that, instead of employing a single-spiral disc, he uses one having three spirals of 15 round holes each, each spiral being slightly offset with respect to its predecessor, so that the holes of one spiral half overlap those of the previous spiral, as shown in Fig. 1. The layout of the disc itself is shown in Fig. 2.

This type of disc, used in conjunction with a similar one at the receiving end, enables a considerable improvement in the detail of the image to be obtained along the line of

the image strips; it does not improve transverse detail. In other words, since horizontal scanning is employed, horizontal detail is improved, but vertical detail remains unimproved.

THE PHOTO-CELL AMPLIFIER



After the reflected light from the subject has fallen on the photo-electric cells the above amplifier magnifies the electrical impulses and passes them on to the transmitter.

A further advantage is that "strip effect" is almost completely eliminated. This strip effect is caused in single spiral systems by the difficulty of so drilling holes in the disc that the strips fit *exactly* edge to edge.

The disc used at the receiving end measured 44 in. in diameter, and carried forty-five 2-in. lenses arranged in three spirals. The light source at the receiving end consisted of a special neon arc which Sanabria has developed, and about which he would say little, except that it will operate on an input as low as 40 volts, and only consumes 1 amp.

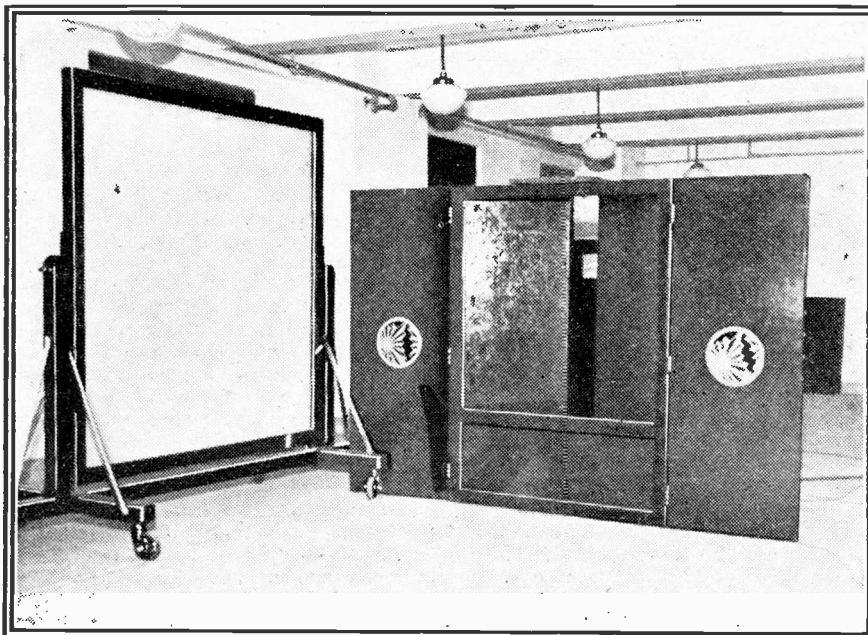
Improvement in Detail.

Pressed for further information as to the cause of the vast improvement in detail over that expected from a 45-line system, Sanabria explained that his photo-electric cell amplifier at the transmitter was largely responsible, but of its special characteristics he would only say that it is designed so as to steepen the wave front of the signal impulses. This feature, he said, aided considerably in the production of clear-cut, finely detailed images.

As to the wave-band required, this is only about 15 kc. wide. Nevertheless, much of the success is undoubtedly due to the triple spiral disc and its associated optical systems. It is well known that in order to increase detail, especially for projection work, it is necessary to increase the number of holes in a disc of the single spiral type.

(Continued on page 829.)

AS GOOD AS A HOME CINEMATOGRAPH



Our contributor saw television pictures on this screen which he declares were as good as those usually given by a home cinema outfit.

A NOVEL RESISTANCE

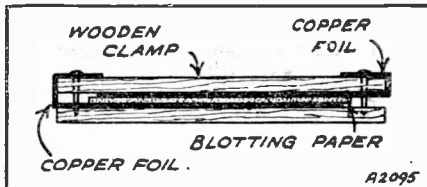
How a "P.W." reader achieved a fairly low value.

The Editor, POPULAR WIRELESS.

Dear Sir,—Being a constant reader of your fine paper, I thought that you might be interested in a rather novel low resistance I have made.

I wished to make a fairly low resistance (about 1,000 ohms). I tried a strip of blot-

LIKE A CONDENSER



The blotting paper is sandwiched between the copper foil like the dielectric of a condenser.

ting paper soaked in Indian ink but found the resistance too high, even when the strip was very short. So what I did was to sandwich a piece of the paper between two plates of copper foil just like the dielectric of a two-plate condenser.

Finding this resistance a trifle too low, I added two other pieces of paper between the two plates, thus making a resistance suitable for my purpose.

Hoping this will be of use to you.

I remain,

Sincerely yours,
C. JAMES ROE.

Finchley.

A DE LUXE SET

The experiences of a "P.W." enthusiast.

The Editor, POPULAR WIRELESS.

Dear Sir,—I enclose herewith a photograph of my "1931 De Luxe" Receiver, as this set was built from knowledge derived from POPULAR WIRELESS and "Modern Wireless." It started off with the circuit of the "Magic" Four in the original hook-up, and with certain minor alterations ended up in this.

Stations Simply Roll In!

The set employs S.G., Det., R.C. and Transformer, and except for the R.C. coupling is the "Magic" Four de luxe. Foreign stations simply roll in for the conditions prevailing here. I have often heard the National programme. Bucharest is, perhaps, the best station I receive from Europe, even to the 160 beats per minute of the metronome. Purity is exceptional. A few particulars of the balance of the circuit may perhaps interest you. Home-built eliminator (A.C.) capable of 50 m.a. at 200 volts, 4-volt Philips valves throughout. Magnavox 10½-in. M.C. loud speaker, battery type. Regentone charger with fool-proof switching from charger to set. M.A. with shorting switch in series with all valves. Concealed panel lights, Paillard induction gramophone motor, Toman pick-up, sub-baseboard wiring. The switching arrangement from radio to gram, and the amplifier circuit is original. The reproduction on the

moving coil with the original circuit on radio was perfect, but greater brilliance was found with a pentode in the last stage. Instability however, was creeping in, so I decided to have pentodes only in the gramophone amplifier circuit. With a simple 8-point switch and a lot of complicated wiring, I succeeded in accomplishing all that I wanted. When switched to radio the pentodes are off (there are 6 valves in the cabinet—2 pentodes in parallel)—and the four valves of the radio circuit are on. When switched to gram, the H.F., Det. and S. Power are off and the first L.F. and pentodes are on. Sounds a little complicated, but it was done, and the results are really gratifying.

I have been subscribing to POPULAR WIRELESS for over three and a half years.

Yours respectfully,
FRANK T. COOPER.

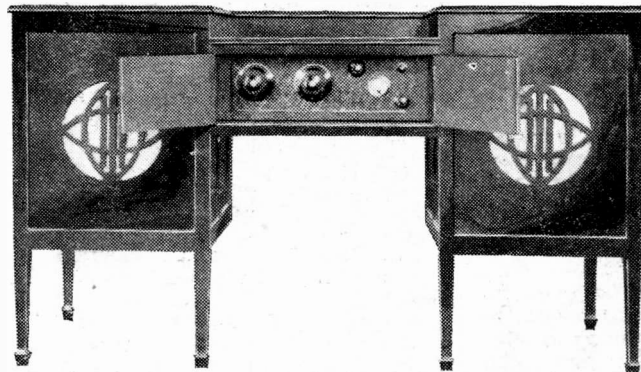
Bombay.

PRACTICAL POINTERS.

Copper Wire—Screening, etc.

A quarter of a pound of No. 24 S.W.G. D.C.C. wire has a length of fifty yards, two feet, three inches.

BUILT IN BOMBAY



This is our Bombay correspondent's fine outfit. It is a development of the "P.W." "Magic" Four.

A quarter of a pound of No. 26 D.S.C. wire has a length of 81½ yards.

Sets which employ only one high-frequency stage can often be screened effectively by one upright screen. But when two H.F. stages are employed it is usually necessary for much more elaborate screening to be used.

When fixing up a potentiometer to get smooth variations of H.T. supply remember that it must be disconnected when the set is switched off, or there will be constant drain on the H.T. battery or supply.

MR. MARCONI HAS A LOT TO ANSWER FOR

(Continued from previous page.)

a hundred per cent real live audience. Anyone would. I like the applause and appreciation. It does your heart good to know someone's liking your act. It keeps you up to high water level. An audience, too, has personality, like an artiste. Artiste and audience react on each other.

The great difference between English and American broadcasting is from the listener's point of view. There are more radio stations in New York than in England, Ireland, Scotland and Wales all heaped together. Then again, commercial firms in America "buy up the ether." They arrange the concerts, and give themselves publicity at the same time.

A Tall Order!

Well, it's queer to the English way of thinking, but it's not a bad idea. If you heard a poor radio concert, I guess you wouldn't jump at buying the wares of it. Consequently, the firms who organise American radio concerts are good entertainment value.

It's a tall order asking me which is best—English or American broadcasting. It's too much a question of personal opinion and individual choice. Actually, I don't think there's anything to choose either way, except that American listeners have a wider variety of programmes to choose from.

I have had mighty little chance to give

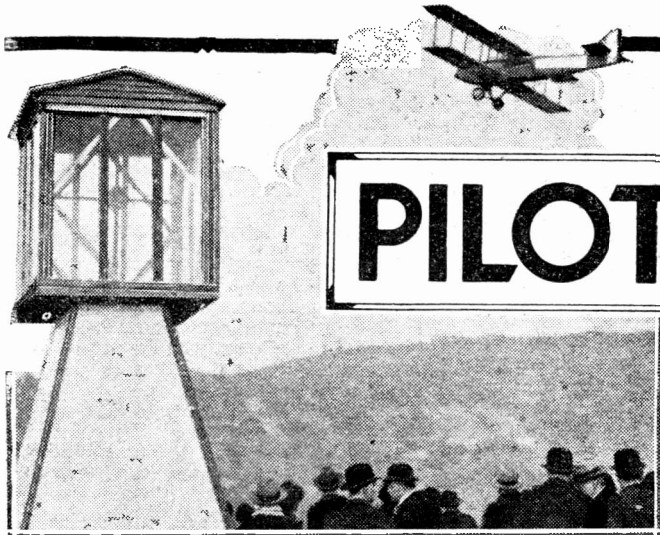
attention to the British broadcast concerts. The few I have heard have been good—some of them really fine. I can't see that British listeners have any kick against the B.B.C. There seem to be concerts to suit every taste—real highbrow stuff, and the other sort, too—what is called lowbrow.

I don't like that name. It's what gets to the heart of the world, or, at least, most people in the world, and if there's anything low in that, then my name's not Sophie Tucker.

EVERY "P.W." READER
SHOULD ALSO TAKE
MODERN WIRELESS
EVERY MONTH.
BRITAIN'S LEADING RADIO MAGAZINE

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PILOTED *by* RADIO

Taking the bearings of an aeroplane in flight from two different places, and then plotting its position on a map, is not the only way in which radio can guide air liners. A much more ingenious scheme, which gives immediate indication, is explained here
 By A. S. CLARK.

AS the heavy three-engined air-liner drones its way through the fog, passengers may look askance at the misty banks rolling past the windows and wonder whatever induced them to go by air. But what of the pilot, the man responsible for all their lives? Is he worried? No, not a bit! Let's just take a peep at him as he sits at his controls. There he is, as complacent as possible, although he can hardly see beyond the nose of his machine. But what is the secret of his unwrinkled brow?

Listening As He Flies.

Why, radio. A pair of headphones are sewn in his helmet, and he is listening—listening to a continuous note which sometimes breaks up into a letter in the Morse code coming through above a blurred background.

Immediately he hears that Morse signal, he knows he is off his correct route. What is more, he knows whether he is too far to the right or too far to the left, and you will feel the aeroplane bank slightly as it turns back to its proper course.

The effect is certainly wonderful, far more wonderful than the means by which

first and last L's are incomplete merely for purposes of the diagram.) The bottom line represents a continuous buzz, as though the key were being held down permanently.

One Continuous Buzz.

In Morse the breaks between the signals which make up a letter are equal to the length of a dot, and the time between two letters is the same length as that taken by a dash. Keeping this in mind, look at Fig. 1 again.

What do you spot? The letters are so chosen that the *dash* in one comes exactly opposite the *pause* between the letters in the other case. Also, the dots in either case come dead opposite the short pauses in the composition of the other letter.

The result is that if both letters are received at the same strength, they fit together like pieces in a jig-saw puzzle, and the effect in the telephones is one long buzz.

Now for Fig. 2. Suppose we are flying from A to B. Our machine, like the crow, will go along the straight line joining the two points.

Situated at B there would be a station radiating in two definite arcs of 90 degrees. These two arcs will join one another exactly along the line A B. By means of special directional apparatus there is no overlap, each signal keeping to its own right angle.

Keeping "Course."

Over the arc that lies on our right-hand as we go towards B the signal is the letter F, while in the arc on our left the letter L is transmitted. These two letters are transmitted so as to interlock, as explained in Fig. 1.

By means of automatic apparatus at the transmitter they are kept continually interlocked. Also, their strength is kept exactly equal the whole time.

As long as our aeroplane keeps accurately on the line A B, it will pick up both letters at the same strength, and the continuous buzz already mentioned will be heard, and all will be well. Immediately, however, the slightest digression to either side is made, reception is "unbalanced."

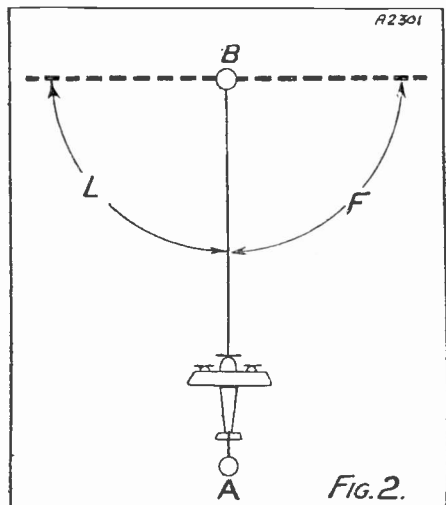
If our deviation is to the right, then the F will come in more strongly than the L, and it will be possible to pick out the letter F above the blurred background. If, on the

other hand, we wander to the left, then the L will predominate.

The farther we are from the line A B, the louder will the letter indicating deviation be heard. If our pilot hears the F coming through, he will turn to the left, and if it is an L that he hears, then round to the right we must go.

When an airman becomes really used to an ether route of this kind, he can tell quite well how far he is off his course by the strength at which the indicating signal is received. A beacon of this type is at present in operation along a part of the Croydon to Paris air-route.

HOW THE BEACON WORKS



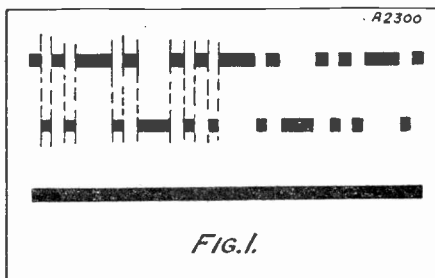
Showing the angles through which the directional station transmits in relation to the correct course.

The actual transmitter is situated at Abbeville, which town is at a point intermediate between Croydon and Le Bourget aerodromes.

Invaluable In Fog.

The service is available to pilots flying either towards or away from the transmitter, because it has a radiation over 360 degrees, the second 180 degrees being really a replica of what has been described in Fig. 2. The only difference being that the same letters are radiated in diagonally opposite quadrants.

INTERLOCKING "L's" AND "F's"



By transmitting suitable letters in the right relation to one another, it is possible in effect to obtain a continuous signal.

it is obtained. The latter is extremely simple, but, nevertheless, very interesting, as you will agree when you have read the explanation.

Two Letters Transmitted.

First of all have a look at Fig. 1. You will recognise the top line as being a series of F's in the Morse code, while the second line contains L's in the same code. (The

FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found—?

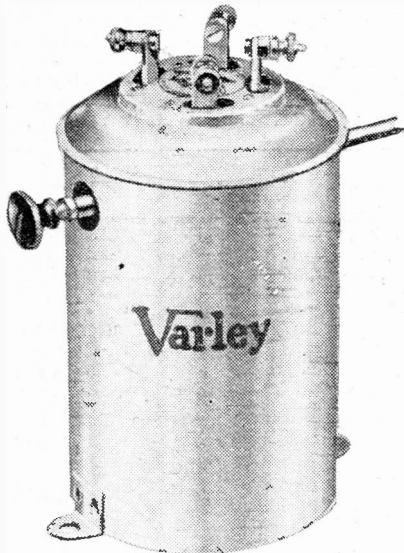


NEW VARLEY COIL.

ONE must always feel prejudiced in favour of a component that makes set construction simpler, for I am sure no one wants to do unnecessary work.

But if sacrifices are made for that end, then the conscientious constructor can but ignore the article.

However, this is not necessary in the case of the new Varley Intervalve H.F. Coil, for this is a very efficient component and pos-



The Varley H.F. Intervalve Coupling Coil.

sesses other qualities besides that of simplifying set assembly.

In reference to this last, it is a completely screened device, so that it renders the usual more or less complicated screening methods quite unnecessary.

Further, it has a wave-change switch and can cover ordinary and long waves with equal effectiveness.

It has been designed primarily to operate in conjunction with the Varley Constant Square-Peak Band-Pass Coil, and its switching can be ganged with that on the C.S.P.

We have thoroughly tested the new Varley coil and find it to be a very good coil indeed. It can be used either as a tuned anode or tuned grid coil, and costs 8s. 6d.

"P.W." readers will be interested to learn that both this new coil and the very efficient Varley Constant Square-Peak

Band-Pass Coil can now be supplied for use with Extensers, so obviating wave-change switches. But the Square Peak demands a special Extenser, and this "Cyldon" are able to supply.

"MAGNUM" VOLUME CONTROL.

Messrs. Burne-Jones & Co., Ltd., recently submitted one of their new "Magnum" volume controls. It is available in two values, half megohm and two megohms, at the price of 5s.

In construction it is particularly compact, its overall dimensions being $1\frac{1}{2}$ in. diameter by $\frac{3}{4}$ in. deep. It is completely enclosed within a black casing, and the three terminals are neatly grouped at the back.

The action is smooth and unmarred by any "dead spots" or jerkiness.

TWO BAEDEKER LOUD SPEAKERS.

There is something rather attractive about the names of the two speakers that recently arrived from Baedekers Trading Company, Birmingham. The one is called "Nico" and the other "Alfio," and they are priced at 42s. and 73s. respectively.

"Nico" is built into an oak cabinet with a polished walnut front, and is certainly a nice instrument in appearance.

The "Alfio" cabinet is of similar material but over the silk gauze of figured gold that covers the cone is a fret of black wood which is quite striking.

Both speakers give pleasing results. Personally, I would pay the extra and go for "Alfio," for it is markedly superior, although "Nico" has quite a respectable response.

A W.B. VALVE HOLDER.

In the course of some experimental work I happened across a component which had wandered from the construction department. It was a W.B. four- or five-pin Universal valve holder. And it has points which merit at least its brief description in this page.

It costs only 1s. 3d., but it is so designed that it can be mounted either vertically for a screened-grid valve or horizontally for ordinary types, and it will take either four-pin or five-pin valves. The main part of its structure is an excellent bakelite moulding. It should be noted that it is not of an anti-microphonic character.

WEARITE VOLUME CONTROL.

It is not often that a volume control is asked to pass much in the way of current; indeed, usually it is a matter more of micro-amperes than milliamperes. But the current-carrying capacity of such a component provides some measure of indication as to its technical efficiency, from which it will be gathered that the Wearite volume control—a product of Messrs. Wright & Weaire—

which is able to pass 1 milliamp (i.e. having a resistance of 500,000 ohms, it can safely be joined between two points across which there is a potential difference of 500 ohms), is an article deserving a mead of commendation.

But it is also essential that a volume control should have a smooth action and

Manufacturers and traders are invited to submit radio apparatus of any kind for review purposes. All examinations and tests are carried out in the "P.W." Technical Department, with the strictest of impartiality, under the personal supervision of the Technical Editor.

We should like to point out that we prefer to receive production samples picked from stock, and that we cannot in any circumstances guarantee their return, as it is our practice thoroughly to dissect much of the gear in the course of our investigation!

And readers should note that the subsequent reports appearing on this page are intended as guides to buyers, and are, therefore, framed up in a readily readable manner free from technicalities unnecessary for that immediate purpose.

provide an even adjustment from minimum to maximum. I find that in these respects, too, the Wearite grades as A1, so that I have no hesitation at all in recommending its use in "P.W." receivers.

A CLIX VALVE HOLDER.

The valve holder that is illustrated on this page is a Clix panel-mounting type, and is due to Messrs. Lectro-Linx.

Its special feature is that it is fitted with helically resilient sockets of a special design enabling easy but efficient contact with valve pins to be made.

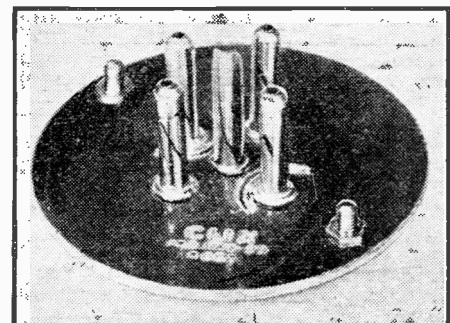
Also it should be noted that very little solid dielectric is employed, and that electrical losses have been reduced to a minimum.

The five-pin type (as illustrated) costs 6d., and the four-pin 5d.

For certain kinds of sets this Clix product is just the very thing, and for factory produced receivers it should be absorbed in large quantities, and I believe already a number of the leading set makers are including them in their designs.

"MOTOR" LOUD SPEAKERS.

I recently received from Messrs. Tekade Radio and Electric, Ltd., a copy of a catalogue dealing with their "Motor" Loud Speakers, Units and Chassis. It is a nicely produced brochure and one that is well worth sending for.



The Clix panel-mounting valve holder.

LOUDSPEAKER TONE VALUES

By G.V. Dowding, Associate I.E.E.



MANY of you will no doubt remember the friendly argument that I had with Victor King early this year. There was no umpire or referee to award points in that verbal encounter, so no verdict is on record. But I have just received the following letter from my old friend in which he returns to the attack.

"My dear G. V. D., I have read the proof of that little article 'Electrified Music' (it appeared in last week's P.W.—Ed.) with great interest, and herewith my compliments to your Mr. H. A. R. Baxter for hitting the nail so accurately and so firmly on the head. It always has been my contention that the B.B.C. wastes its time and its, or rather *our*, money when it tries to transform the happy parlours and kitchens of the land into so many miniature Queen's Halls.

Radio Robbery.

"They sadly over-rate the powers of the medium through which they operate. Those B.B.C. music pundits could just as usefully employ their time trying to wheedle the Fifth Symphony out of a children's comb and jews'-harp band as in an endeavour to reproduce the works of the Great Masters

Another friendly argument between "P.W.'s" Technical Editor and Victor King concerning a subject of vital importance to all radio enthusiasts. You will enjoy reading the two distinct points of view brought forward by these popular wireless experts and will no doubt form conclusions of your own.

And I am not sure, G. V. D., that they even merit that term. My dictionary says that an 'imitation' is 'that which is produced as a copy.'

"But radio actually *changes* the very pattern of a musical composition. Instruments are robbed of their individual characteristics, notes are suppressed, and others exaggerated, spurious tones are developed, and, in many instances, the pitch of some of the notes actually raised an octave through the excision of fundamental frequencies and the retention, and even magnification, of their harmonics.

"And this in the best of sets. Certainly we are all striving to reach the straight line output, and that ideal may one day be attained, but even then faithful copies of original musical performances will only be possible given a volume approaching that produced in the original instance, and who wants full-bodied Queen's Hall emissions in one's own home?

Lay the Halos Aside!

"No, it is time the B.B.C. realised that they are at the one end of a huge transformation process, a machine that hands out something very different from what is put into it. Seemingly, they are smugly satisfied so long as they can vibrate the ether with fairly good ethereal representations of the sounds engendered in their studios, and don't care a tuppenny piece what happens to their goods after that.

"No service after sales! If they would only lay their halos aside for a while and face up to this they could make broadcasting vastly more popular than it is.

"Here is my suggestion, G. V. D. (and I know you will heartily disapprove). The B.B.C. should sling overboard all ideas of educating the public in conventional musical matters, and should concentrate on the building up of an art of loud-speaker music.

"Instead of studying the effect of a broadcast musical performance in terms of the more or less perfect manner in which their microphones and transmitters can handle them, they should analyse and remodel them in accordance with what is heard in the average home on the average radio receiver.

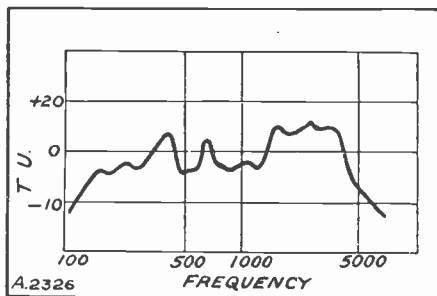
Too Many Musicians?

"It is always safe to work to averages, you know. When sets in general improve, the average will go up. It is a great thing to have a radio orchestra of one hundred and forty musicians, but I maintain that twenty musicians would be able to please listeners better if they were made to play, not for the microphone, but for the normal cone loud speaker.

"Brother Boult's bass section is pure waste, and he has scores of unnecessary strings. Jack Payne and his merry boys number less than twenty, I believe, but you can take it from me that he gets over with twenty times the effect.

"I wonder if any one listener would ever have credited the big B.B.C. orchestra with more than a score of instrumentalists if he hadn't been told that it exceeded the century at a cost of, possibly, six or seven times that of the B.B.C. Dance Orchestra?

THE AVERAGE SPEAKER

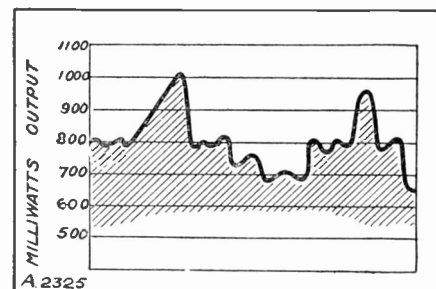


The response curve of an ordinary cone loud speaker plotted against Transmission Units (Decibels), a system which gives a closer approximation of what is heard than straightforward degrees of overall voltage-amplification.

as performed by great orchestras on the loud-speaker diaphragms of their ten (or is it twenty?) million listeners.

"They can and do manage to get over with very thin imitations of the real things and, apparently, many people find these imitations both instructive and pleasurable. But it should never be forgotten that they are at the best the merest imitations.

NOT REALLY SO BAD!



On the other hand, here is a curve showing variations in the power output of a set which, in fact, would probably pass quite unnoticed!

"And don't tell me one hundred and forty expensive music producers are essential for public performances of a calibre suited to the dignity of the corporation. The average listener (note my constant use of that word average) doesn't care a hoot

(Continued on next page.)

LOUD-SPEAKER TONE VALUES.

(Continued from previous page.)

about that: what he wants is good stuff coming from his loud speaker.

"Reverting to Jack Payne, I surmise he is one of the very few B.B.C.-ites who really comprehend the limitations of the connecting link between the B.B.C. and their audience. That is why he is one of the most popular 'turns.'

Maybe there are more listeners learning to appreciate and enjoy dance music than there are those who are going 'classical,' for that reason. I don't know—that is surmise.

Jack Payne Knows!

"But I am firmly convinced that if there were a ballot only a tiny majority would vote for the retention of the 'Symphony Orchestra' in favour of 'J. P.'

"And I wonder if there would be a great outcry if suddenly, and without previous announcement, Jack Payne and his bunch took over all the chamber and symphony

already he seems to know—that it is the melody that matters in microphone music, for it is generally only the melody that retains its original structure; the greater part of the harmonic construction goes west.

"There ought to be a school of loud-speaker music where qualified teachers would impart to their pupils instruction in harmony and counterpoint based on the frequency characteristics of the cheap cone loud speaker. Now, G. V. D., what have you have to say to that?"

Mr. Dowding's Reply.

There is a great deal that I could say, but there won't be enough space for more than a few brief remarks.

In regard to the accusation that music is completely mangled through the radio, it is my opinion that both he and Mr. Baxter sadly underestimate the qualities of the average radio outfit. But in a sense Victor King's argument is unanswerable as are all cases framed against imperfection. Only a perfect thing is able to withstand every criticism but, unfortunately, there is no perfection in this imperfect world.

However, present-day radio is by no means one of the least perfect things in existence. I think that where my worthy friend goes wrong is in confusing harmony with harmonics. A common error. Harmony

comprises combinations of notes, harmonics are the partials of these individual notes and composers do not write *tunes* with these. As a matter of fact, it is dubious whether most of the Great Masters knew there were such things!

Dubious Harmonics.

And harmonics ranging above the four or so thousand cycles of frequency where the average radio set "cuts off" are much less important than many try to make out. The higher the note the vastly fewer are its harmonics in the audio range. That is why the higher the note played on a violin the less its rich individualism. A "Strad." cannot get away with anything much more than can a cheap half-crown violin on its "E" string, but virtuosos generally use this string more to demonstrate their agility and technique than to vaunt the tone of their instruments. A harmonic that has a frequency greater than that of the highest "audio" frequency is of little moment. A high violin note will only have three or four harmonics of dubious usefulness while low notes will have hundreds well within the audio range, harmonics pitching where the fundamentals of "toneful" piano notes lie.

As for the bass, here I must admit that the average radio receiver fails rather badly, but not so badly as Victor King would apparently like us to believe. Even so, bass does not play such a vital part in music that its partial reproduction is going to ruin a composition entirely. Now

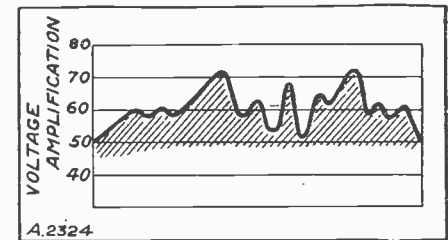
if the average set were good at both the bass and the high note ends, but failed in the middle—!

There is little need for me to pursue the subject further, for I have dealt with it at some length in a "Modern Wireless" article entitled "Do we Want the Higher Frequencies?" to which those who are interested can refer. It may or may not have been published by the time these words are in print—I am afraid I cannot say definitely.

Anyway, I believe that it will extinguish the bogey Victor King has conjured up.

It is my considered opinion that the B.B.C. is doing right in ignoring such

YOU WOULDN'T HEAR THEM



Although the voltage-amplification variations shown look very nasty, it is unlikely that even a keen ear would hear the difference between these and a completely straight-line response.

limitations as are imposed on the reproduction of their music by radio receivers. They can do nothing else. It is very easy to talk about "averages," but what on earth is the average set?

Some loud speakers may have pronounced peaks at 1,000 cycles, others at 500; how pleased listeners would be if the B.B.C. struck an average and diminished their transmissions at 750 cycles!

Whatever they did to try to pander to "averages" they would very seriously upset a great many receivers and instil vastly more false values into radio than does their splendid "straight line" output.

That Mangled Music.

It is not difficult to write glibly about the mangling loud speaker twisting all music round to its own peculiar form, but what mangling there is in many respects so different in individual cases that it will not, on the whole, conform to type.

But as the mangling is of a uniform nature in each instance, the various kinds of broadcast music retain their comparative individualism. The B.B.C. Symphony Orchestra playing Bach may sound different on Jones' set from what it does on Smith's outfit, but at least it always sounds the same on the same set and exhibits the same degrees of difference from, say Jack Payne's orchestra.

And, don't forget, my ear has a different curve from yours, but that doesn't matter a scrap so long as the things we hear retain the same bases of comparison. In radio broadcasting we look to the B.B.C. for a base in the shape of a straight line of comparative perfection.

WORLD'S BIGGEST RADIO-GRAM



Claimed to be the biggest radio-gram set in the world, this H.M.V. instrument is 22 ft. high and weighs over a ton. It was exhibited at a London store.

broadcasts? Not jazzing them, but handling them 'concert' fashion.

"I am inclined to think there would be thousands of letters written to the papers praising the B.B.C. on its vastly improved transmissions. Indeed, I would go further and say that such an event would signalise the commencement of the public's real education into the pleasurable absorption of this kind of music.

"And Jack Payne would demonstrate what

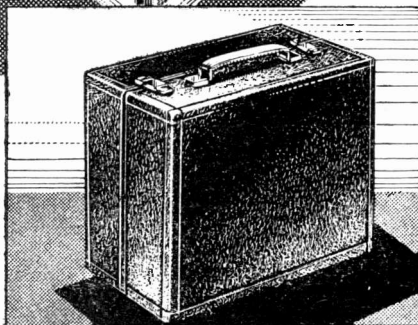
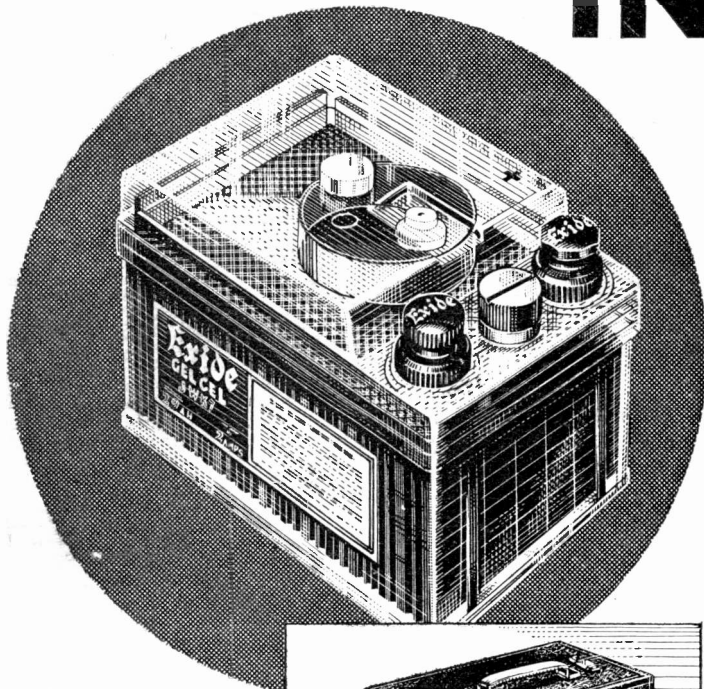
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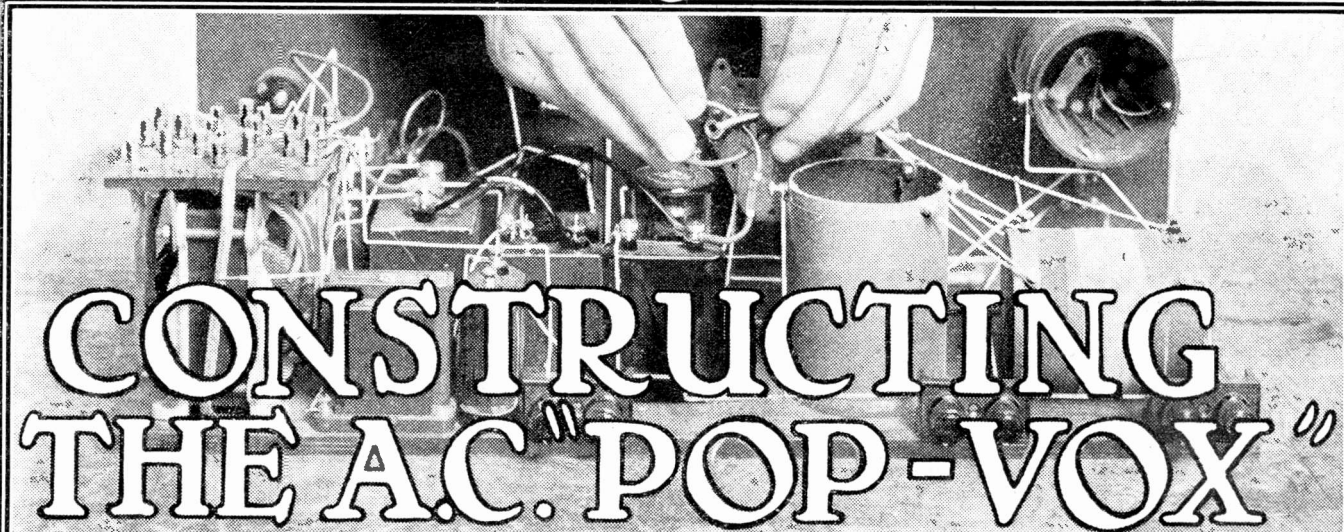
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CONSTRUCTING THE A.C. "POP-VOX"

IN last week's "P.W." we told you quite a lot about the design of the A.C. "Pop-Vox," and we briefly touched upon most of its important features.

This week we must confine ourselves more strictly to considerations of actual construction.

Even so, it is impossible not to "enthus" about the set, for the striking simplification due to extensified tuning and other "P.W." features is reflected in the practical form in which the receiver emerges.

You will realise that by using A.C.

Last week we did not have space to go fully into the actual construction of this excellent receiver. In this article, however, we deal with the matter in detail, and mention all the little points with which you are likely to be concerned.

As regards the components to be used, we are repeating the list given last week, which shows the actual makers of parts used (those first mentioned) and, following, suitable alternative makes that may be employed.

Watch the Spacing.

When all the parts have been collected, and have been given the usual "once-over" to guard against loose terminals, etc., they should be placed on the baseboard in position. See that everything fits snugly, and that the spacing is as shown in our wiring diagram.

Stand the panel up in place, and make sure that its components are not going to foul those on the baseboard, when in position.

If all seems O.K., commence the panel drilling by making the three holes along the bottom to take the fixing screws. If these are drilled through when the baseboard and panel are positioned in the cabinet you will ensure a good close fit and no gaps or overlaps.

Complete the panel drilling by means of the dimensions given on the panel layout diagram. You can then mount the various components on the panel, but do not fix it to the baseboard at this stage.

Now carry on with the layout of the baseboard parts, fast-

ening the "Contradyne" Coil by means of a short strip of wood wedged into the former and screwed to the baseboard.

Alternatively, the former may be secured by a strip across its top, or by any other handy method which holds it firmly in place.

Aim at Short Wiring.

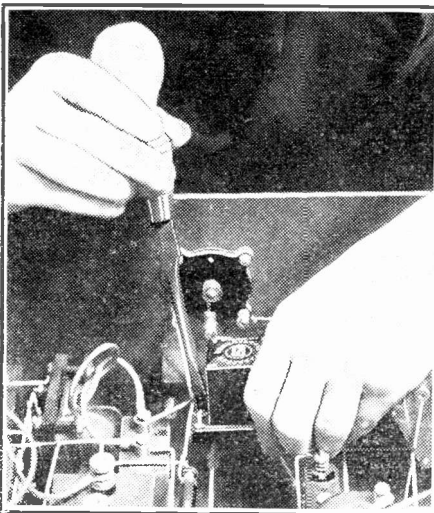
Note that each valve holder is placed with the grid (G) terminal arranged for short wiring to its appropriate connecting-point. And that coil units, transformers, etc., have a right-way-round, and must not be mounted with terminals facing otherwise than as shown if our own results are to be duplicated with your set.

When all parts are screwed in position you can wire up the baseboard components, starting with the heater-windings that employ metal-covered flex. Remember when wiring to use the pliers with moderation, as well as with firmness and enthusiasm when tightening up the nuts!

There is no compulsion to solder, but, of course, as this is a mains set that process

(Continued on page 814.)

PLACING THE "PARAFEED"

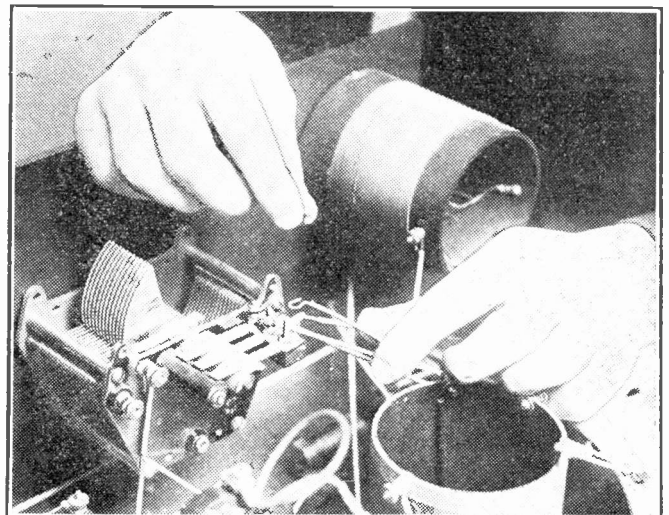


The special "Parafeed" transformer hardly takes up any space at all, and it has very useful slots on the terminal beads, enabling a screwdriver to be used for tightening up.

valves a gain of at least one stage is achieved, as compared with a battery-run set. In other words, you will get quite four-valve results from a Det. and 2 L.F. circuit. And you will be struck by the straightforwardness of the layout as shown by the wiring diagram.

Remember that this diagram (it appeared last week) is drawn to scale, and a little "rule" can be made from the "inches" marked at the top of it. You can measure with that "rule" every dimension, and so get your own layout exactly right.

THE "EXTENSER" CONNECTIONS



The Extenser is a great improvement over older methods of tuning through two wave-bands. The wave-change switch is now a thing of the past; two of the connections which went to this component now go to the self-changer contacts. The third one is eliminated completely.

THE MIRROR OF THE B.B.C.

MR. ASHBRIDGE
HUSTLES.

THOSE TALKS—TELEVISION
—SCHNEIDER BROADCAST
ARRANGEMENTS—STREET
ARTISTE DISCOVERIES

A FORTNIGHT or so ago papers in the North of England described the "flying visit" of the Chief Engineer of the B.B.C., who went to Newcastle and the North-East to decide what should be done about the experiment of trying to synchronise the wave-lengths of North Regional and Newcastle.

Immediately on arrival at Newcastle, Mr. Ashbridge set out with his testing van column, which he kept in movement until nearly dawn traversing both ways the service areas of the transmitters involved.

He was back in London just after lunch the next day. A few days later he set out for Scotland overnight, did a thorough inspection of the new station at Falkirk and was back in London by the day train, arriving within twenty-four hours of his departure.

For all the quietness of his demeanour, there is probably no greater hustler in the country than the Chief Engineer of the B.B.C. Incidentally, I gather he was very well pleased with what he saw in Scotland.

Those Talks.

I congratulate the B.B.C. on their Autumn and Winter Talks, as recently published. There is certainly much more general interest and entertainment value. But I cannot understand the unrestrained joy of some daily newspapers at the alleged discovery that the announcement of the new series means a radical change in B.B.C. policy.

True, there is to be more flexibility and scope on the Regional waves, but it should be realised that this is being purchased at the heavy price of much more rigidity and limitation on the National waves, particularly on 5 X X, which provides a multitude of listeners with the only programme they can get. In the result, listeners to London, Midland and North Regional will gain substantially; whereas listeners to 5 X X will lose a good deal of the lighter fare to which they had become accustomed under the old regime.

I agree that a move forward has been made; I would be much happier, however, if the principle of flexibility and scope had been applied to both main sets of programmes. Until this is done, sound and consistent contrast cannot be achieved.

Television.

The summer season topic seems to be television. First of all, we were deluged by claims about Cathode Rays from America, probably a part of their television publicity campaign.

Then there is a prompt rejoinder from Baird Television, who contend that the experiment with the portable transmitter in B.B.C. studio No. 10 marks "an entirely new era."

These claims will be received as were those of the Americans, with reserve. Considerable

progress has undoubtedly been made, enough to make it possible for the B.B.C. occasionally to vary the nature of the experimental transmissions.

In these hard times, the success of anything British will be welcome to all of us. Personally, I wish the Baird Company every success, but I still think it will be a long time before we have a regular television service.

Savoy Hill is very cross indeed, but probably will continue with the experiments in various forms. It is a fact that successive Postmasters-General show keen interest in television, and even Downing Street sends distinguished visitors to demonstrations in Long Acre.

Schneider Broadcast Arrangements.

The running commentary on the race for the Schneider Trophy will in many respects

"HULLO, GRANFER!"



This is "Miss Exide" greeting an old pal at the radio round-up, held recently at Clifton Junction.

be the most important outside broadcast of the whole year, and listeners may rest assured that every effort will be made by Mr. Gerald Cock and his staff of organisers and engineers to bring into every home not only a description of the race but something of the atmosphere which makes it the world's most thrilling contest.

Technically, the broadcast should be perfect, as extensive line tests will be carried out for many days prior to the race, while the helpful co-operation which the B.B.C. always gets from the Post Office telephone service, over whose lines all outside broadcasts are done, will be such that possible breakdowns are reduced to negligibility.

The B.B.C.'s observation post from which the running commentary will be carried out is to be on Ryde Pier, and the commentator will be Squadron-Leader Helmore, who has described some of the Air Force Display events at Hendon Aerodrome during the last few years.

I do not know at the moment who will assist Mr. Helmore on Saturday, September 12th, but it will not be Flight-Lieutenant Ragg, who did so when we won the Trophy in 1929, because Mr. Ragg is at present on service in Mesopotamia.

Street Artiste Discoveries.

The auditions for street artistes, from which, as I mentioned some weeks ago, the Vaudeville department at Savoy Hill was hoping to find sufficient talent to put on another "Kerbstone Performers" Programme, will bring some newcomers to the microphone on Tuesday, September 8th.

Among them are Jack Wilson and E. Johnson (songs with banjo accompaniment), James Elliott (dulcimer solos), Molly Molloy (soprano, with her husband at the piano), Stephen Francis Dance and Partner (the latter a 14-year-old girl accordion-player), and S. Vicarage, one of those lightning "spoon players" who works to the accompaniment of a barrel-organ.

The last entertainment by street artistes was so successful that the B.B.C. has gone to a lot of trouble to arrange the forthcoming one.

FOR THE LISTENER

By "PHILEMON."

Our popular contributor is now abroad, and this week he has more interesting things to say about radio in Italy.

REALLY you must have been having some pretty bad weather in England lately, for it has been almost impossible for me to get into touch by radio with you with any clearness or comfort. The atmospheric barrage has been practically impenetrable.

I have been able to get the Promenade Concerts all right on the shorter wave-length; but one gets such pots of good music out here on the Continent that, when one seeks London through the air, it is for a change; for a play, for a talk, for vaudeville. And in this respect the history of last week has been a tale of disappointment.

I see that we are to have discussions again this autumn. Mr. Holt Marvell and Mr. S. P. B. Mais are to present us with a series of discussions on "Living Dangerously."

In the matter of discussions there is a

good deal of leeway to make up. In the past, some of them have been rather wearisome.

They have been formal and futile. I have switched out of discussions more often, I think, than out of any other kind of item.

Many of the previous discussions have failed because of the impression that they were prearranged and, so to speak, "put-up jobs." One has even heard the disputers turning over the pages of their manuscript!

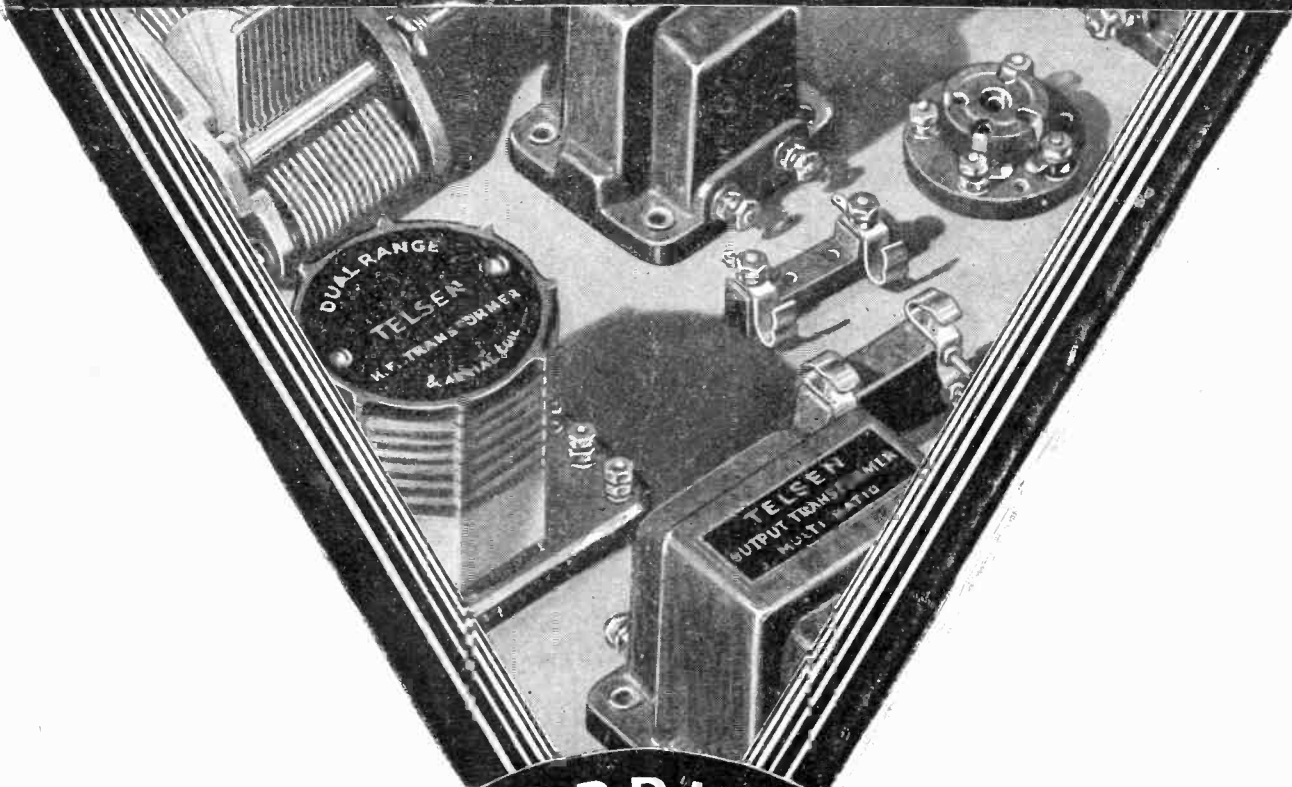
Too Cut-and-Dried.

It is all written down. No doubt it has all been censored and passed for broadcasting. The very jokes have been rehearsed. And the whole thing has been lacking in sharp-edgedness, like the acting of a poor company of amateur actors who speak their parts not as if the words were being

(Continued on page 828.)



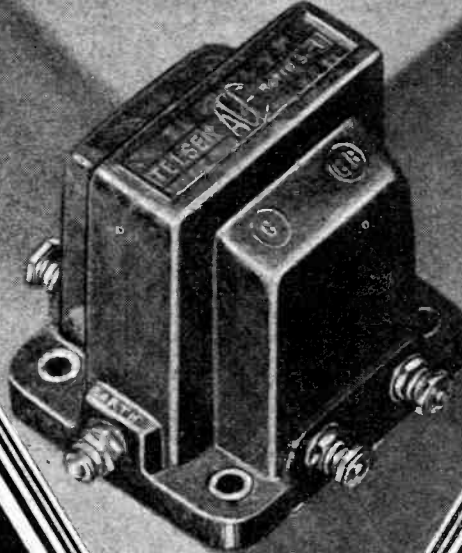
Telsen for better reception



ALL BRITISH
TELSSEN
RADIO COMPONENTS



Telsen's first claim to fame



TELSEN

L.F. TRANSFORMERS

Telsen transformers have achieved fame in the radio world on account of the high standard of their quality and performance. Designed and built on the soundest of engineering principles, these robust, full-size transformers give not only efficient but enduring service.

Telsen "Ace" Transformer, Ratios 3-1, 5-1. Price	5/6
Telsen "Radiogrand" Transformer, Ratios 3-1, 5-1. Price	8/6
Telsen "Radiogrand" 7-1 Super-Ratio Transformer. Price	12/6
Telsen Intervalve Transformer, Ratio 1.75-1. Price	12/6
Telsen Multi-Ratio Output Transformer, Ratios 9-1, 15-1, 22.5-1. Price	12/6
Telsen Output Transformer, Ratio 1-1. Price	12/6
Telsen Pentode Output Transformer. Price	12/6

TELSEN L.F. CHOKES

Telsen L.F. Intervalve Coupling Choke, 40, 100 & 125 henrys. Price	5/-
Telsen Output Choke (Plain), 20 henrys. Price	8/-
Telsen Output Choke (Tapped) 20 henrys. Price	8/6
Telsen Heavy Duty Power Grid L.F. Choke, 40 henrys. Price	8/-

TELSEN

THE LARGEST RADIO COMPONENT
MANUFACTURERS IN THE WORLD

One of Telsen's latest achievements



TELSEN MANSBRIDGE TYPE CONDENSERS

Telsen have installed the most advanced plant in the world for the manufacture of Mansbridge Type Condensers. Only genuine Mansbridge foil paper and the finest linen tissue are employed in the exclusive method of manufacture. Every Telsen Mansbridge Type Condenser is hermetically sealed from the atmosphere and Post Office standards of insulation are adopted throughout.

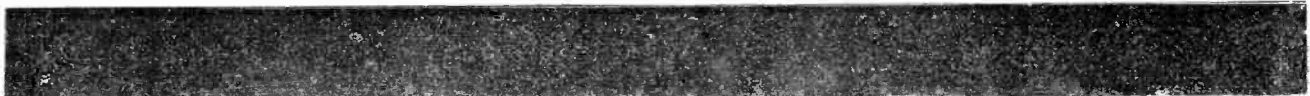
The preliminary research, the most modern plant in the world, the finest raw materials, the latest

methods of manufacture and the final test, all combine to give Telsen Mansbridge Type Condensers a high insulation through years of service with freedom from breakdown. The type of construction employed makes them genuinely non-inductive. The following values are guaranteed within 5 per cent. :

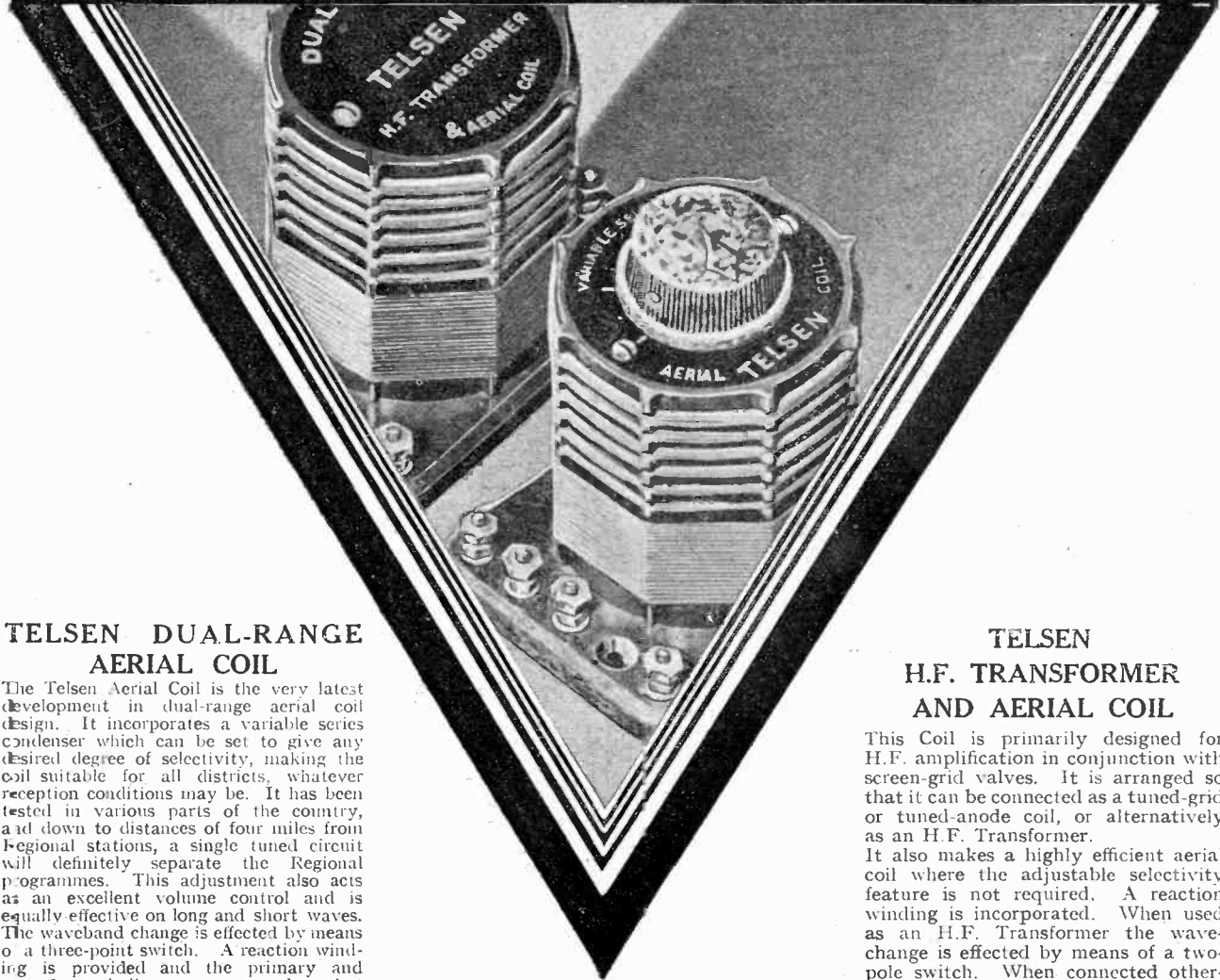
Cap. mfd.	500-volt. test.	Price	1,000 volt. test.	Price
.01	1/6	2/6
.04	1/9	2/9
.1	1/9	2/9
.25	2/-	3/-
.5	2/3	3/3
1.0	2/3	3/6
2.0	3/-	5/-

TELSEN

ALL BRITISH RADIO COMPONENTS



Another Telsen achievement



TELSEN DUAL-RANGE AERIAL COIL

The Telsen Aerial Coil is the very latest development in dual-range aerial coil design. It incorporates a variable series condenser which can be set to give any desired degree of selectivity, making the coil suitable for all districts, whatever reception conditions may be. It has been tested in various parts of the country, and down to distances of four miles from Regional stations, a single tuned circuit will definitely separate the Regional programmes. This adjustment also acts as an excellent volume control and is equally effective on long and short waves. The waveband change is effected by means of a three-point switch. A reaction winding is provided and the primary and secondary windings are separated so that the aerial circuit can be isolated in mains driven or screen grid receivers.

Telsen Aerial Coil with Variable Series Condenser incorporated .. Price 7/6

TELSEN H.F. TRANSFORMER AND AERIAL COIL

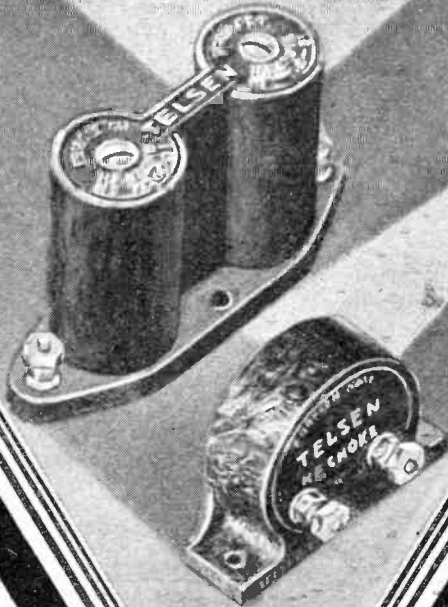
This Coil is primarily designed for H.F. amplification in conjunction with screen-grid valves. It is arranged so that it can be connected as a tuned-grid or tuned-anode coil, or alternatively as an H.F. Transformer. It also makes a highly efficient aerial coil where the adjustable selectivity feature is not required. A reaction winding is incorporated. When used as an H.F. Transformer the wave-change is effected by means of a two-pole switch. When connected otherwise a three-point switch should be used.

Telsen H.F. Transformer and Aerial Coil. Price 5/6

TELSEN

THE LARGEST RADIO COMPONENT MANUFACTURERS IN THE WORLD

They build better on Telsen



TELSEN BINOCULAR H.F. CHOKE

An inductance of 180,000 microhenrys—a self-capacity of .000002 microfarad—figures which prove that the Telsen Binocular H.F. Choke fulfils its purpose to the utmost and meets the demand of modern set designers and builders. Owing to the binocular formation the external field, and therefore unwanted reaction effects, are reduced to an absolute minimum. It covers the whole broadcast band and it is free from parasitic resonances.

Telsen Binocular H.F. Choke,
Price 5/-

TELSEN STANDARD H.F. CHOKE

The Telsen Standard H.F. Choke utilises the minimum of baseboard space. It is designed to cover the whole broadcast band and has an extremely low self capacity. The inductance is 150,000 microhenrys and the resistance 400 ohms.

It has proved very popular, and has been incorporated by set designers in many of the leading circuits.

Telsen Standard H.F. Choke,
Price 2/-

TELSEN

**ALL BRITISH
RADIO COMPONENTS**

IN writing an article dealing with the success of the "P.W." "Super-Quad"—the set that has set the British Isles talking—it is difficult not to reiterate some of the views that have already been expressed by previous writers on the subject.

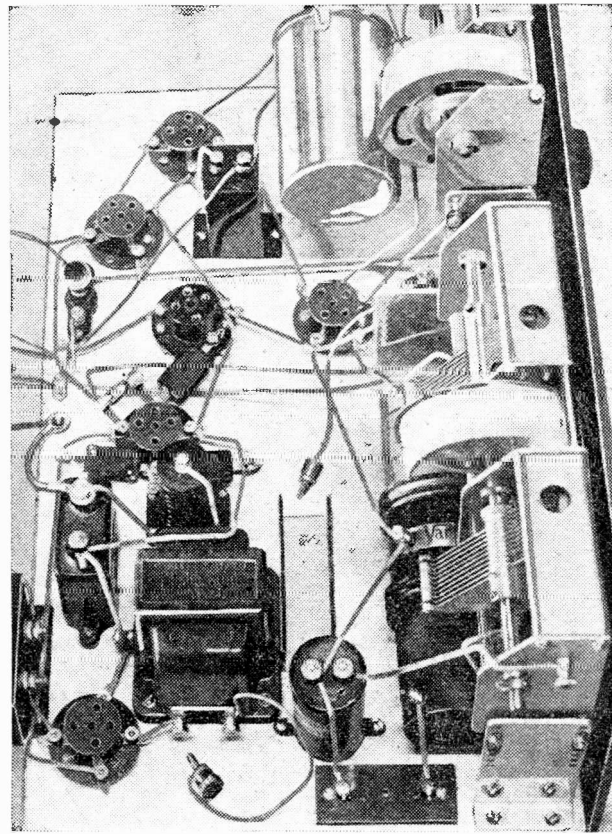
Besides a lot of congratulatory letters—even though it is unusually early for these to come in—we have received much correspondence from readers who either wish to make certain component changes, having "some of the things on hand," or who query whether the set can be used with (1) any mains unit, (2) four and six-volt valves.

The H.T. Supply.

These are all perfectly legitimate and sensible questions, and so I propose here to deal with them, and at the same time I hope to make this article interesting to non-querist readers.

Let us deal with the mains unit question first, for the H.T. supply is a vital factor in the achievement of real success. Part success, if such a term can be used, can be reached with most sets, even when the H.T. supply is poor and the set is starved of power, but such "part success" is not easily obtained with a super.

A badly operated "Super-Quad" is a most disappointing affair, for, though the receiver is not a greedy one—it takes remarkably few milliamps and requires only



PACKED WITH POINTS.

The "P.W." "Super-Quad's" phenomenal success is mainly due to various novel features incorporated in the design.

120 volts H.T.—it must be supplied with adequate power to enable satisfactory results to be obtained.

Electrically a super-het is a complicated affair, and if the oscillator and mixer valve (the bi-grid valve) is starved of H.T., and if the intermediate H.F. valve is similarly rationed, the electrical characteristics are upset and the results are very seriously impaired.

Thus a 120-volt (or even better, 150-volt) battery is desirable if anything like justice is to be done to the "Super-Quad." Below this figure the S.G. valve and the output valve will hardly be at their best.

Using a Mains Unit.

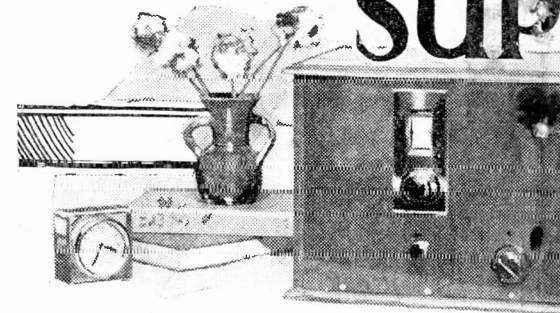
Now, when it comes to using a mains unit the answer to (1) is, not with *any* mains unit. As pointed out by Mr. Briggs last week, a unit giving 20–25 m/a is preferable in order to have a reasonable safety margin. Also, you need have a unit with only two tapplings, one of which should give about 80 volts for H.T. + 2. the screen grid of the S.G. valve. The remaining terminals on the set being joined together and connected to the max. tapping on the mains unit. Furthermore, the unit should be of good make to ensure that the output is properly smoothed and de-coupled.

So we would say: "Go ahead and use a mains unit by all means, but be sure it is a good one, and has an adequate margin of power. 25 milliamps at 120 or more volts would be O.K.

Now for point number two. The question of valves is an important one, for you can easily make or mar a set by the choice of these very important accessories.

Six-volt valves are not at the moment

THE SUCCESS T "SUP



Some further notes on a few specially interesting as

By K. D. I

suitable, because as far as I know there are no 6-volt double-grid valves available. There is a 4-volt bi-grid, I believe—of foreign manufacture—but at the moment I have not had an opportunity of trying it on the "Super-Quad," so should not like to say yes or no regarding its suitability.

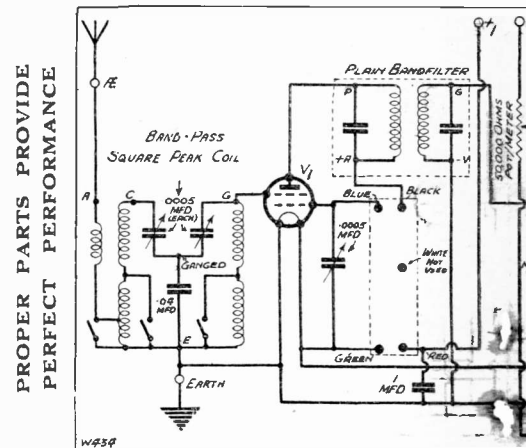
This therefore restricts us to two-volters. And very fine valves they are, too! Here's my selection for the "Super-Quad": Cossor double grid, Osram S.22 or Mazda S.G. valve for the intermediate stage, Osram H.2, Six-Sixty 210 H.L., or Cossor and Mazda H.L.210 valves for detector (Eta, Fotos, Lissen, Tungram and Dario, also make suitable valves) and a good power valve from either

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THESE ARE THE FEW PARTS—

- 1 Panel, 16 x 8 in. (Paxolin, or Peto-Scott, Parex, Permcot).
- 1 Cabinet, baseboard 10 in. deep (Cameo, or Pickett, Osborn, Peto-Scott, Ready Radio).
- 1 .0005-mfd. two-gang condenser with vernier drum drive (J.B., or Polar, Lotus, Cyldon, Formo).
- 1 .0005-mfd. condenser with vernier drum drive (J.B., etc.).
- 1 Square-Peak aerial coil (Varley).
- 1 Oscillator unit type 0.2 (Wearite, or Lewcos OSC.126).
- 1 Band filter unit with pig-tail (Wearite, or Lewcos).
- 1 Band filter unit (Wearite, or Lewcos).
- 1 3-contact push-pull switch (Ready Radio, or Bulgin, Peto-Scott, Wearite, Telsen, Goltone).
- 1 25,000-ohm Spag. res. (Lewcos, or Bulgin, Ready Radio, Telsen).
- 1 50,000-ohm potentiometer (Colvern, or Sovereign, Igranie).
- 5 4-pin valve holders (Clix and Wearite, or Telsen, Lotus, Bulgin, Formo, Igranie).
- 1 5-pin valve holder (Clix, or Telsen, Wearite, Bulgin).
- 2 1-mfd. fixed condensers (Formo and Dubilier, or T.C.C., Igranie, Hydra, Helsby, Peto-Scott).

THE FIRST SUPER-HET I



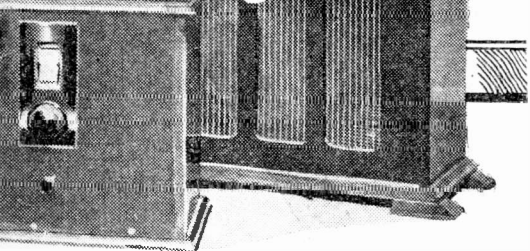
PROPER PARTS PROVIDE PERFECT PERFORMANCE

RECOMMENDED

- LOUD SPEAKERS.**—Blue Spot, B.T.-H., Amplion, Celestion, Undy.
- VALVES.**—1 Double grid (Cossor or Osram); 1 S.G. (Mazda or Cossor, Osram, Six-Sixty); 1 H.L. type for 2nd Detector (Six-Sixty, Mazda, Fotos, Osram, Lissen, Cossor); 1 L.F. valve of

power type # (M Osram P.2). If used, characteristic as near those tioned as possible. **BATTERIES.**—G. valve. H.T. 210 capacity (Dryde Ready, Lissen,

ESS OF THE "P.W." ER-QUAD



pects of the now-famous "P.W." "Super-Quad."
ROGERS.

of these mentioned makes for the output. The P.2 is well worth trying here.

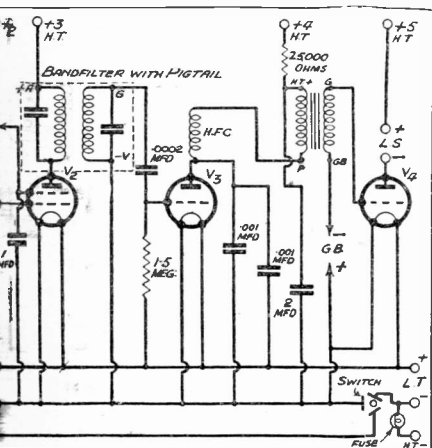
Too many people fail to realise the tremendous differences that can be obtained merely by changing one valve in a set, and the consequence is that far too many people try out a set with practically any old valves and then appraise or condemn it on such a trial.

Keep Up to Date.

It is expensive to get new valves with each new set that one builds, but a little thought will show that a periodic modernising of one's stock would be advantageous. Money is tight these days, but if you can replace your two-year-old detector with something more modern, or

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FOUR EVER FEATURED



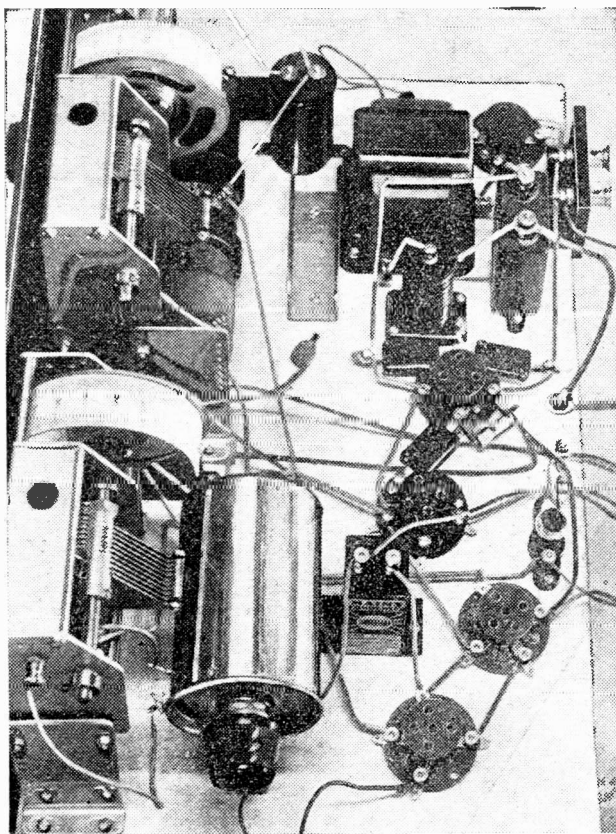
SUCCESS MADE CERTAIN
BY SYSTEMATIC SELECTION

ACCESSORIES

Mazda P.220A or other valves are suitable should be of valves mentioned. B. to suit last 10-150 volts super ex, Pertrix, Ever G.E.C.).

ACCUMULATOR. — Voltage to suit valves (Exide, Ediswan, Lissen, Pertrix, G.E.C.).

MAINS UNIT. — State voltage and type of mains, and give details of set when ordering (Heayberd, Regentone, Lotus, Atlas, R.I., Ekco, Tannoy).



EFFICIENT OSCILLATION.

The oscillator and condenser are clearly shown in the foreground.

if you can add a P.2 or S.22 to your stock, you will be surprised at the increased results you obtain on the majority of sets.

The "P.W." "Super-Quad" is one of these sets. Every valve pulls its weight, and that is the secret of the set's phenomenal success. The components, the Bandpass filter, intermediates, oscillator, and transformer, were all chosen for a purpose—to make one whole that would astonish everybody who heard it.

That is why we publish in our lists of components—the "Super-Quad" list is reproduced herewith so that you can refresh your memory—the names of the actual makes used, separately from alternatives that can be employed if desired. And yet, with all that, we find readers on occasion using something quite different, some component that not only did not figure in our list, but is quite unsuitable.

A Magnificent Set.

The "Super-Quad," when properly built with the correct parts, is an astounding success. Your "Super-Quad" can be just such a success as the original model IF you keep to the parts specified.

Take, for instance, the Telsen 1:7 transformer. You may be tempted to ask would a 1:3 do? Probably you have one "in stock" and would like to use it.

It would work, there is no gainsaying that, but the original 1:7 was chosen for a definite purpose, a purpose the 1:3 would hardly fulfil in its entirety; and though you would get good results with a 1:3, you would just miss the peak of perfection the designers of the set aimed at.

There is one point in the "Super-Quad's"

construction that may cause a little doubt. That is the wiring of terminals A and C on the band-pass filter. On the wiring diagram A is shown as being the terminal further away from the panel and C the nearer. We learn, however, that Messrs. Varley are now placing the band-pass unit on the market with the position of these terminals reversed, so that A is nearer the panel and C further away.

Watch This Point.

This makes no difference to the connections, only to their position. A still goes to the aerial terminal and C to the variable condenser. So if you get one of the new coils, carry out the connections of these two terminals according to the lettering of the wiring diagram and not the actual positioning shown.

If you do connect it wrongly, taking the aerial to C and condenser to A, the set will work, and work well, but you will be wasting the band-pass coil, for it will not be band-passing at all.

There is another question that I have heard asked quite a few times lately concerning the "Super-

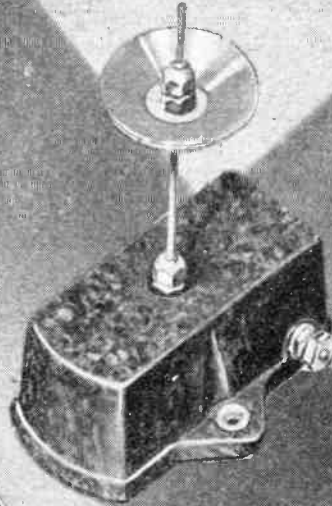
Quad." It concerns the interchangeability of the bi-grid valve with that of an S.G. type. Admittedly the theoretical depiction of the bi-grid valve looks like the S.G. symbol—except for one fact. The grids are

(Continued on page 832.)

—NEEDED FOR THE "SUPER-QUAD"

- 1 2-mfd. fixed condenser (Dubilier, or Formo, T.C.C., Igranic, Hydra, Helsby, Peto-Scott).
- 1 .04-mfd. non-inductive fixed condenser (Dubilier).
- 1 1.5-meg. grid leak and clips (Loewe, or combined grid-leak and holder, Dubilier, Telsen, Ferranti, Ediswan, Ready Radio, Igranic, Graham-Farish, Watmel, Varley).
- 1 .0002-mfd. grid condenser (T.C.C., or Ready Radio, Telsen, Goltone, Ferranti, Ediswan, Igranic, Formo, Watmel).
- 2 .001-mfd. fixed condensers (T.C.C., etc.)
- 1 H.F. choke (Lewcos, or Ready Radio, Peto-Scott, Telsen, R.I., Varley, Lotus, Wearite).
- 1 L.F. transformer, high ratio, 1:7 (Telsen).
- 1 Fuse holder (Ready Radio, or Bulgin, Telsen).
- 1 Terminal block (Junit, or Belling & Lee).
- 2 Terminals (Ealex, or Belling & Lee, Igranic, Clix, Goltone).
- Battery plugs and spade terminals (Belling & Lee, or Ealex, Clix, Igranic).
- G.B. battery clip (Wearite, or Bulgin, Burton).
- Glazite, wire, screws, flex, etc.

Telsen for better reproduction



**TELSEN LOUD SPEAKER
UNIT**

The Telsen Loud Speaker Unit is pleasing to the most sensitive ear. The deep notes of the bass, the brilliance of the soprano, and the crispness of diction are clearly reproduced without any distortion.

It employs cobalt steel magnets, and the detachable rod which carries the cone is fitted with cone washers and clutch. The entire unit is enclosed in a beautifully moulded bakelite dust cover.

**Telsen Loud Speaker Unit,
Price 5/6**

TELSEN

THE LARGEST RADIO COMPONENT
MANUFACTURERS IN THE WORLD

Typical of Telsen value

6^{D.}
EACH

TELSEN VALVE HOLDERS.

(Prov. Pat. No. 20286/30).

The Telsen four and five-pin valve holders embody patent metal spring contacts, which are designed to provide the most efficient contact with split and non-split valve legs, and are extended in one piece to form soldering tags. Low capacity and self-locating.

Telsen 4-pin Valve Holder. Price 6d.
Telsen 5-pin Valve Holder. Price 8d.

TELSEN FIXED MICA CONDENSERS.

(Prov. Pat. No. 20287/30).

Telsen fixed mica condensers are made in capacities from .0001 mfd.—.002 mfd. They can be mounted upright or flat, and the .0003-mfd. Telsen fixed mica condenser is supplied complete with patent grid leak clips to facilitate series or parallel connections. All Telsen fixed mica condensers are tested at 500 volts.

Telsen Fixed Mica Condensers. Price 6d.

6^{D.}
EACH

TELSEN GRID LEAK HOLDER.

The Telsen Grid Leak Holder will hold firmly any standard size or type of Grid Leak. Ample clearance is provided between the terminal screw leads and the baseboard (underneath), preventing any surface leakage upsetting the value of the Grid Leak. The terminals and fixing holes are accessible without removing the Grid Leak.

Telsen Grid Leak Holder Price 6d.

TELSEN SPAGHETTI FLEXIBLE RESISTANCES.

These are made in a range of values from 300-200,000 ohms, with a maximum current varying from 42 mA-1½A. The terminal tags are firmly fixed to the wire and clearly marked with their respective resistance values; they are impregnated with special insulating compound which renders them proof against corrosion.

Telsen Spaghetti Flexible Resistances. From 6d.

TELSEN FUSE HOLDER.

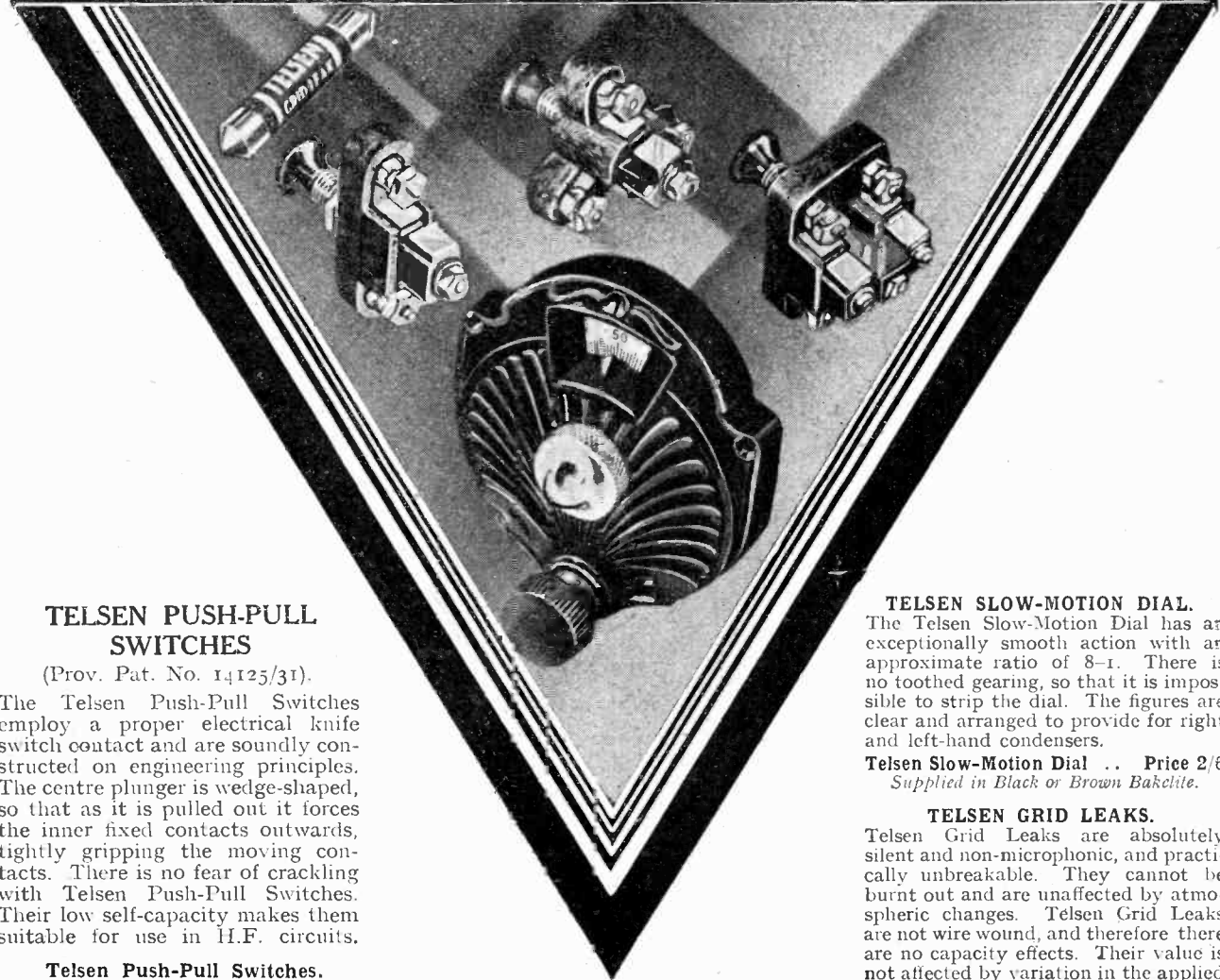
This is a neat and inexpensive device which should be incorporated in every set as a precaution against burnt-out valves. Illustration shows the Telsen fuse holder in use with the standard type of radio fuse.

Telsen Radio Fuse Holder Price 6d.

TELSEN

**ALL BRITISH
RADIO COMPONENTS**

Switch over to Telsen



TELSEN PUSH-PULL SWITCHES

(Prov. Pat. No. 14125/31).

The Telsen Push-Pull Switches employ a proper electrical knife switch contact and are soundly constructed on engineering principles. The centre plunger is wedge-shaped, so that as it is pulled out it forces the inner fixed contacts outwards, tightly gripping the moving contacts. There is no fear of crackling with Telsen Push-Pull Switches. Their low self-capacity makes them suitable for use in H.F. circuits.

Telsen Push-Pull Switches.

Two-point	Price 1/-
Three-point	Price 1/3d
Four-point (2-pole)		Price 1/6d

TELSEN SLOW-MOTION DIAL.

The Telsen Slow-Motion Dial has an exceptionally smooth action with an approximate ratio of 8-1. There is no toothed gearing, so that it is impossible to strip the dial. The figures are clear and arranged to provide for right and left-hand condensers.

Telsen Slow-Motion Dial .. Price 2/6

Supplied in Black or Brown Bakelite.

TELSEN GRID LEAKS.

Telsen Grid Leaks are absolutely silent and non-microphonic, and practically unbreakable. They cannot be burnt out and are unaffected by atmospheric changes. Telsen Grid Leaks are not wire wound, and therefore there are no capacity effects. Their value is not affected by variation in the applied voltage. Made in capacities ranging from 1-5 megohms.

Telsen Grid Leak Price 9d.

TELSEN

THE LARGEST RADIO COMPONENT
MANUFACTURERS IN THE WORLD



The choice of experts

TELSEN BAKELITE DIELECTRIC CONDENSERS.

These Condensers are of a new and improved type and of exceptionally compact dimensions. The moving vanes, which are interleaved with finest quality bakelite, are keyed on to the spindle, so that they cannot be pushed out of line, and there is a definite stop at each end of the travel. The connection to rotor is made by means of a phosphor bronze pigtail so that there is no crackling due to rubbing contacts. The connection to the stator vanes is absolutely positive—a very important point.

- Telsen Bakelite Dielectric Differential Condenser. Made in capacities of .0001, .00015, .0005. Price 2/-
- Telsen, Bakelite Dielectric Re-action Condenser. Made in capacities of .0001, .00015, .0003. Price .. 2/-
- Ditto .0005, .00075. Price .. 2/3
- Telsen Bakelite Dielectric Tuning Condenser. Made in capacities of .0003, .0005. Price 2/-

TELSEN PRE-SET CONDENSER.

These Condensers have been carefully designed to give proper separation of vanes when the adjustment is unscrewed, which results in a very low minimum capacity, giving a wide range of selectivity adjustment when used in the aerial circuit.

Telsen Pre-Set Condenser. Made in capacities of :

Max. Cap.	Min. Cap.
.002	.00025
.001	.00004
.0003	.000005
.0001	.000001

Price 1/6.

TELSEN LOGARITHMIC VARIABLE CONDENSERS.

The Telsen Logarithmic Variable Condenser is of robust construction and high insulation. The H.F. losses are very low and the frame is braced at three points, so that the possibility of distortion and short-circuiting is negligible. Substantial terminals are provided with alternative connection to the stator.

Telsen Logarithmic Variable Condenser. Made in capacities of .005, .00025, .00035. Price .. 4/6

TELSEN

ALL BRITISH
RADIO COMPONENTS

CONSTRUCTING THE A.C. "POP-VOX"

(Continued from page 801.)

makes a fine, safe job of the joints if you prefer it. But good tight screwed-down joints are just as effective, though they must be made very thoroughly and carefully.

Get all the real wires done before you put in the spaghetti wiring, otherwise you may damage the tags or insulation of the latter components. And as you go along continually remind yourself that good, firm joints are vitally necessary in a powerful mains set of this type.

When nearing the end, you can fix the panel in position and complete the wiring to it. (If fixed earlier in the proceedings it is unnecessarily in the way.)

You will have noticed that no external screens are employed, and this simplifies wiring considerably. It is rendered possible by very careful layout of all the components and by well-considered selection.

Watch Those Wires.

Be particularly careful of flexible leads, and those to the coils, for if the lettering on these is not watched carefully a mistake here may prevent the whole set from working. And, by the way, insulated staples, obtainable in pennyworths at any electrical shop, are very useful for holding the mains flex firmly to the base-board, and similar work.

Every wire must not only connect firmly where it is supposed to, but must be held well away from all metal, etc., which it is not supposed to touch. There should be no possibility of any wire bending and touching a neighbouring wire or component.

Pay particular attention to the "mains" end of the set, where the big transformer and rectifying valve are placed. You will notice that the input from the mains plug must go via one lead direct to the mains switch, as shown in the diagrams. From the other side of that switch one lead goes to the appropriate O terminal on the transformer. The other mains flex lead from the plug goes as explained in the maker's literature to that terminal on the mains

transformer which corresponds with the voltage of your own mains. (Be specially careful about this part of the work.)

When you have finished wiring don't be in a hurry to try the set, but go patiently over it, with a friend checking off the wires, if possible, to make sure it is correctly connected. When you are *sure* all is as it should be, you can prepare to try the set out.

Suitable Valves.

For the rectifying valve you need one of the U60/250 type. In the V1 valve holder you will require an A.C. HL; for V2 a similar (A.C. HL) valve (or the special detector valve "A.C. Det." marketed by "Six-Sixty"); and for V3 a P.625.

For the "radio" test, you should pull-out the radio-gram switch to disconnect the pick-up. Adjust the Selector knob

volume and reaction adjustments as necessary for the stations you are receiving.

You should, of course, hear no hum. But if your set hums switch off and pull the plug from the mains socket, to look for the cause of the trouble.

(It occasionally happens that placing the mains plug round the other way in its socket will remove hum, but generally there is no hum at all, or if there should be it is due to a wrong connection somewhere.)

You ought to receive dozens and dozens of stations on an ordinary aerial; the procedure for the distant ones being to pick up the weak programme or carrier on the Extenser, using reaction if necessary, and then turn the Selector knob till the maximum strength is found. You will find it makes a tremendous difference and yet you can hear sufficiently well to tune even if the Selector is not set properly at first.

For long waves—that is to say, for tuning from 100–200 on the Extenser dial—the Selector must be right round as far as it will go in a clockwise direction, this being the long-wave position in which the aerial is joined to stud B, and so direct to the A terminal of the "P.V." unit.

Provision for Pick-up.

Finally, a word about the gramophone side. In our own tests with a variety of pick-ups we found that all that was necessary was to connect the two terminals direct to the pick-up.

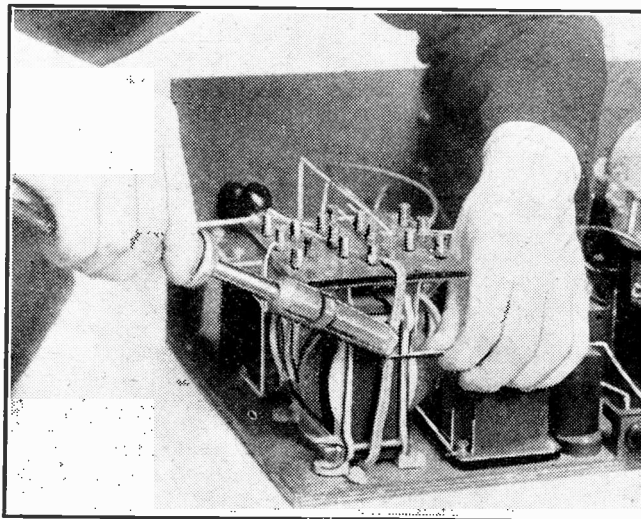
Some readers may prefer to use negative grid bias as well, and it can instantly be seen if this effects an improvement, merely by joining a 1½-v. neg. bias battery in series with the pick-up across the two terminals.

If this should prove advantageous the further step of providing "automatic" bias is easily made. All that is necessary is to join a 1,000-ohms "Spaghetti" to the cathode terminal of V₁, and take all the wires which previously went to that terminal to the other end of the "spaghetti," with the exception of the lead from the 2-meg. leak.

The final cathode connections of V₁ would thus be to the leak and 1,000 ohms "spaghetti," the other side of this "spaghetti" going to the moving vanes of the Extenser, etc.

(A fixed condenser is sometimes employed across such a resistance, but this is often unnecessary.)

SOLDERED CONNECTIONS ARE BEST



In a mains receiver it is always best to solder the more important connections, as some of them carry quite high voltages and heavy currents. If you do not feel like tackling the job, though, make sure that all connections are well screwed down.

about half-way round, the differential reaction at zero, and the volume control two-thirds of the way to maximum.

When you are sure all is O.K., turn on the switch which controls the point to which your plug is connected. You will have to wait two minutes or so for the valves to "warm up."

Eliminating Hum.

At the end of that time tune in on the Extenser, gliding over long or medium waves merely by rotating the dial. Alter

SELECT YOUR COMPONENT MAKES FROM THIS LIST.

- | | | |
|---|--|--|
| <ul style="list-style-type: none"> 1 Panel 21 in. by 7 in. (Permcot, or Peto-Scott, Goltone). 1 Cabinet, 21 in. by 10 in., baseboard (Camco, Pickett, Gilbert). 1 Selector Coil (Goltone, or Ready Radio, R.I., Formo). 1 Single-pole double-throw push-pull Switch (Wearite, or Goltone, Igranico). 1 .0005-mfd. Extenser (Cydon, or Formo, Wave-master). 1 .0001-mfd. or over differential reaction condenser (Ready Radio or Telsen, Lotus, J.B., Formo). 1 1-meg. Volume Control (A.E.D., or R.I.). 1 Mains Switch (Bulgin, or Igranico). 1 P.V.1 and P.V.2 Coils (Parex, or Ferranti, Lewcos, R.I.). 1 Coil Quoit (Peto-Scott, or Wearite, Goltone). 1 .0003-mfd. fixed condenser (Dubilier, Goltone or Ready Radio, Telsen). 1 2-meg. leak and holder (Lissen, or Ediswan, Ferranti, Igranico, Telsen). | <ul style="list-style-type: none"> 2 5-pin valve holders (Telsen, or Lotus, Clix, Bulgin, Igranico). 2 4-pin valve holders (as above). 1 H.F.C. (Varley, or Lewcos, Ready Radio). 2 1-mfd. fixed condensers (Lissen, or T.C.C.). 3 2-mfd. fixed condensers (Lissen, or Dubilier, Ferranti, and Formo). 3 4-mfd. fixed condensers (Formo, or T.C.C.). 1 Parafeed L.F. Transformer (R.I.). 1 Output Choke (R.I., or Bulgin, Lotus, Telsen). 2 Smoothing Chokes (Wearite, or Ferranti, Igranico, Varley). 1 50,000-ohm Spaghetti resistance (Ready Radio, or Bulgin, Telsen, Sovereign, Peto-Scott, Igranico, Goltone). 1 25,000-ohm Spaghetti resistance (Lewcos, or as above). 1 30,000-ohm Spaghetti resistance (Bulgin, or as above). 2 1,000-ohm Spaghetti resistances (Lewcos, or as above). | <ul style="list-style-type: none"> 1 200,000-ohm resistance (Graham Farish, or Peto-Scott, Wearite). 1 Mains Transformer (Igranico universal type B). 3 Terminal Blocks (Belling & Lee), Copper sheathed cable for heater leads. Flex, Glazite, screws, 2 oz. 24 DSC wire for hank coil, etc. |
|---|--|--|

THE VALVES TO USE.

- For V1.—A.C. HL type (Cossor, Osram, Mazda, Eta, or Six-Sixty).
- For V2.—A.C. detector type (Six-Sixty), or A.C. HL type (Eta, Mazda, Cossor, Osram).
- For V3.—P.625 type (Osram, Mazda, Eta, Six-Sixty, or Cossor).

RECOMMENDED LOUD SPEAKERS.

- British Blue Spot. British Thomson-Houston.
- Whiteley Electric. Uday, Celestion, Amphion.

**Every
Ready Radio kit
is tested
and passed
before
despatch**

G.P. Kendall

Mr. G. P. Kendall, B.Sc., has now joined the staff of Ready Radio as Chief Engineer. He was, for many years, Assistant Technical Editor and Chief of Research in "Popular Wireless" and "Modern Wireless."

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(with valves and cabinet) - £12 - 1 - 6
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	£	s.	d.
1 Fuller S.W.X.7 Acc.	11	0	
1 Fuller 16-volt C.B. Batt.		2	10
2 Fuller 60-volt Super-Cap. H.T. Batteries	1	7	0
1 Celestion D.10 Loud Speaker		3	0

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or 12 monthly instalments of - - - £1.6.0
- Kit "C"** - - £15: 12:6
or 12 monthly instalments of - - - £1.8.9

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EASY PAYMENT ORDER. Please despatch my Easy Payment Order for the goods specified for which I enclose first deposit of £.....

Name

Address

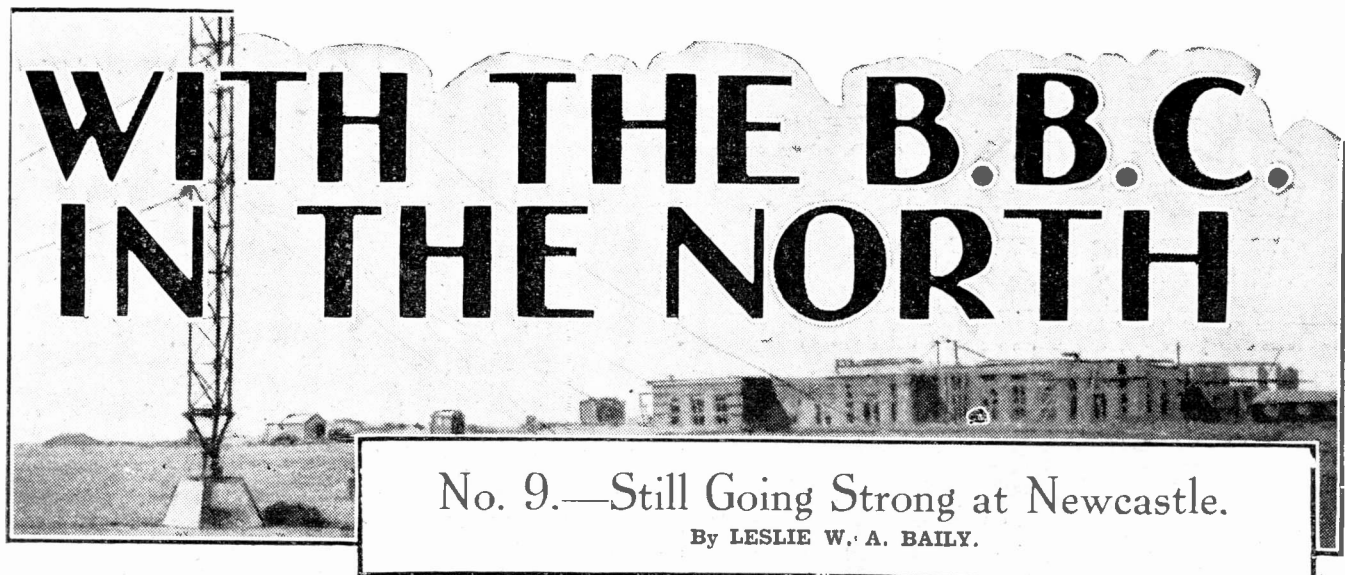
Kit required.....

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Telephone: HOB.5555 (Phone Exchange)

Telegrams: READIRAD, SEDIST



No. 9.—Still Going Strong at Newcastle.

By LESLIE W. A. BAILY.

THE original London, Birmingham, and Manchester B.B.C. transmitters were opened in November, 1922. Newcastle followed in December. The first famous trio, 2 L O, 5 I T, and 2 Z Y, are nothing more than memories, but 5 N O remains, the grand old veteran of B.B.C. transmitters.

And 5 N O will continue to remain, for so far, the Regional scheme has not succeeded in penetrating its alternative programmes to Tyneside, and so the local transmitter must stay on duty for a little while longer.

A Real "Old Stager."

1922-1931, and still going strong! Since December 24th, 1922, the Newcastle transmitter has broadcast a total of 25,000 hours. The engineers at 5 N O proudly pointed out to me among the brightly glowing transmitting valves one which has been in steady use for over three years without showing any of the usual signs of old age.

After its extraordinary opening night 5 N O settled down to a remarkably uneventful career.

Its history has lacked "incidents" since that night when, after promising Newcastle a broadcasting station by Christmas, 1922, the B.B.C. found that the studios would not be ready in time, so that a lorry drawn up in the yard of the Co-operative Wholesale Society's factory in Blandford Street had to be improvised as a B.B.C. studio. Nobody on the present Newcastle staff remembers that hectic evening.

The Same Transmitter.

Tom Payne, the first station director, now runs a wireless business in the city. He was followed in turn by Bertram Fryer, E. L. Odhams (now editor of "World Radio"), Gordon Rule, and finally G. L. Marshall, formerly station director both at Edinburgh and Glasgow.

The transmitter is still in the erstwhile stable outside which the lorry-studio was parked on Christmas Eve, 1922. It is one of the famous Marconi "Q" type sets, plus tuning-fork wave-length control apparatus which was installed when 5 N O went on

This week our Special Correspondent, who is touring Northern B.B.C. stations exclusively for "Popular Wireless," describes his visit to Newcastle-on-Tyne.

the National common wave (288.5 metres) nearly two years ago. It is now being used for the experiment of synchronising 5 N O with the North Regional transmitter at Moorside Edge, on 479 metres.

In my article on the Glasgow station I have already described the "Q" type transmitter, so let us now travel a mile across the heart of Newcastle to New Bridge Street, where a building of peculiarly ecclesiastical outward appearance is occupied by the studio, offices, and control-room. It dates

in the heyday of its glory as a "main" station. As I sat in the very charming waiting-room at New Bridge Street I looked around at the signed photographs of celebrities on the walls and reflected on the change that has come upon 5 N O. I read the signatures of Peggy O'Neil, Myra Hess, Sybil Thorndike, Robert Radford, Owen Nares, Miriam Licette, and many others. They had all broadcast in "the old days" from Newcastle.

Doing Its Share.

Now Newcastle (like Leeds) is a "feeder" for the North Regional transmitter. Two or three times a week it sends a programme up to Moorside Edge. Its staff was reduced and its orchestra abolished long ago. More recently part of the building has been sublet as offices.

By all accounts, however, there is some excellent programme material in Northumberland and Durham, and it is the duty of 5 N O to collect this and throw it into the North Regional pool.

The control-room contains the usual amplifiers and switchboards. The landlines bringing programmes from London or Manchester come to this room. Here the programme is amplified and then sent over another line to the Newcastle transmitter.

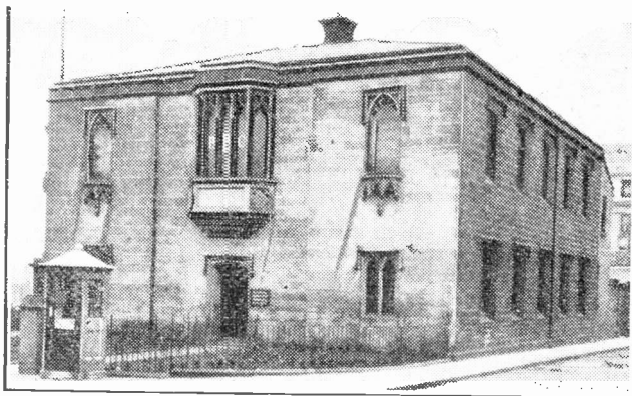
Important Work.

When the landline system is reorganised (as already announced in my Leeds article in this series), the Newcastle control-room will have another duty to perform. It will pass the National programme forward over a new underground cable to Edinburgh, for distribution to the Scottish transmitters.

Sixteen points for "O.B.'s" are permanently wired to the Newcastle control-room. A 5 X X receiving station on the outskirts of the city is connected to the control-room for "wireless link" relays.

There are nine engineers at Newcastle. The others of the station staff are the station director, a newly-appointed announcer, two lady secretaries, and a commissionaire.

MODERN USE FOR AN OLD BUILDING



This is "Broadcasting House," Newcastle, a building of rather ecclesiastical appearance which dates back to the eighteenth century. It houses studio, offices, and control-room.

back to the 18th century, and until the B.B.C. took it over in 1926 it was a maternity hospital.

One of the main hospital wards is now "No. 1" studio—I say "No. 1" because the name sticks as a reminder of the time when there were several studios in this building. "No. 1" (the walls of which are hung with old-fashioned curtaining of the 1926 era) is now the one and only.

When Mr. Marshall first came, 5 N O was



CHANGE FOR THE BETTER



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If you can't get that station you want—**change to Mazda.** If you need a little more selectivity—**change to Mazda.** "Amazing" was the original verdict—and amazing still they are. There is exactly the valve for your purpose in the Mazda range. Ask your dealer for Mazda valves and see that you get them.

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V.131



CAPT. ECKERSLEY'S QUERY CORNER

GRID-LEAK AND BIAS VALUES— IMPROVING QUALITY.

Under the above title, week by week, our Chief Radio Consultant comments upon radio queries submitted by "P.W." readers. Don't address your questions to Capt. Eckersley, however—a selection of those received by the Query Department in the ordinary way will be answered by him.

Grid-Leak and Bias Values.

L. V. (Deal).—"In a resistance-capacity coupled L.F. stage grid-bias is applied via a high resistance of the grid leak type.

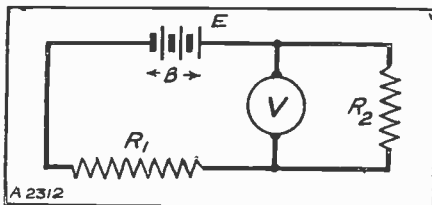
"I am sometimes puzzled by this circumstance, and fail altogether to understand why the resistance of the 'leak' does not affect the amount of bias actually received by the grid of the valve. For instance, if the grid leak has a resistance of one megohm and applied bias at the biasing battery is $4\frac{1}{2}$ volts, the grid is said to be biased $4\frac{1}{2}$ volts.

"As I understand it, the grid still remains at $4\frac{1}{2}$ -volts negative potential if the resistance of the leak is increased to 10, 20 or even a 100 megohms.

"Is there any limit to the increase in the resistance of the grid leak? If not, how can one remove bias from the grid of a valve?"

"Air, after all, I am told, is not a perfect insulator and may, therefore, be regarded as a high resistance. What, then, prevents the grid from remaining biased when the leak is removed, so that only air separates the grid from the negative terminal of the biasing battery?"

HOW IT WORKS



To explain why no "volts" are lost when bias is applied to a valve via a grid leak, it is necessary to resort to Ohm's Law. Read what our Radio Consultant-in-Chief has to say about it.

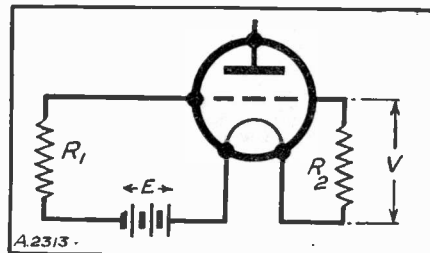
May I, at the risk of seeming to go too far back to the elements, point out the fundamentals of Ohm's Law. I do not want you to think I am being sarcastic. Lots of engineers I know are shaky on this point.

B is a battery of voltage E, V is a voltmeter which it is assumed does not take any current at all. R_1 is a resistance and R_2 is a resistance.

Now the voltage measured by V is dependent upon the current I multiplied by R_2 . But the current $I = E$ divided by $R_1 + R_2$.

Thus the voltage at V is given by E times R_2 divided by $R_1 + R_2$. Now if R_2 is very big compared to R_1 , the voltage V will be virtually equal to E. If R_2 is small compared to R_1 , the voltage V is very much smaller than E.

A PRACTICAL ILLUSTRATION



In this diagram the resistances are shown as they appear in a circuit in practice. R_2 represents the valve's impedance between grid and filament, and R_1 the value of the grid leak through which the bias is applied.

In a valve we have a resistance R_1 , the grid leak, and R_2 , the valve's internal resistance between grid and filament (see the second sketch).

But if there is negative on the grid the resistance R_2 is nearly infinite. It is, in fact, very large compared to R_1 , and so, as we have seen, E equals V. But R_2 is finite; it is the resistance of several megohms in the valve holder, etc. If R_1 is several megohms R_1 becomes comparable to R_2 and V gets less than E until, if R_1 is infinite (air) while R_2 is finite (valve holder), V is much less than E and equals 0.

I cannot do better than explain things thus, and hope you will puzzle out the analogy from my original "model."

Improving Quality.

R. R. (Huddersfield).—"In a reply to 'T. W. (Kensington),' regarding the use of 'gapped' iron-cored apparatus in receivers to improve transient response, I notice that Captain Eckersley suggests that, since transient distortion occurs in so many stages of the chain between microphone and loudspeaker, there may be little object in endeavouring to effect improvement in this respect in one's receiver.

"May I permit myself the impertinence of asking your Chief Radio Consultant if this is an expression of opinion or a statement of fact? That is to say, is it definitely

established that loudspeaker reproduction can never rise above the level of quality afforded by the worst 'distorter' in the whole broadcast chain? Or can improvement in, for instance, one's receiver achieve results better than those given by a receiver which is no better than the weakest link in the chain?"

My statement was a matter of opinion—since making it I have to add a fact.

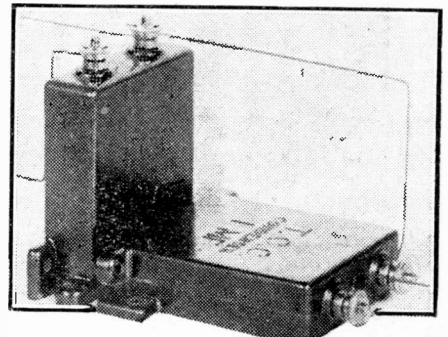
Recently I had occasion to test a design of a power amplifier under working conditions. I hesitated whether to use two transformers, one from receiver to a line (short), the other from line to power amplifier.

The (quality) input was from the North Regional Station, which is the latest B.B.C. design of transmitter. The loudspeaker was, in my opinion, the best for detecting transient distortion, and was, therefore, a very good loudspeaker. The transformers were of the same type as used by the B.B.C. Means were arranged for including or excluding the two transformers—the substitute being resistance capacity.

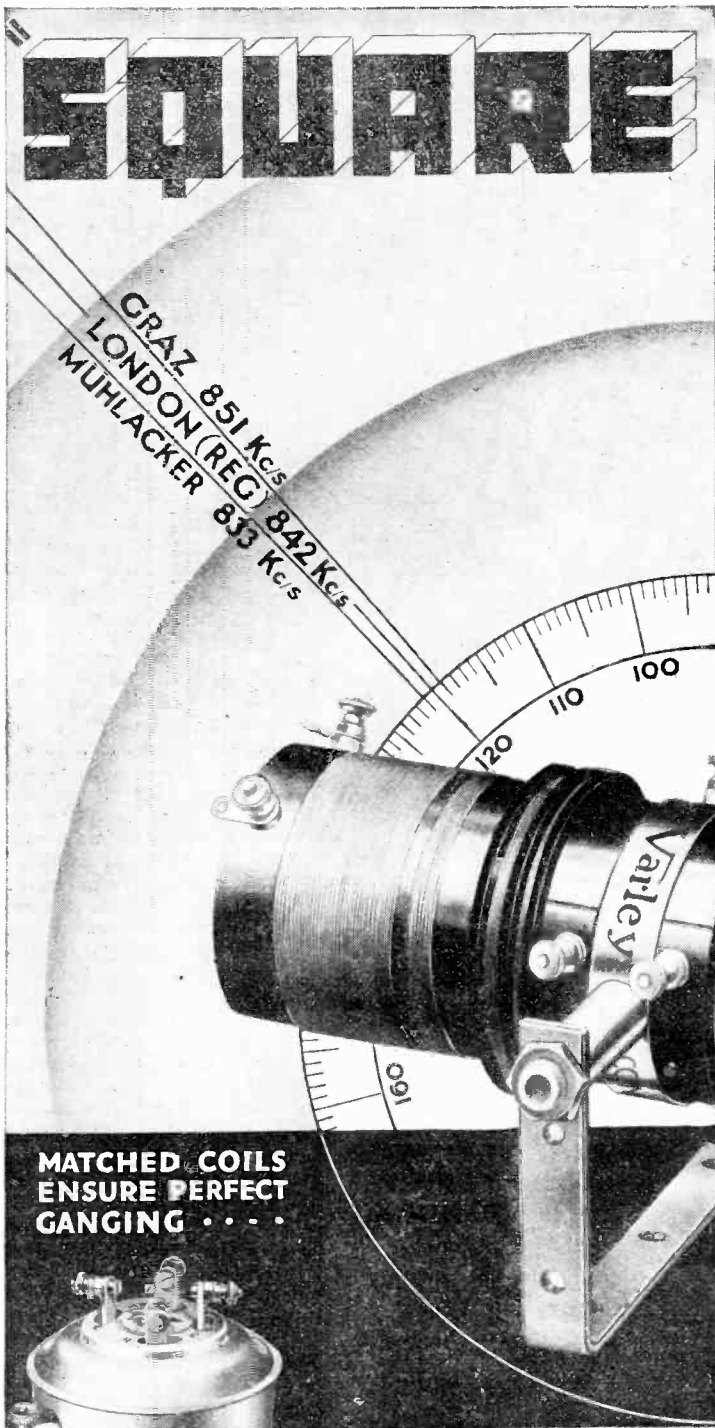
The observers were both used to the judgment of quality. The result, taken of course by turning one's back and guessing which was the better quality, came out in favour of R.C., but even then mistakes were made and it took an acute ear listening for some time to detect the effect.

With an "ordinary" loudspeaker, a slightly inferior transmission, a wrongly designed or adjusted circuit in *any* part of the chain could have made the effect indistinguishable. There is, in fact, very little in it, so my opinion still stands.

FIXING FIXED CONDENSERS



Nowadays, some fixed condensers have very useful "double feet." They enable these components to be mounted in two positions.



**MATCHED COILS
ENSURE PERFECT
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H.F. INTERVALVE COIL. (Dual range) New Model without switch, for use with the "Square Peak" Coil, type BP7. Completely screened. Its inductance inside the screen is exactly matched to that of the "Square Peak" Coil to ensure perfect ganging.

List No BP8 Price **8/6**

Also supplied with wave-change switch List No. BP6., same price.

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(REGD TRADE MARK)

9 Kc. SEPARATION!

In his test report on the Varley "Square Peak" Band-pass Coil, the technical editor of "Popular Wireless" writes: "A beautifully made component . . . Will increase selectivity to an extraordinary extent . . . covers exceptionally wide wave-bands, viz. 220-580 and 1,000-2,300 metres . . . Gives a constant station separation throughout the whole of this range, a fact that proves the practical perfection of its design . . . Sensitivity was maintained at practically normal level—no mean feat in view of the sharp station separation given . . . The best commercial wave-change coil-unit that has yet been produced."

The "Square Peak" Coil gives a constant square-topped peak and separation of substantially 9 Kc. over the whole of both wave-bands. Easily replaces most existing aerial coils. Needs no screening.

Illustrated is the new additional model BP7 with terminals in place of wave-change switch, enabling the coil to be used with "Extensers" or any type of remote switch control.

15/-

Supplied with universal mounting bracket. (Type BP5, complete with wave-change switch, same price.) Regd. design No. 763904. Pat. Pending.

THE "SQUARE PEAK" COIL



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STARRING FOR A RADIO REVUE

OUR SPECIAL CORRESPONDENT

Tells of the hard work and training that goes to the making of an hour of broadcast revue.

NOT long ago, Mr. Philip Ridgeway (alias Mr. Ramsbottom of "The Ridgeway Parade") commenced a long and enthusiastic search for a girl with a Voice that was Different. As he himself appreciatively expressed it at the time, he wanted a girl "with Spring in her voice." Some hundreds of young ladies presented themselves for his approval, and with characteristic thoroughness he gave each one an interview and an audition at Savoy Hill.

A Tall Order!

Mr. Ridgeway himself told me exactly what he was seeking. "Many people," he said, "are under the impression that I am looking for a first-class soprano singer. That is quite wrong.

"What I want," he said, "is a girl whose voice can express all the beauty and freshness of English youth. She must have a speaking voice that is clear, natural, and beautiful; which in some indefinable way expresses the scent of an English flower. The sort of voice that novelists write about and young men dream upon."

This sounded to me a pretty tall order, but Mr. Ridgeway had unbounded faith in his own judgment and his ability to find the right girl. It cost him many hours of hard work before he discovered Miss Babs Farren.

Perhaps it is sheer coincidence that Miss Farren conveys to the eye all those things which her voice conveyed to Mr. Ridgeway, and to the millions of wireless listeners who have heard her.

She is slim and short, with a wonderful pink and white complexion, very, very blue eyes, and neat bobbed hair that is the colour of rich, creamy butter. She conveys a lasting impression of neatness and compactness and very wholesome Englishness. And her voice—well, to me it was soft and low and essentially Springlike.

Born For The Stage.

She gave me, too, a vague idea that she is a little surprised with herself—surprised that she should so suddenly have become the centre of popular attention. She regards herself, I believe, as just an ordinary English girl, with, perhaps, a gift for stage work—that is, possessing a pleasing voice and appearance, and an ability to dance rather more than averagely well.

As a matter of fact, stage work is in Miss Farren's blood. Her father was Fred Farren, who produced a number of musical shows at the Empire Theatre, London, some years ago. Miss Farren's earliest ambition

was to become a great singer, but on second thoughts she decided she might do better as a dancer. She was trained to dance, and made her first stage appearance at the age of ten.

Although she is still very young, she has travelled the length and breadth of England in various stage shows. Two years ago she was in "Marjorlaine" at the Gaiety Theatre, where she ran away with the Press notices.

Hard Work.

She has also been to America in vaudeville. When she was playing in Detroit she hardly saw daylight for three whole weeks, for she had to give four performances a day, and there was no window in her dressing-room. Her vaudeville engagements in New York kept her occupied seven days a week.

"It was terribly hard work," she told me when I visited her at her flat near Queen's

A DELIGHTFUL SINGER



Miss Babs Farren, "the girl with Spring in her Voice."



Club. "The conditions were very different from those I had experienced in England. I missed English faces and the atmosphere of England so much that I was genuinely glad to return home. You see, I am a true Londoner. A Cockney, in fact. I was born near Vauxhall Gardens."

I asked her to tell me something of her wireless experiences.

"Before my agent sent me a card for Mr. Ridgeway's audition, I had never given a thought to appearing before the microphone," she answered. "I had heard that it was such a terribly difficult business to obtain an audition with the B.B.C.

"Well, the audition came, and I found it all very strange and mysterious, although I was not in the least nervous. The number of people who dashed in and out of the announcer's box rather amused me. They all seemed in such a tremendous hurry.

"Mr. Ridgeway, of course, was in charge, and after I had sung two songs, he asked me to recite, and then to cry with him, just to test my feelings and emotions. A little later I was told he had chosen me."

"You were thrilled?" I asked.

Soon "Found Her Feet."

"I was gratified," answered Miss Farren, guardedly. "You see, Mr. Ridgeway knew nothing of my stage experience—he did not even know my name. He chose me simply because of my voice."

"Are you ever nervous before the microphone?"

"Not now. But during my first rehearsals I was terrified. I tried to remember all the things I mustn't do, and altogether got terribly scared of myself. Mr. Ridgeway, however, was wonderfully kind to me, and I owe a very great deal to him. He took me under his wing and soon made me feel as though I had been doing wireless work as long as he has."

Miss Farren's hobbies are as simple as her voice is beautiful. She loves reading—there was an open copy of "The Good Companions" on her table. Her favourite author is Dickens, and it is for this reason that she enjoys the Dickensian style of Priestley.

EVERYTHING **The G.E.C.** ELECTRICAL
YOUR GUARANTEE

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an entirely new range of

Osram Valves

FOR D.C. MAINS

MADE IN ENGLAND

WITH INDIRECTLY HEATED CATHODES

The New Osram D.C. Valves (0.25 ampere) bring all the advantages of the Mains operated set within reach of those with Direct Current Electric supply mains.

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- 2** Reliable and robust.
- 3** Special care paid to high insulation in the valves — a most important feature in D.C. valves.
- 4** Filament current enables any 0.25 amp. Power or Pentode valve to be used in last stage.
- 5** Characteristic efficiency of the highest — the OSRAM
- 6** D.H. Detector achieves an amplification Factor of **40** and slope of **3.7 m.a./volt**.
- 6** Only 0.25 ampere filament consumption. The whole set with valves wired in series consumes no more current from the mains than an ordinary 60 watt electric lamp.
- 7** Up to 6 valves may be used together if desired, with filaments in series and cathodes in parallel — invaluable for simplification of grid bias circuits. This is a unique feature of OSRAM D.C. Valves.

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RADIOTORIAL

All Editorial communications should be addressed to the Editor, POPULAR WIRELESS, Tallis House, Tallis Street, London, E.C.4.

The Editor will be pleased to consider articles and photographs dealing with all subjects appertaining to wireless work. The Editor cannot accept responsibility for manuscripts or photos. Every care will be taken to return MSS. not accepted for publication. A stamped and addressed envelope must be sent with every article. All enquiries concerning advertising rates, etc., to be addressed to the Sole Agents, Messrs. John H. Lile, Ltd., 4, Ludgate Circus, London, E.C.4.

The constructional articles which appear from time to time in this journal are the outcome of research and experimental work carried out with a view to improving the technique of wireless reception. As much of the information given in the columns of this paper concerns the most recent developments in the radio world, some of the arrangements and specialities described may be the subject of Letters Patent, and the amateur and the trader would be well advised to obtain permission of the patentees to use the patents before doing so.

QUESTIONS AND ANSWERS

JUST A BROKEN LEAD.

We have often commented on the friendly way in which some readers have tried to help others by publishing their experiences, and the following amusing letter from a Cardiff reader explains itself, and may afford some valuable hints to those who have experienced a similar trouble.

"I hope you will be able to find room in 'P.W.' somewhere for this letter, because after all the naughty things I have said I ought to do penance. The least I can do is to put other people wise, if possible, to what caused me to lose handfuls of hair, and to gain the scornful disdain of the wife. (She hates me tinkering about with the set, but I notice that as soon as I put it right she is as pleased to listen as anybody.)

"It is a 'Flexi-Coupled Comet' with a 'Selector' coil, and it found its way among the foreigners like Thos. Cook himself; at the end of last February and March we were getting

dozens of stations, but after the brighter weather got here (Yes, there was some!), and holidays, and one thing after another, we did not use the set so much.

"This last few weeks, instead of getting better as the evenings are getting darker, it seems worse. And in the end, Cardiff was the

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only station coming over with a real punch, and although I could sometimes hear others, they were not worth listening to.

"Fed up with the whole thing, I was just getting ready to lose my temper with it, and bash something to bits, when I noticed that adjusting the 'Selector' coil made no difference at all. It had done in the past, and that gave me the first hint of what was wrong.

"I undid the wiring to it, took it off, opened it up, and found that the flexible lead connected to the knob-control to the coil itself was broken through, except for one stingy little strand of wire.

"Hastily grabbing a new piece of flex, I soldered it on in place of that old one and, Oh Boy! she was off again—and what a difference!

"Just that simple wire was the cause of the whole trouble, and I do not mind admitting

(Continued on page 824.)

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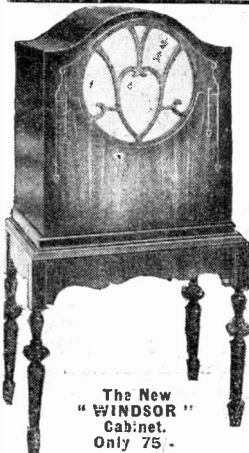
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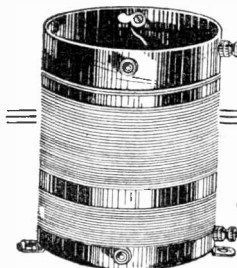
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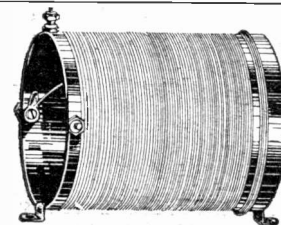
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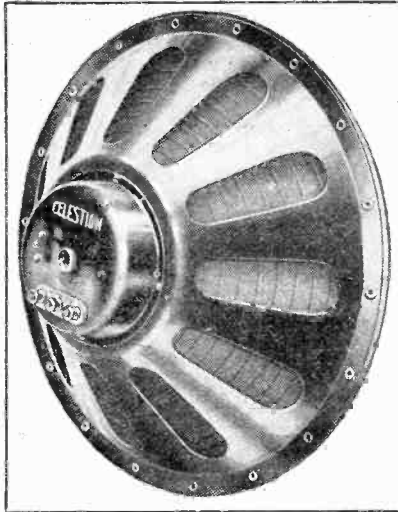
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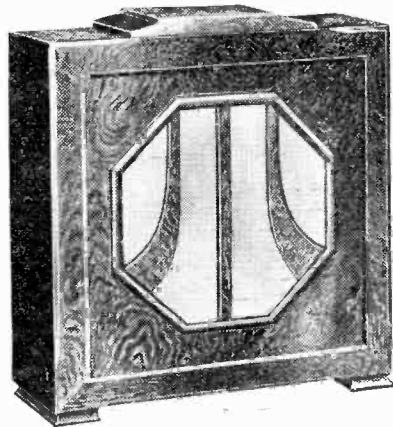
See also page 825.



The M.12 Chassis at 35/- places Celestion quality within the reach of all

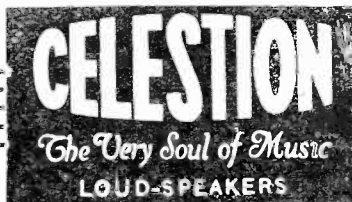
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RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 822.)

I nearly smashed up the set, I got so fed up with it. However, if this will now save anyone else some anxiety I shall feel it really was worth while."

SAVING H.T. CURRENT.

P. B. S. (Wiltshire)—"I found the real trouble was the long loud-speaker leads which seemed to be wasting H.T. battery current.

"P.W." PANEL NO. 35.—AUTOMATIC GRID BIAS.

"Automatic" or "Free" Grid Bias is obtained in sets using A.C. valves by passing the anode current of the valve in question through a resistance.

This is usually about 1,000 ohms, and is connected between cathode and "earth," the grid return of the valve also going to the latter point.

It is generally necessary to by-pass the resistance with a large fixed condenser.

Since I put in a choke-filter output the whole question of battery supply has been more satisfactory. In fact, it is now so good that I am adding the extra valve I have always aimed for bringing it up to four valves with real loud-speaker reproduction.

"I suppose I shall need a larger battery in this case. And, apart from the choke, is there anything you can suggest to improve the life of the battery as, to me, the constant H.T. renewal is the one bugbear of wireless?"

When buying the new battery be sure that you get one of adequate size to provide the current required by the four-valve set. If you get too small a battery it will always be over-run, and consequently its life will be invariably much shorter than it should be.

You can ascertain from the battery-maker how much current (in milliamperes) it will usefully give, and your valve curves will tell you exactly how much

anode current the set is taking, if you have no milliammeter in circuit to measure this anode current.

The filter output and the adequate capacity of the battery are the main safeguards in economical running. Apart from these, good points to watch are to keep the battery in a cool place, dustproof; and, of course, protect it from stray metal wires, or such things as scissors being laid upon it, as these can easily ruin it. Also use the correct grid bias.

EXTENSERING AN OLD SET.

T. L. (Manchester).—"They tell me it is not so bad in London, but I do not mind telling you money is 'tight' up this way. So, instead of being tempted by one of your new sets, I am going to make my old detector and two L.F. run through this season again.

"I am satisfied with all that, but what I want is sharp tuning and easy wave-change.

"My one extravagance is going to be an 'Extenser,' for I have realised that the really modern set must have this, so please give the wiring in words."

Yours is a very good plan, and the wiring of the new arrangement that we suggest would be as follows:

Aerial lead-in to the A terminal in the "Selector" coil. B and C terminal on this coil to A on the medium-wave "Pop-Vox" coil (P.V.1).

"WHY IS IT SO NOISY TO-DAY?"

Perhaps the switching doesn't work properly? Or some mysterious noise has appeared and is spoiling your radio reception?—or one of the batteries seems to run down much faster than formerly?

Whatever your radio problem may be, remember that the Technical Query Department is thoroughly equipped to assist our readers, and offers an unrivalled service.

Full details, including scale of charges, can be obtained direct from the Technical Query Dept., POPULAR WIRELESS, The Fleetway House, Farringdon Street, London, E.C.4.

A postcard will do. On receipt of this an Application Form will be sent to you post free immediately. This application will place you under no obligation whatever, but, having the form, you will know exactly what information we require to have before us in order to solve your problems.

LONDON READERS, PLEASE NOTE: Inquiries should NOT be made by phone or in person at Fleetway House or Talh's House.

X on the medium-wave P.V.1 coil to one end of the Contradyn coil, and to one of the wave-change contacts on the Extenser. The other side of the Contradyn coil goes to the No 1. terminal on the P.V.2 coil.

(Continued on page 826.)

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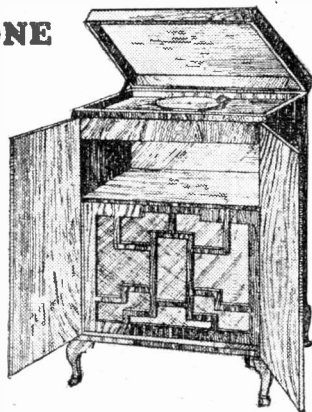
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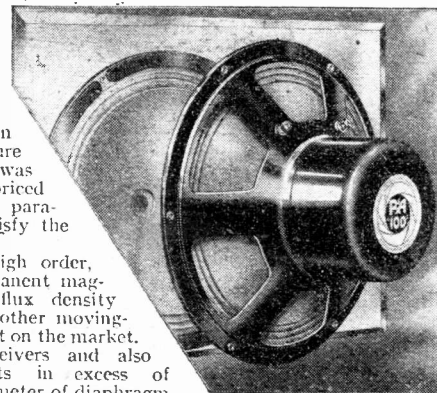
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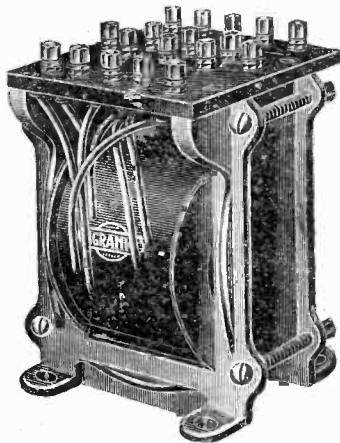
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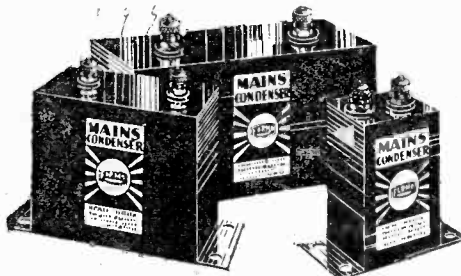
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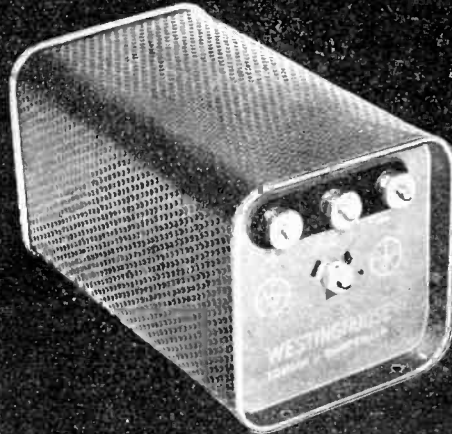
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See also page 822.

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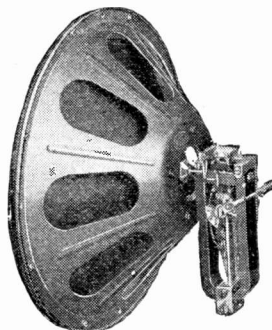
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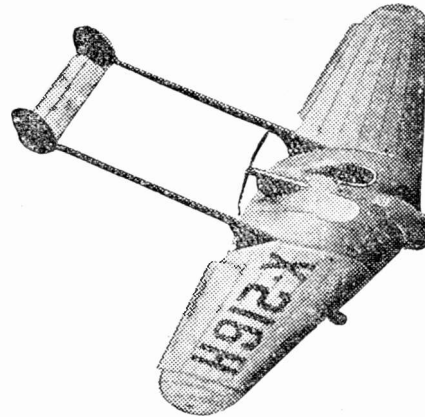
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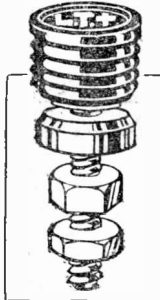
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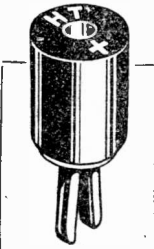
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FOR THE LISTENER

(Continued from page 802.)

uttered for the first time out of their heads, but as if they were reciting what was written in a book.

I am also bound to say that many of the previous discussions have failed because of the impression that the men taking part in them have not been quite sincere. They have not always believed what they said. They have been arguing for argument's sake, as we used to do in the days of Mutual Improvement Societies.

Don't Flog a Dead Dog!

They have been anxious to score off each other rather than to elucidate the truth. Such stuff is always poor stuff. It is a dead dog, and no amount of beating it can bring it to life.

We don't want a discussion between two disembodied points of view, which would be abstract and academic, but between two living men, each of whom occupies one or other of the points of view with his whole heart. We do not want to know what these two men have read about in books, but what they have actually found and felt in living their lives out.

A discussion on "Living Dangerously" between two sheltered spinsters would be mere footling. This discussion is not going to be worth while unless either Mr. Marvell or Mr. Mais has lived, or is actually living, dangerously.

They must know something about it first hand.

The Dangerous Liver.

It amuses me to try to conjecture beforehand which of these two young gentlemen is the "dangerous liver"! Which is the advocate for "safety first"? Which is the turbulent, daring, experimental fellow?

I have my doubts about Mr. Marvell. I know him to be successful. Can one live dangerously and be successful? Or is he leading a double life? Is his success a mask behind which lurks a disobedient, adventurous, pioneering, dare-devil soul?

I know little about Mr. Mais except from articles of his which I have occasionally read. Is he poor? Is he always losing his job because of the outrageous, divinely heretical, things he says and does? Which of these two is casting himself as a seed upon stony ground? We must "wait and see."

I, myself, am in no doubt about this matter. If somebody had not "lived dangerously" we should not be now living in the safety we enjoy. But it wasn't me! I am but a poor swimmer. I move fairly well when I am in my depth; but when I get out of my depth, I am frightened and lose my style entirely!

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SIX-FOOT TELEVISION PICTURES

(Continued from page 792.)

But increasing the number of holes automatically entails reducing their diameter, unless a disc of unwieldy proportions is used, and a reduction in aperture diameter means a considerable loss of light in the received image. Sanabria has succeeded in breaking through this vicious circle, achieving both detail and adequate illumination for projection.

In fact, his images are undoubtedly the best I have seen to date. Although the apparatus shown was unquestionably a laboratory set-up, the fact that it worked so well and gave a good image 6-ft. square, augurs well for the development in the near future of a simply operated receiver, sufficiently compact for home use, which will project an image, say, 2 ft. square on the living-room wall.

Two-Way Scanning.

But there still remain the problems of enlarging, without loss of detail, the field of view which the transmitter can handle, and transmitting by wire or by wireless the enormously wide frequency bands which will then result.

Sanabria is at present endeavouring to work out a system of scanning in two directions at right angles to one another (i.e. vertically as well as horizontally) which may solve the first problem.

Recent accounts in America of the six-foot television images now being demonstrated by U. A. Sanabria, have aroused considerable interest as to the light source which he is using at the receiver, and the inventor has just revealed the secret of his lamp.

All television workers to date have made use of neon lamps because this light source is the only one known which will respond sufficiently rapidly to the modulation of the incoming high-frequency television signals. For the production of small images, flat plate type neons are used, but for projection work the crater type is employed, because this type concentrates an intense glow in a tiny area of the cathode.

But the amount of light obtainable from even a crater type neon is totally inadequate for the purposes of projection on to a large screen.

New Type of "Neon."

Sanabria, however, hit on the plan of heating the cathode to a high temperature, thus heating up the small area of gas in which the glow discharge takes place. This causes the gas in the tube to give a very much brighter light and, best of all, it breaks down at from 15 to 25 volts, instead of the usual 140 volts, making the tube as responsive to weak signals as a modern loud speaker is to weak speech impulses. In this way, much finer shades of detail can be faithfully portrayed.

The hot cathode is similar to the heating device used in an indirectly-heated cathode type of valve.

A great possibility of this departure is that gases other than neon may be more easily and advantageously employed than was the case heretofore, thus enabling images of different colours to be shown.

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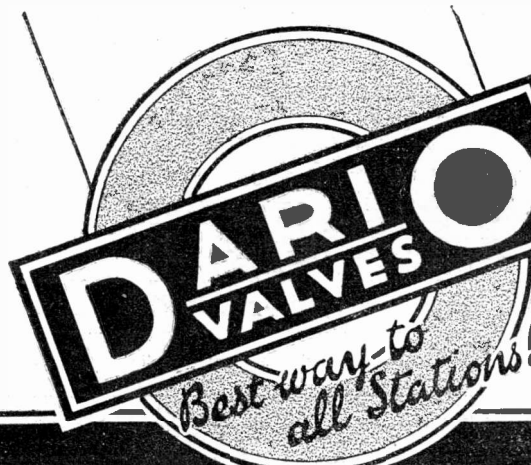
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**TECHNICAL
NOTES**

Some diverse and informative jottings about interesting aspects of radio reception.

By Dr. J. H. T. ROBERTS, F.Inst.P.

H.F. Coupling.

AN H.F. transformer or a tapped anode coil forms a suitable coupling, at any rate in the majority of cases, for a screened-grid valve. If a plain tuned-anode circuit is used with an H.F. amplifier there is a considerable likelihood of oscillation setting in, particularly if the coils are more than-ordinarily efficient.

This is due to the fact that an S.G. valve, notwithstanding the presence of the screened grid and the positive voltage applied to the same, still has a certain amount of inter-electrode capacity.

In consequence of this, even though we take as much care as possible to avoid stray couplings, both magnetic and capacitive, the circuit will oscillate if the high-frequency anode voltage exceeds the grid voltage by more than the critical amount.

The circuit can be rendered more stable by introducing losses into the aerial coil, but what is gained in one way is lost in another, and in making the aerial coil less efficient we also lose, of course, both in amplification and selectivity.

One method which is now often used is to connect the anode to an intermediate point on the anode tuning coil, whilst another method which is not perhaps quite so simple as the tapped tuned-anode coil is to wind a second coil over the tuned coil so as to produce in effect an H.F. transformer.

Although, as I say, this latter method is not perhaps quite so simple or easy, it has certain advantages in regard to the circuit and is often to be preferred.

Are They Atmospherics?

This is the time of the year when crackling and other noises heard in the loud speaker are commonly attributed to atmospherics. There is naturally some justification for this, but at the same time you do not want to jump to the conclusion that all such noises emanate from outside the receiver itself.

Clearly the "acid" test in this matter is to disconnect the aerial from the receiver: if the noises still continue and are not diminished in loudness, then the aerial system can scarcely be blamed.

If the interfering noises are merely diminished when the aerial is disconnected it suggests that they are due to atmospherics and that, in the absence of the aerial, these are being picked up (with much less strength) by the coils of the receiver.

There is just one word of warning I should like to give you. Even if the crackles are definitely associated with the aerial, that is to say, if they disappear when the aerial is disconnected and recur when the aerial is reconnected, it still does not necessarily follow that they are true atmospherics. It may be that some bad

(Continued on next page.)

TECHNICAL NOTES

(Continued from previous page.)

contact in a switch or the aerial is causing the trouble.

On the other hand, if the interfering sounds proceed unabated irrespective of whether the aerial is connected or not, it is quite evident that they are produced within the receiver itself.

L.T. Switches.

A very common cause of trouble of this kind is a defective L.T. switch or filament rheostat.

I have often found, and I expect you have, too, that the type of low-tension push-pull switch which has a plunger entirely free to rotate is very apt to cause trouble of this kind.

There are all manner of other causes of internal cracklings, and sometimes it is not at all an easy matter to discover them. A defective H.T. dry battery, a bad contact in a coil, or for that matter in any other component in the receiver, as well as frayed insulation in a transformer, are all liable to give rise to "atmospherics."

I once had a particularly baffling case in which the trouble was sometimes evident and would at other times disappear altogether, and after a great deal of patient searching it was found that there was a broken wire in the L.F. transformer which was making intermittent contact.

This, however, is quite unusual, and your troubles are far more likely to be due to low-tension switches, rheostats, or H.T. batteries.

The Earth Connection.

Reverting to the question of stability in a receiver, you will generally find that in the case of a set having one or more stages of high-frequency amplification it is particularly important to have a short earth lead and a good connection to ground.

If the earth lead is long or wandering, or if the earth itself is a bad one, there is a great liability to oscillation setting in. Generally you will find that this liability is greater on the longer wave-lengths, although it is difficult to draw any hard and fast rule, and a good deal depends upon the precise nature of the circuit.

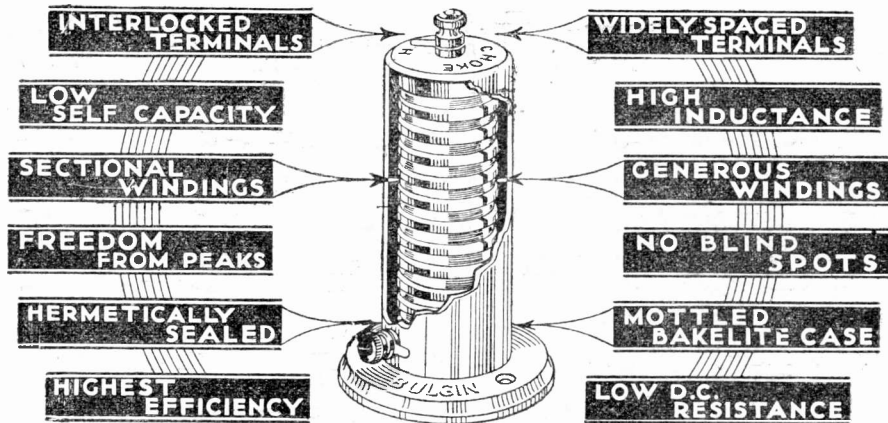
Where the ordinary aerial and earth system is used it is clearly essential to have a proper earth, but what is not so generally known is that, even with a frame aerial, where a fair amount of high-frequency amplification is used, good results can often be got in the way of stability by adding an earth connection.

Stray Coupling.

In wiring up a receiver it is very important to arrange the wiring so as to avoid as far as possible stray coupling. This has always been an important consideration, but in these days, when sets are so "compact," notwithstanding the advantages gained by screening, it is more than ever necessary to give the most careful consideration to the spacing of the various conductors.

When two conductors, for example two wires or busbars, are adjacent, especially when they are carrying high-frequency currents, the condenser effect which they produce may have a serious influence upon the operation of the receiver.

(Continued on next page.)



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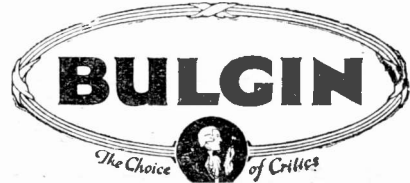
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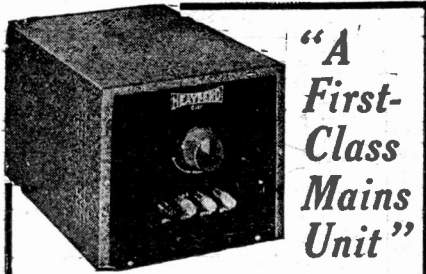
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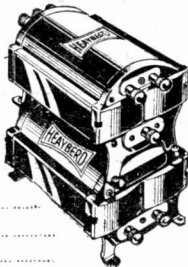
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TECHNICAL NOTES

Continued from previous page.

You want to bear in mind that any two conductors separated by an insulating medium or dielectric form a condenser and the capacity of this condenser depends upon the area of the conductors and upon their nearness together. The larger they are in area and the closer together the greater will be the capacity.

A Cause of Trouble.

So you see that you always have these condenser or capacity effects between the various wires of the set and it is purely a question of whether the capacity produced is sufficient to upset the working of the receiver.

A particular case in point, probably the most notable case of unwanted capacity causing trouble in a set, is that of the inter-electrode capacity in the valve.

As you know, the anode and the grid of a valve must form a condenser, and in the old days when we were content with a comparatively low magnification per stage, this anode-grid capacity did not seriously matter, although it clearly imposed a limit upon the degree to which the amplification could be pushed.

As soon as we tried to get extra amplification the valve went into oscillation, because the energy in the grid circuit was amplified in the anode circuit and then fed back owing to the capacity between these two electrodes.

One of the most notable advances in high-frequency amplification was the introduction of the neutralising condenser which, like most important inventions, is extremely simple in principle.

Balancing Out Valve Capacity.

The neutralising condenser is a small added condenser which has the effect of counter-balancing the inter-electrode capacity of the valve and so enabling the magnification to be pushed up to a very much higher value than previously.

The neutralising condenser must, of course, be variable, and must be adjusted until its value exactly balances the inter-electrode capacity of the valve.

When this state of affairs is achieved, the impulses due to the capacity in the valve and the impulses due to the capacity in the neutralising condenser are of equal strength and opposite in phase and consequently they cancel each other out.

I mention all this because the action of the neutralising condenser is sometimes rather a mystery to newcomers to radio, and also to emphasize the importance of avoiding stray capacity effects in other parts of the circuit.

You will realise, therefore, the importance of giving as much spacing as possible to the various parts of the wiring, also of avoiding the wires running close together and parallel to one another.

The precautions are specially necessary in the aerial and other high-frequency parts of the circuit. Bear in mind also that the too close proximity of a high-frequency-carrying conductor to a screen is bad practice, because it results in interaction between the conductor and the screen with consequent loss of energy.

Testing Pick-up:

A very common type of query which I get from readers is on the question of pick-up sensitivity: they want to know "What is the most sensitive and suitable pick-up to use?"

This is about as easy to answer as the question: "What is the best motor-car for me to buy?" It depends so very much upon a variety of circumstances and conditions, and all I can really tell you is that there are now quite a number of excellent pick-ups on the market: some are more sensitive than others, but even that does not necessarily mean that those which are in themselves more sensitive will necessarily be the best choice for your particular set of conditions.

Choosing a pick-up is much like choosing a valve, and if you are in doubt you will be best advised to consult your dealer, or an expert friend, explaining the details of the circuit and other conditions.

THE SUCCESS OF THE "P.W." "SUPER-QUAD"

(Continued from page 809.)

actually reversed in their relative positions with the filament.

The control grid (taking the radio frequency input) of the S.G. valve is nearer the filament than the screen grid; while in the bi-grid valve the control grid is further than the inner or second grid.

Obviously, then, the bi-grid and S.G. valves are not interchangeable, though with a different circuit an S.G. valve could be used as detector-mixer, together with a separate oscillator.

It is here that the "P.W." "Super-Quad" again scores over other circuits, for it does not need a separate oscillator, the bi-grid carrying out double duties.

I hope I have succeeded in clearing up some of the little points of which some readers may be doubtful, and in showing how very important it is that in a receiver containing such fine qualities every component should be of the best, and properly chosen for the job it has to do.

The Fitch of Perfection.

A typical analogy would be to compare the "P.W." "Super-Quad" to a Schneider trophy plane as against the heavier and slower standard flying-boat. The "Super-Quad" is a combination of carefully selected parts—is, in fact, a "hotted-up" receiver, though this process of "hotting" in no way makes the set tricky to operate. It does, however, enable results to be achieved that would be impossible with an ordinary four- or five-valver, and achieved with such amazing simplicity of construction and operation as to astound even the "hardened" radio fan.

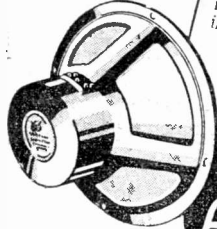
But, like the Schneider plane, things must be quite right with every part. There must be no "this-will-do" attitude in its construction, or the set will be but a travesty of its proper self. Take pains to follow all the directions carefully and you will have one of the most astonishing receivers of the year, a set which will make you the envy of your neighbour who is probably still struggling along with that old five-valver of which he used to be so proud.

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Telephone: HOP 5555 (Private Exchange)

Telegrams: READIRAD., SEDIST

Become a Ready Radio customer and avail yourself of Mr. Kendall's invaluable technical advice at any time you need it.

72
PAGES

**"P.W." HAS THE LARGEST
WIRELESS CIRCULATION**

72
PAGES

Popular Wireless

Every Thursday
PRICE
3d.

No. 484. Vol. XIX.

INCORPORATING "WIRELESS"

September 12th, 1931.

*In this
issue*

FORECAST OF THE EXHIBITION



The National Radio Exhibition opens in London next week, and it is going to be a record-breaking show. Read all about the preparations now being made, and the surprises the manufacturers have in store.

Also in This Issue:

ABOUT OUR EXHIBITION SETS

RADIO
IN
BERLIN

THE L.S.D.
OF
FREE G.B.

A RADIO
SUNDAY
IN ROME

THE
B.B.C.'S
RECEIVERS

QUEER
S.G.
FAULTS

AN EXTENSER CRYSTAL SET

INTRODUCING

LEWCOS

Regd.

P.V. and P.J. Coils

Read what the Technical Editor of "Popular Wireless" says about LEWCOS P.J. and P.V. Coils—

"I have examined a complete set of Lewcos P.V. and P.J. coils, and I can assure you that they are really first-class components from every point of view."

"They are definitely superior to many other makes, and this, in the circumstances, is hardly surprising!"

"I particularly like the little mounting feet that are securely fixed to them, for these enable the coils to be mounted either vertically or horizontally."

"Constructors should make a particular note of these 'Lewcos' P.V.'s & P.J.'s"

WE ARE EXHIBITING AT



VISIT OUR STAND No. 27.



LEWCOS RADIO PRODUCTS FOR BETTER RECEPTION

THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LIMITED, CHURCH ROAD, LEYTON, LONDON, E.10



ANOTHER MAZDA MASTERPIECE

A 2-VOLT BATTERY PENTODE WITH AMAZING CHARACTERISTICS

Here—at last—is the real solution to the output stage problem in portable receivers. Giving an enormous undistorted output with an anode current consumption of only 3.5 m.a. at 120 volts, the Mazda Pen 220 obviates the need for heavy H.T. supply when ample volume is required. The Pen 220 is a product of Mazda ingenuity, Mazda experience, Mazda research—another Mazda Achievement.

FROM ALL GOOD RADIO DEALERS

LOOK FOR "EDDY" IN
YOUR DEALER'S WINDOW

MAZDA PEN 220

Characteristics:

Fil. volts	-	-	-	2 v.
Fil. Current	-	-	-	0.2 amps.
Max. Anode volts	-	-	-	150 v.
Max. Screen volts	-	-	-	125 v.
Mutual Conductance	-	-	-	2.5 m.a./v.
Grid Bias	-	-	-	-3 to -4.5 v.

PRICE 20/-

EDISWAN RADIO

THE AMAZING

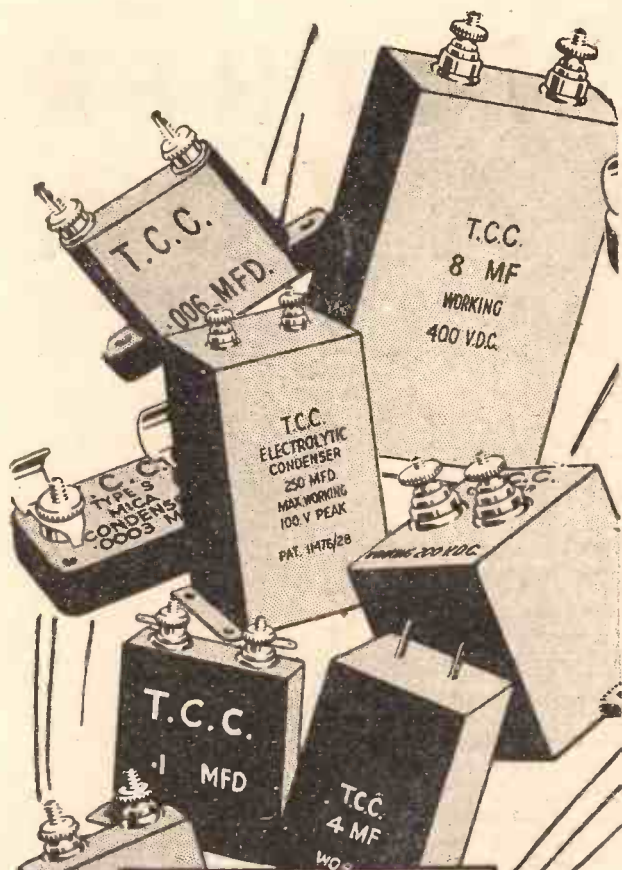
MAZDA THE BRITISH VALVES

STAND NO. 21
NATIONAL RADIO
EXHIBITION, OLYMPIA

THE EDISON SWAN ELECTRIC CO. LTD.



155 CHARING CROSS RD., LONDON, W.C.2



**YOU'LL FIND
THEM ALL
ON STAND
No 14
and in all the
best sets at
OLYMPIA**



**LOOK FOR THE CONDENSER
IN THE GREEN CASE**

The Telegraph Condenser Co. Ltd., Water Farm Rd., N. Acton, W.3.

♥ 8901



**It holds your attention ; it makes
you realise the beauty of music.**

Every day "Wufa" enthusiasts write giving
evidence of the singular qualities of this loudspeaker.

Read these Extracts :-

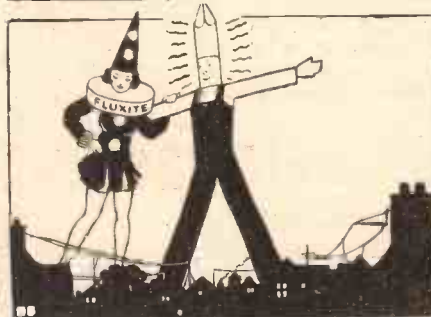
"A great speaker at a small price."
"The purest speaker I have ever
heard."
"The Wufa Speaker is great, con-
sidering I use only a 2-valve set."



CABINET SPEAKER (No. 75)
Embodies the Wufa 60 Pole
unit, which has alternative resis-
tances to match your set. This
cabinet speaker of attractive
modern design is fully qualified
to take its place in any home.
Excellent volume and reproduc-
tion: Polished Walnut
cabinet. Gold Tinsel
fret. Price **75/-**

Your dealer will willingly demonstrate.

M. Lichtenberg, 4 Ct. Queen St., Kingsway, W.C.2



"We're Fluxite and Solder,
the reliable pair,
"Famous for Soldering—
known everywhere !
We've soldered all connec-
tions, and here's the
reward—
Good Programmes come
clearly
From Home and Abroad!"

See that Fluxite and Solder are always by you—in the house, garage,
workshop—anywhere where simple, speedy, soldering is needed. They
cost so little, but will make scores of everyday articles last years longer !
For Pots, Pans, Silver, and Brassware : RADIO : odd jobs in the garage—
there's always something useful for Fluxite and Solder to do.

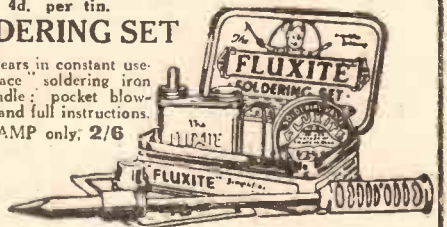
All Hardware and Ironmongery
Stores sell Fluxite in tins, 8d.,
1/4 and 2/8.

ANOTHER USE FOR FLUXITE
Hardening Tools and Case Hardening.
Ask for Leaflet on improved method.

NEW "JUNIOR" SIZE, 4d. per tin.
FLUXITE SOLDERING SET

Simple to use and lasts for years in constant use.
Contains special "small-space" soldering iron
with non-heating metal handle : pocket blow-
lamp, Fluxite, Solder, etc., and full instructions.
COMPLETE, 7/6. or LAMP only, 2/6

FLUXITE LTD.
(Dept. 324),
ROTHERHITHE, S.E.16



ALL MECHANICS WILL HAVE

FLUXITE

IT SIMPLIFIES ALL SOLDERING

PERFECT PAIR WAY
TO PERFECT RADIO



Wander plugs in the PERTRIX H.T.? PERTRIX L.T. connected up all right? Then switch on. You never realised radio could be so good, did you? That's the best of getting the Perfect Pair—they work in perfect harmony with each other and with your set, giving you just Perfect Radio. And they last longer, too . . . infinitely longer.

Made by BRITANNIA BATTERIES, Limited
at Redditch who also make:

Batteries for Central Stations • Batteries for Country House Lighting • Emergency and Stand-by Lighting Batteries for Theatres, Cinemas, Hospitals, etc. • Batteries for the Starting and Lighting, and Lighting and Ignition of Motor Cars, Motor Cycles, Buses and Coaches • Batteries for Electric Vehicles, Trucks, Locomotives, Ships and Yachts • The only Nickel-Iron Alkaline Battery on sale in Britain that is entirely made in this country.

PERTRIX
SUPER LIFE
DRY BATTERIES
&
ACCUMULATORS

THE PERFECT PAIR FOR PERFECT RADIO

Advert. of PERTRIX LIMITED, 233, Shaftesbury Avenue, London, W.C.2.
Telephone: Temple Bar 7971 (5 lines) Works: Redditch

DON'T LEAVE IT TO CHANCE.

Protect your S.G. or Pentode Valve with a Belling-Lee Anode Connector. Contacts are safely placed *inside* the insulated cap. Short circuits impossible.

- S.G. Safety Anode Connector - - - 6d.
- Engraved Wander Plug - - - 2d.
- Belling-Lee Battery Cords with engraved Wander Plugs and spring grip Spade Terminals. 5, 6, 7, 8, 9 and 10 way.
- 54 in. cords 4/- to 6/6. 30 in. cords 2/6 to 5/-.
- With fuse, 1/- extra.



37 DIFFERENT LETTERINGS.

Belling-Lee Terminal, Type "R," with insulated engraved heads that *can't* come off. 37 different letterings that *don't* rub off. 3d. each.

Type "M" 4d. - Type "R" 6d.
Insulated and non-rotating name.

BELLING-LEE TERMINAL MOUNT.

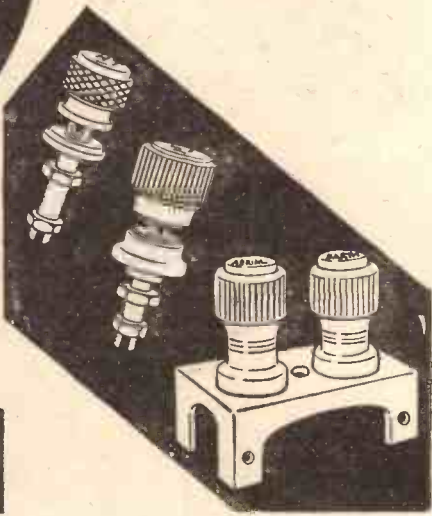
To take two terminals of any type - 8d.



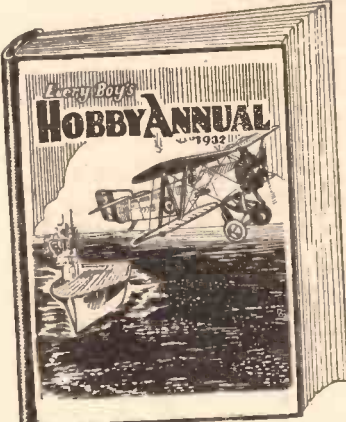
THE BEST TERMINALS IN THE WORLD.

For perfect design, finish and workmanship Belling-Lee Terminals are unequalled. Chosen by all the leading Wireless Journals and by most manufacturers of sets and battery eliminators. *Your* choice, too.

BELLING-LEE
FOR EVERY RADIO CONNECTION



Adv. of Belling & Lee, Ltd., Queensway Works, Ponders End, Middx.



The most up-to-date Book for the Boy with a Hobby!

Every Boy's HOBBY ANNUAL is the finest book of its kind ever published. It is packed with brightly written articles on practically every hobby and subject appealing to the boy of to-day. Every boy who is keen on making things and finding out how things work will want this wonderful book. It is profusely illustrated with photographs and drawings that show how in the simplest way. There are also two large folding photogravure plates.

HOBBY Annual
On Sale Everywhere - - 6/- net

N&K INDUCTOR LOUDSPEAKER



FOR PERFECT REPRODUCTION
NO FIELD ENERGISING REQUIRED
CHASSIS £3 : 10 : 0

IN BAKELITE CABINET, £5 : 5 : 0
A. BRODERSEN, 11, NORTHAMPTON SQUARE, CLERKENWELL 7286. LONDON, E.C.1.

"POPULAR WIRELESS" ADVERTISEMENT RATES

Whole Page £40 Quarter Page £10
Half Page £20 Eighth Page £5

Narrow Column Advts. (3 cols. to page) per inch 30/-
Minimum Space accepted - - - half inch 15/-

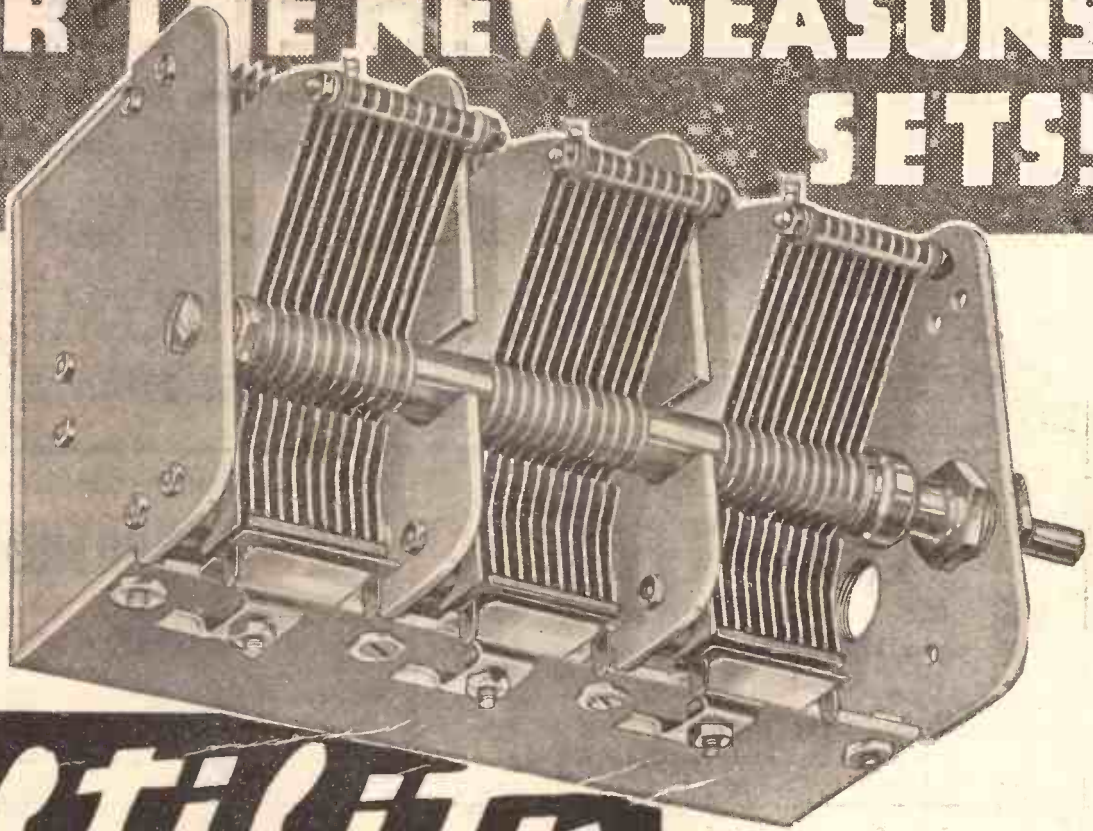
NO SERIES DISCOUNT. ALL ADVERTISEMENT COPY SUBJECT TO EDITORIAL APPROVAL

COPY AND BLOCKS MUST BE IN HAND 11 DAYS BEFORE DATE OF ISSUE TO ENSURE PROOFS

ALL communications respecting ADVERTISING must be made to:-

JOHN H. LILE, Ltd., 4, Ludgate Circus, London, E.C.4
DO NOT MISS OUR EXHIBITION NUMBERS—SEPT. 19 & 26.

SCREENED CONDENSERS FOR THE NEW SEASONS SETS!



Most of the new circuits will be ganged. But whilst tuning will be simplified in theory, the circuits will demand matching of a much higher degree of accuracy and absolutely perfect screening. With these requirements in mind "Utility" designers have produced a group of instruments which are unsurpassed.

The new "Utility" ganged condensers are so constructed that it is impossible to set up torsional stresses during tuning operations, a common fault with most ganged condensers. Therefore, capacity remains constant—a vital factor in delicate tuning. Exceptionally smooth action and dead accuracy of tuning are secured by an ingenious ball-bearing centre spindle.

SEMI-SCREENED		TOTALLY SCREENED	
Cat. No.		Cat. No.	
W.305/2	Two-gang 17/6	W.306/2	Two-gang .. 22/6
W.305/3	Three-gang (as illustrated) .. 22/6	W.306/3	Three-gang .. 27/6
	Friction Dial 2/6 extra. (Prices of four-gang on application.)		

★ Send a post-card for the new "Utility" Catalogue.

WILKINS & WRIGHT, LTD.

"UTILITY" WORKS, HOLYHEAD ROAD, BIRMINGHAM.

AGENTS—London: E. R. Morton, Ltd., 22, Bartlett's Buildings, Holborn Circus, E.C.1; Scottish: E. B. Hammond, 113, Vincent Street, Glasgow; Lancashire and Cheshire: J. R. Lister, 93, Old Road, Blackley, Manchester; Westmorland, Cumberland, Durham, Northumberland, Yorkshire and Derbyshire: H. C. Rawson, Ltd., 100, London Road, Sheffield.

ADVANCE DESIGNS BY "UTILITY" EXPERTS!

STAND NO. 90
WE ARE EXHIBITING AT



Belmont

OUT NEXT WEEK!

THE WIRELESS CONSTRUCTOR

SPECIAL EXHIBITION NUMBER

ENLARGED!—SAME PRICE, 6d.—BETTER THAN EVER!

VICTOR KING'S VERY LATEST—i.e.:—

THE "I.E."

A set without a precedent!
Ordinary — and short — wave-
lengths.
No switching—No coil-changing.

Also in the October "Constructor"

THE "EXHIBITION" FOUR

Magnificent long-range results
—Real quality reproduction—

Other features of the October number—on sale early next week—include

Queer Queries
Savoy Hill News
The Light Charger
Pick-up Hints and Tips
Round the Dials
The New Season's Valves
Television in Germany

On the Grid
Points for Purchasers
As We Find Them
A Practical Man's
Corner
The Month on Short
Waves

When the Set Goes
Wrong
In Lighter Vein
With Pick-up and
Speaker
In the Radio Workshop

*And a long profusely illustrated review
of the Radio Show at Olympia,*

THIS YEAR'S EXHIBITS

DON'T MISS IT—RADIO'S ONLY SIXPENNY

THE WIRELESS CONSTRUCTOR

OUT SEPTEMBER 15th.

PRICE SIXPENCE

"Say boy! What have you done to your set, put more valves in it?"

"Sounds like it, doesn't it, but actually I bought a Regentone Mains Unit instead of the old dry batteries, and the jolly old thing seems to have taken a new lease of life."

"Was this mains unit very expensive?"

"Couldn't afford it in these hard times if it were. Actually it's going to save me money."

"What! That's interesting. Where did you get it?"

"Oh! In that shop on the way to the station. The young fellow there if he sees the slightest chance of doing business will be round to give you a demonstration. He knows that a Regentone demonstration is a sure sale!"

"Well it sounds good to me, I'll pop in and see him."

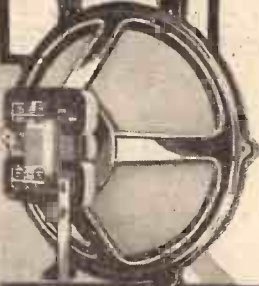
EVERYTHING **G.E.C.** ELECTRICAL
your guarantee

GECOPHONE

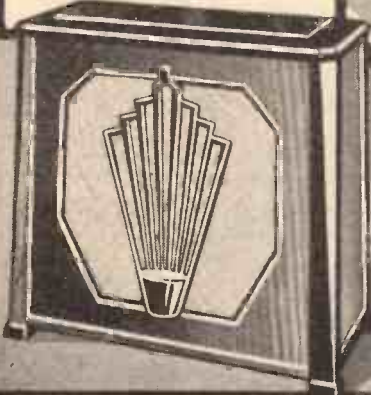
New and improved models - *revelations in performance and price*

The new range of GECOPHONE Radio Receivers and Loud Speakers presents many striking developments in design—features which raise the pleasures of radio entertainment to a much higher standard of excellence than previously attained. For many months G.E.C. radio experts have applied themselves ceaselessly to the task of improving quality of reproduction, ease of operation and intrinsic beauty of cabinet construction. The result has been a triumph of technical skill and experience. A GECOPHONE Receiver or Loud Speaker impresses not only by its wonderful audible efficiency, but also by the high-grade workmanship which is obvious in every part of its make-up.

**GECOPHONE
 INDUCTOR
 DYNAMIC
 LOUDSPEAKER**
(Farrand Inductor Pat.)
 PRICE, Chassis only
£3.10.0



**GECOPHONE INDUCTOR
 DYNAMIC LOUD SPEAKER**
 Unrivalled performance on all types
 of receivers. Attractive walnut cabinet.
PRICE . £5 . 10 . 0
 HIRE PURCHASE: Deposit £1 and
 12 monthly payments of 8/-



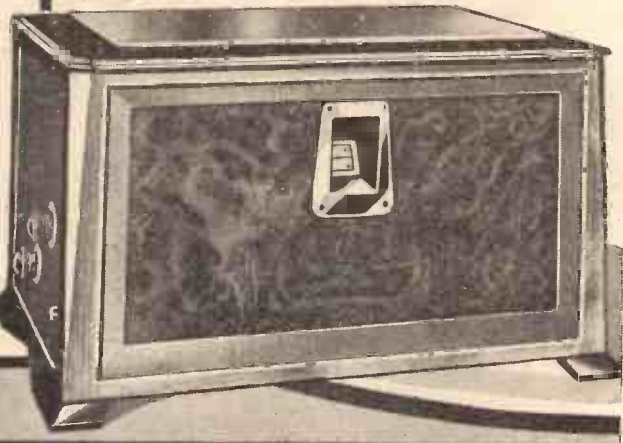
**GECOPHONE
 ALL-ELECTRIC
 TABLE "FOUR"**
 (For A.C. Mains)

A really powerful Receiver giving the finest performances under modern broadcasting conditions. Cabinet medium walnut with front panel to match.

PRICE, including OSRAM VALVES and Royalty

20 Gns.

HIRE PURCHASE:
 Deposit £2 10s. 0d. and
 12 monthly payments
 of £1 13s. 0d.
 D.C. MODEL £25 0 0



HIRE PURCHASE—terms are stated in each example of GECOPHONE Radio Receivers and Loud Speakers given in this advertisement. Equally attractive terms for other models are also stated in Folder B.C. 5958 which gives full particulars of the complete GECOPHONE range. A copy will be sent you **POST FREE** for coupon at bottom right-hand corner. All sets and loud speakers are illustrated in actual colours and fully explained. **WRITE FOR A COPY TO-DAY.**

SUPREMACY IN RADIO

Advt. of The General Electric Co. Ltd. Head Office and Public Showrooms: Magnet House, Kingsway, London, W.C.2

EVERYTHING **G.E.C.** ELECTRICAL
your guarantee

RADIO RECEIVERS AND LOUD SPEAKERS

MADE IN ENGLAND
Sold by all Wireless Dealers

GECophone CONSOLE ALL-ELECTRIC RECEIVER
(For A.C. Mains)

A self-contained floor cabinet type Receiver with built-in Inductor Dynamic Loud Speaker. Inlaid Walnut Cabinet.

PRICE including OSRAM VALVES and royalty **29 GNS.**

HIRE PURCHASE: Deposit £3 10s. od. and 12 monthly payments of £2 8s. 6d.

GECophone ALL-ELECTRIC RADIO-GRAMOPHONE
(For A.C. Mains)

A model which sets a new standard of radio-gramophone entertainment. An enormous advance for this type instrument. Inlaid walnut cabinet.

PRICE including OSRAM VALVES and Royalty **40 GNS.**

HIRE PURCHASE: Deposit £4 10s. od. and 12 monthly payments of £3 7s. 6d.

NATIONAL RADIO EXHIBITION

If you are visiting the NATIONAL RADIO EXHIBITION do not fail to see the GECophone Radio Receivers and Loud Speakers on the 2 G.E.C. Stands and the Special Demonstration Room in the Gallery, National Hall.

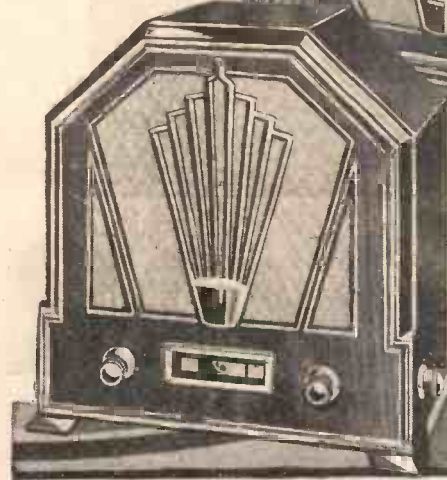
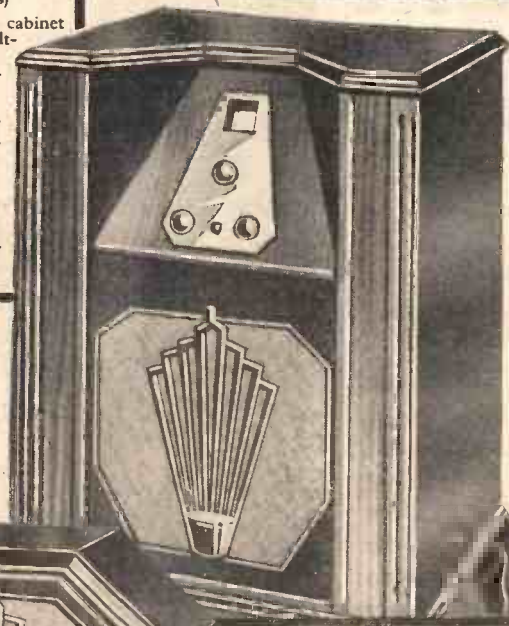
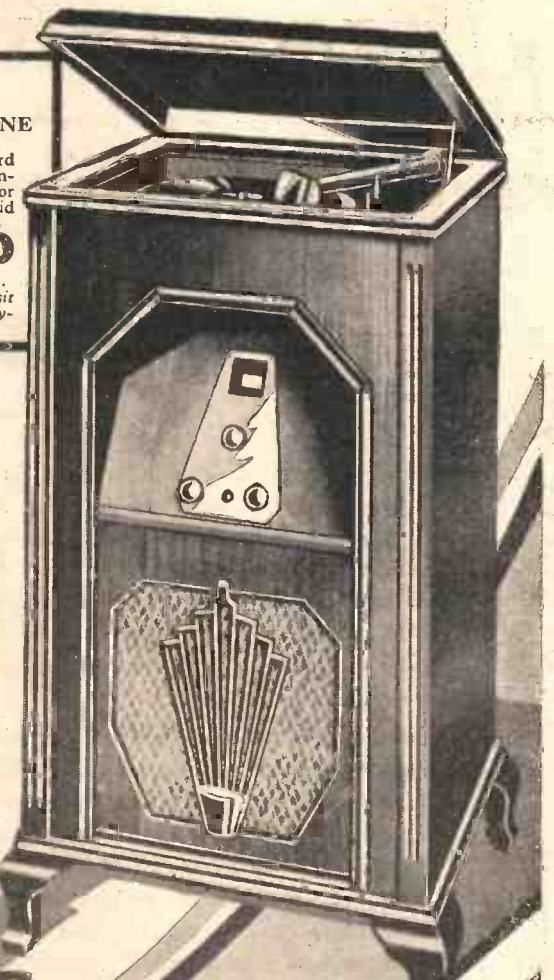
GECophone ALL-ELECTRIC "COMPACT" RECEIVER
(For A.C. Mains)

WITH BUILT-IN INDUCTOR DYNAMIC LOUD SPEAKER.

A new self-contained Receiver giving pure and powerful output from a wide range of stations. Handsome polished walnut cabinet.

PRICE including OSRAM VALVES and Royalty **18 GNS.**

HIRE PURCHASE: Deposit £2 and 12 monthly payments of £1 10s. od.



POST THIS COUPON

Please send me Folder No. P.C. 5958 giving particulars of GECophone Radio Receivers and Loud Speakers.

Name _____ Address _____

The General Electric Co. Ltd.
Magnet House, Kingway,
London, W.C.2

P.W.
Cut out and paste on postcard, or enclose in unsealed envelope, Halfpenny postage in either case.

G.E.C. RADIO

Branches & Public Showrooms throughout Great Britain.

Long life Freedom from hum Uniform results

THE principles of construction used in Cossor Mains Valves ensure long service, high slope, freedom from hum and low grid-anode capacity. These valves are of the indirectly-heated type. The cathode, which is heavily coated with a special electron-emitting substance, is heated by means of an internal heater-wire, the heater-wire itself being heavily insulated throughout its length.

The electrode system is built as one solid unit securely braced top and bottom with stout insulating bridge pieces. As a result, absolute uniformity is guaranteed, and uniformity of construction means, of course, uniformity of results. All Cossor Mains Valves therefore give the same high standard of performance. The immensely strong construction ensures long life and ability to withstand the most severe impact without damage. Cossor Mains Valves are stocked by the best retailers and may be obtained from any good Wireless Shop in types to suit every All-Electric A.C. Receiver.



Send for a copy of Leaflet No. L.36 which gives full technical details of all types of Cossor A.C. Mains Valves.

COSSOR

A.C. MAINS VALVES

FOR ALL-ELECTRIC SETS

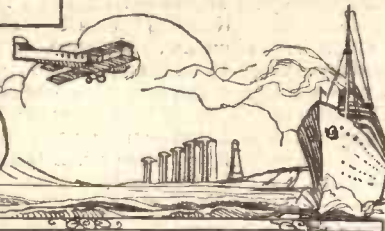
Popular Wireless

LARGEST NET SALES



Scientific Adviser:
Sir OLIVER LODGE, F.R.S.
Chief Radio Consultant:
CAPT. P. P. ECKERSLEY, M.I.E.E.
Editor: NORMAN EDWARDS.

Technical Editor: G. V. DOWDING, Associate I.E.E.
Assistant Technical Editors:
K. D. ROGERS, P. R. BIRD,
A. JOHNSON RANDALL.



THE HALF-PIANO
SWISS SHOW
A BIG ORDER
MY STATUE!

RADIO NOTES & NEWS

WHOSE IDEA?
"MAN-NERISMS"
GLASGOW AND TRAMS
THE EMPIRE QUESTION

Trying a Radio-gram.

WE went a-visiting the other Sunday where there was a radio-gramophone, and as I had never before had the run of one of these things I asked my host to put it through its paces.

It was afternoon. Nat. and Reg. came over well, but the tremendous volume had to be toned down. My attention was directed to the bass; there was lots of it, and some of it ought not to have been there, but I did not say so.

The Half-Piano Mode.

WE tried foreigners, and got Paris and Huizen; nothing else. In order to rotate the frame aerial we had to heave the set, which was as big and as heavy as half a piano, round and round on the lino. We needed only baize aprons to make us look like Bindles!

Now, thought I, apart from not having to wind up the grammy, what advantages does this lot offer me over my S.G. three-valver, made of the choicest parts, my new loud speaker and my beloved grammy? The difference between the pick-up results and those my grammy gives could not have been great, and needle scratch was heavier.

Swiss Radio Show.

TO all whom it may interest I would impart the news that there is to be a Swiss Radio Exhibition at Basle between September 26th and October 4th, in the building used by the Swiss Sample Fair. Copies of the prospectus and forms of application for space may be obtained from the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1.

I understand that there are to be two sections, one for the manufacturers and sellers of radio sets, gramophones, musical instruments and "talkie" apparatus, and

the other illustrating the development of radio in Switzerland.

Outdoor Aerials.

MY professional friend "Grid Leak," of the "Daily Sketch," discussing the merits of indoor and outdoor aerials, seems to imply that the balance in favour of the outdoor aerial is due to the fact that the outdoor aerial is *out-of-doors*. Doubtless he knows the truth; doubtless he has not made it plain. Ariel will supplement "Grid Leak's" remarks by explaining that an outdoor aerial of the usual type is of the "open circuit" variety—i.e. it has the end remote from the set *free* and insulated. As a rule, the indoor type is either a frame aerial or almost a closed

the army of one of the States in South-Eastern Europe. This contract was snatched from the teeth of French, German, American and other manufacturers, and must be worth very many thousands of pounds.

A Statue to Ariel.

"MY" statue on Broadcasting House is getting along finely. Eric Gill is the "sculptist," and although I don't admire his working clothes I venerate his genius, which almost equals my own: Owing to my being so busy answering your letters and fending off the iron bedstead man, we had to use Mr. Leslie French as a model. Mr. French was associated with Ben Groet and has Shakespeare in his bones.

"... AND NOW THE WIRELESS MILITARY BAND WILL PLAY ..."



One of the most popular features of the B.E.C. programmes is music by the Wireless Military Band, here shown assembled, with soloist, in the London Studio No. 10.

Whose Idea is This?

I AM an amateur hiker of considerable and varied experience. I have tramped in four-countries, including China and Switzerland; so I know a thing or two about road-work and camping. Hence I am amazed to hear that someone has designed and intends to exhibit at the Show a radio set for hikers. This set is said to weigh 12 lbs. and to be 8 in. square!

Hikers will howl with laughter at the mere idea of including such an incubus in their kit. Of

course, it may appeal to those who walk from Croydon to Box Hill and 'bus back. But the true hiker hikes to get away from radio and the world in general.

Brothers! Think of wireless in the Doone Valley—and weep!

Big Order for Britain.

A PROOF that Britain can not only deliver the right goods, but can also compete with other countries is furnished by the fact that Marconi's have just secured a contract for the supply of 128 duplex field radio-telephone sets for

A Few Man-nerisms.

MY indefatigable correspondent, Mr. A. W. Mann, has provided me with some titbits which I pass on to you,

(Continued on next page.)

"ARIEL" REVIEWS THE NEWS OF THE WEEK

on his authority. The experimental S.W. station relaying Hilversum on 81.45 m. is Paolina. The "Nautilus" uses 200 watts.

CT 3 A G (Funchal, Madeira), which used to work on 47 m. is now on 24 m. with a new call-sign CT 3 A Q. He works on Thursday and Saturday from 22:00 to 02:00.

Sydney, V K 2 H R is now working on 42 m. New Zealand, amateur, Z L-3 A Z, on the amateur band, 8 watts, but can increase to 35 w. Reports to Mr. R. T. Stanton, 17, Martin Avenue, Beckenham, Christchurch, New Zealand.

And Still the "Magic" Four.

THERE must be something of magic about that "Magic" design, for enthusiastic letters continue to dribble in from all over the world. For example, E. A., from Rangoon, writes four foolscap pages in praise of the "Magic" Four.



He gives a list of twenty-six long and short wave stations logged with it, plus a shorter list of

medium-wavers, which take him practically all over the globe. So, you see, it's a matter of building the set aright and using it with skill.

Much obliged, E. A. Copies of "P.W." have been forwarded as requested, but you should place a subscription and avoid disappointment, as some for which you asked are out of print. "P.W." sells out!

Light on the Subject.

THE latest project of Marquis Marconi is said to be to light a bonfire at Rio de Janeiro by a radio impulse from his yacht some 5,000 miles distant, to commemorate the discovery of



America by Columbus. This will be regarded as pure swank by the thousands of gardeners who, like me, cannot get the destructor to work during this weather, even at close

quarters and with a pint of paraffin.

Again, why celebrate the affair? Nobody celebrates the discovery of Australia, and that is much more worthy of a bit of whoopee. And yet again, if Spain hears of this there may be fandangoes, because, although Marconi may consider that Columbus was a Genoese, the Spaniards, I believe, claim him as a compatriot. They supplied the money and ships, anyway.

The "Proms."

MR. COLIN GREEN, writing in the "Daily Dispatch," denies that the public wants what the B.B.C. offers at the Queen's Hall. He elegantly refers to "Wood-worshippers"—meaning people who consider Sir Henry Wood to be a first-

class conductor—and says of Wagner, Brahms, Haydn, Handel and Beethoven, that we must either gush over them or write ourselves down as "soulless jackasses," or "coarse-brained nincompoops." One of Mr. Green's supporters (R. H. Hilton) refers to these concerts as "a thousand tummy aches;" "most of it without soul" (the "soul" in jazz music is so very profound!)"—like a rose with the blush washed out;" Mr. Hilton adds that a barrel organ would be better.

The "Proms." (continued).

ANOTHER of Mr. C. Green's supporters says that the Queen's Hall concerts are "broadcast to please a small minority of eccentric cranks." What awful bunk! I am by no means "highbrow" and

SHORT WAVES.

A MUSICAL BAR.

"The neighbours' loud speaker is perfectly unbearable. Shut the door!"
"The door is shut."
"Well, bolt it."—"Daily Mirror."

It has actually been declared at the Welsh Nationalist Conference that there would be many volunteers ready to go to prison as passive resisters to demands for licence fees, in the sacred cause of more broadcasts in Welsh.
"Play up, Aberdeen!"—"Portsmouth Evening News."

The best type of loud speakers are between one and twelve months old!

"Talk to your Radio" runs a headline in the Yorkshire Evening Press.
No, thanks, it might answer us back—and it talks far too much already.

BEWARE!

Sing a song of wireless now—
A drawer full of scrap,
Five-and-twenty terminals,
Wire all kinked and warped.

Startling new ideas come;
Baseboard brought to light,
New set starts to function well
And Tommy shows delight.

Tommy, sitting at his set—
A P.P.V. umpteen,
Which never had an earthing switch
Where that switch should have been.

One day, lightning flashing by,
Along his aerial flew;
Now his own music Tommy makes—
Upon a harp that's new!
—"Glasgow Evening Herald."

the music of Honegger, Stravinsky, Fogg & Co. seems to me to be the tootling of eccentrics—nevertheless, I declare that I could prepare a programme of Wagner, Bach, Beethoven, Brahms, Mozart, Tchaikovsky, and Schubert, which would elicit rapturous applause.

Glasgow and Trams.

KNOWING about our interest in anti-interference efforts and our approbation of Glasgow's determined move on the trams, Killoch (Glasgow) sends us a rough sketch of the new overhead collector which is being used, for which we are duly obliged. I note that Killoch is a devotee of the Flewelling circuit, and uses it to good effect. He tells me that Scots are in

the habit of carrying florins in preference to half-crowns, on the off-chance of wrong change in their favour. (Good florins?)

A Matter of History.

IT is rarely that I care to tackle the B.B.C. on a question of facts, but an announcement which they have made concerning the Wagner items due from Belfast on September 12th has clashed with one of the pretty pictures of my mind.



They assert that Wagner's "Siegfried Idyll" was written as a birthday gift to his wife, but I have long cherished the belief that he wrote it as a gift to that lady to celebrate the birth of their son, Siegfried, and that it was first performed on the stairs outside the lady's room; the players having been assembled there by stealth. According to the B.B.C., it was originally performed at Lucerne. Does anyone know the facts?

Economy.

IT is quite consistent with the practice of seekers after treasure for the Treasury that the Economy Committee should suggest cutting down the B.B.C.'s allowance; they had the example of the raided Road Fund before them. Well, some cook or other said that you cannot make omelettes without breaking eggs, so why should the B.B.C. be spared? Let the B.B.C. try to practise economy itself. I have here a letter from the manager of a broadcasting station abroad, in which its writer says that he would jump at a post with the B.B.C., without salary, but for ten per cent of the economies he could effect without lowering the quality of the service.

The Empire Question.

CHARACTERISTIC of many letters from Britons abroad is that of E. H. C. (Quetta, India). With a "Melbourne" Three he sits under a still punkah to frightful hours of the night and the most thrilling item he receives from home is "Big Ben."



The rest is silence, or talks on matters which do not interest men and women who are holding up the old flag in ghastly holes, of the boredom of which the heads of the B.B.C. have no proper appreciation. This matter of Empire broadcasting ought to be tackled in an Imperial way by people who know what it is to sit amidst the heathen and dream of Home. Cannot Sir J. Reith read R. L. Stevenson's letters and learn of them how the exiled Scot "wearies of the heather and the deer"?

ARIEL.

THE GREAT RADIO EXHIBITION

Advance information about this year's record-breaking Radio Show

EARLY on the morning of September 18th, 1931, there will be intense activity behind the closed doors of Olympia, London, W. Inside this huge building—one of the largest in London—there will be gathered many hundreds of thousands of pounds worth of radio apparatus of the very latest type, some of it never seen before outside the laboratory where it was constructed.

And following hours of hard work and a sleepless night for many exhibitors, the attendants will at ten o'clock on September 18th throw open the doors of Olympia to the public. The British Radio Exhibition will be on!

Staged Specially for the Listener

And before we get excited by the size and splendour of it, let us coolly consider and dispassionately examine what this great radio exhibition really is. Let us each ask himself, "Of how much importance is this affair to me?"

The somewhat amazing answer is that *you* are the most important part of the whole show. For you are a radio man. Nothing out of the ordinary, perhaps, but just a listener—and, because of that, the whole of this great business is directly dependent on you.

For months a great many keen minds have been wondering day by day, and often by night, what sort of set *you* are thinking of getting. And many a time when you have been sitting in the pictures, laughing at some wisecrack and thoroughly enjoying yourself, hundreds of zealous men (who would have preferred to be enjoying themselves at the pictures, too) have been working hard on your behalf.

Keen on their Work

What sort of men were they—these burners of the midnight oil? The answer is—All sorts. And it is rather flattering to reflect that amongst them are some of the keenest business brains of to-day.

For this great army that has been wondering about you is the Radio Trade—sponsors of the great radio show at Olympia, and a

Next week the wireless season begins in real earnest with the opening of the Radio Exhibition on Friday, September 18th, and below you can read all about the "great push" which the trade is staging at Olympia.

very remarkable phenomenon in British business.

What have these keen-minded fellows, who have been studying our radio requirements, got to show us this year?

Plenty of novelties, you can be sure.

One stunt which will interest invalids is a "radio-pillow" with a phone earpiece inside. This saves wearing telephones, and should have wide applications in the home as well as in hospitals.

There is also a complete set for hikers! It uses two valves, measures about 8" x 8", and packs into the haversack very conveniently.

Tremendous Advances

In every line things have been gingered up. The big sets for this show, little sets, loudspeakers, kits of parts, terminals,

coils, valves, cabinets, aerials, condensers—all are better than before.

It would amaze you beyond measure if you could realise how much thought and attention has been expended upon your requirements. Probably you have been anxious in your mind about your set for next year—what the circuit is going to be, and whether you will build it yourself or get a ready-made one.

Pleasing Everybody

If you magnify your problem by several million times you will appreciate the difficulties of the radio trader. He has got to supply you—the listener—with something. What?

He has asked himself—Are you looking for super-hets, or are you going to stick to straight circuits? Are you going all out for good long-distance foreign reception this year, or are you going to be more or less content with local stuff?

And if you decide on a nice selection of foreign alternatives, are you going to have much difficulty in cutting out that local station's programme? And will you do your own battery charging this year? And are you getting a little fed up with this gramophone business, or are you simply yearning to use a pick-up?

All these and many other points have been given serious attention by the radio manufacturers of Great Britain, and they have come to some very definite and interesting conclusions about you, the listener.

Better Reproduction

They think, for instance, that you are much more particular nowadays than you used to be. A few years ago you would put up with quality that was only a travesty of the real thing, but nowadays, when you hear a concert, you want to have a reasonably realistic reproduction of the original music.

You know good quality when you hear it. And that is why at the forthcoming exhibition loud speakers and low-frequency amplifying and output apparatus have

(Continued on next page.)

RUSHING TO GET READY FOR OLYMPIA



In all the radio factories there has been an enormous speeding up to get ready for the Radio Show, and here is a typical scene inside a British factory with the staff working overtime preparing for September 18th.

THE GREAT RADIO EXHIBITION

(Continued from previous page.)

been given so much attention. On this question of quality alone there has been many magnificent advances since last year.

The output valve itself, the possibilities of the pentode, and the various types of loudspeaker and output-filter circuits, different forms of L.F. coupling and better detection, have all combined to clean up the low-frequency side of radio reproduction.

Some Fine Sets.

As a result, there is no doubt whatever that this year's sets shown at Olympia are going to be better than those of previous seasons. The whole standard has moved forward, and no manufacturer whose quality of reproduction is deficient will stand a hope of selling profitably this year.

The better valves, better loud speakers, and better appreciation of the limitations of the various systems of detection have resulted in one big bogey of radio being laid low for ever—the bogey of bad reproduction.

But this improved standard of reproduction is only one of the very notable tendencies at Olympia—there are others of equal importance. Selectivity, for instance, and the whole question of high-frequency amplification of distant programmes.

As a matter of fact, it is rather odd to learn that in spite of all the difficulties of their job the radio manufacturers have been thoroughly enjoying themselves during the past twelve months. At least, the research and technical departments have, although the year's trade conditions have made enjoyment of any business man's life problematical. But the research departments have had some really exciting times.

Better Valves as Well.

New and better valves, combining rock-of-Gibraltar stability with hitherto unheard-of amplifying powers, have given the specialists in long-distance receivers the time of their lives. And finding that now, at last, they have a margin of safety attainable by the wonderful apparatus recently placed within their hands—they acted like wise men, and have specialised on the simplification of the whole art of long-distance reception.

Already it is quite evident that never has there been such simplification and easy tuning as at this present Show.

If you are unable to tune-in plenty of foreign stations this year, it is going to be your own fault. For it seems that towards

the simplification of tuning all that man can do the radio manufacturer has done.

The various tuning dials are a study in themselves. You get dials with lights behind them, dials with not only the main reading but with a shadow thrown on them to indicate what a second tuned circuit is doing, direct-reading, artfully-sloping, and altogether amazing dials.

The Extenser.

It is not really, of course, the tuning dial itself that has done all the amazing work of simplification, so much as the apparatus behind it. Extraordinarily ingenious tuning, ganging, trimming, and aligning, and so forth.

Nowhere in the world have the problems of a popular demand for two-band tuning been so severe or so ably met as in Great Britain. American sets, we know, need only tune between 250 and 600 metres. They do not listen to any long-wavers at all!

On the Continent, where long-wavers like Königswusterhausen and the Paris stations are almost as popular as our own 5 X X, much ingenuity in wave-change switching and so forth have been shown.

"WHAT WILL THE WIFE SAY?"



The fair sex are getting more and more interested in radio, and this year special efforts have been made to produce designs that will meet with feminine approval. Above, Louise Fazenda, the Warner Bros. star, is seen tuning-in an American receiver as a rest from the talkies.

But Britain has not been asleep, and at Olympia this year many condenser firms will be showing the greatest single-tuning simplification ever engineered—the Extenser. It works like an ordinary tuning condenser, but with this extraordinary and extremely valuable difference: it covers all the wavelengths without switching.

One half of the tuning dial of the Extenser gives readings between 0 and 100, and between these two figure readings are found the medium-wave stations.

Simplified Tuning.

By turning the Extenser's dial round further, three-figure readings are obtained—namely, those from 100 to 200—and here all the long-wave stations are to be found. No switching; just a simple swing from station to station, without any complications or complexities!

It is probable that the many repre-

sentatives of foreign radio firms who visit Olympia will each order every type of Extenser they can lay their hands on, and hurry back home with it to astonish their friends across the seas with particulars of Britain's latest radio development!

It is going to be a wonderful Show for the man with mains. The A.C. valve improvements alone would ensure that, but the latest D.C. valve developments and the excellent supplies of well-designed mains units will make this an especially notable Show from the all-electric point of view.

Exit the "Square Box."

Regarding the question of appearance, which will greatly interest the many ladies who visit the Show, it may be said right out that all other exhibitions are entirely outclassed by the products of 1931-32. In addition to really beautiful woodwork, many wonderful bakelite designs are on show.

As for the good old square box, or the square box with four legs, it is now definitely disappearing from radio design, to give way to artistically conceived models conforming to the latest standards of interior furnishing.

Never before has the Show been so big or so attractively laid out. Every manufacturer seems to have abandoned the idea of stunts, and gone in for specialised technical advance in his own particular field.

There is to be an uncommonly good display of loudspeakers, and it is an open secret that the permanent-magnet moving-coil models are expected to bring makers enormous business. And yet the manufacturers of armature-driven types are quite unperturbed, because of their confidence in the increased efficiency of this class of instrument.

Price Reductions.

In the question of cost there has been no absolutely spectacular avalanche-like fall in prices, such as shilling valves. But, nevertheless, there has been a really severe pruning of prices all round so far as the manufacturers find possible, with the result that a ten-shilling note will this year go further towards the acquirement of a set of parts than a pound note would have done in the not so very far distant past.

It is really amazing what the keen radio purchaser can save by keeping his eyes open, and, if for no other reason than this, you should certainly not fail to pay your 1s. 6d to view the biggest phenomenon that British business can show to-day—the Great Radio Exhibition.

In these times of depression and difficulty, with unemployment rife and industrial difficulties on every hand, the radio trade is one of the very few in the country that has gone ahead. In a world of business slipping away, it did not merely stand fast, but it progressed! And the great radio show at Olympia is going to give proof of that progress.

NEXT WEEK

THE "P.V." || THE "P.V."
PLUS. || STAR.

MAKE SURE—ORDER NOW.

A Radio Sunday in Rome



I SUPPOSE a real radio "fan" would never want to forget wireless, even when on holiday, but when one is interested semi-professionally in the hobby there are times when one wants a rest and a change. In this respect I always seem to be unlucky.

At Civitavecchia again on business a few weeks back, I met the same Marconi engineer who had paved the way for me to see the Pope's transmitter: and after discussing the heat (intense), Mussolini (guardedly) and the holidays (gladly), the talk naturally turned to radio. Apart from radio, these are stock topics of Italian conversation, I find!

Well, to cut a long story short, my long-lost friend had a whole heap of apparatus he was just dying to display to a British enthusiast, and he spent several nights at my hotel trying out bits, pieces, and a new short-waver.

As, for Customs reasons, I had taken no radio gear with me into Italy, I was secretly pleased with this opportunity to see how the other European stations sounded, and made a point of doing another Sunday "ether tour."

And, as a matter of fact, it came out to two Sundays, for after my first week's stay I had to go on to Rome, and borrowed the Marconi man's new short-wave receiver for the trip! All of which in due course.

An Early Start.

Quite early one Sunday morning I switched on one of the sets that had been left in my care, and decided, in between short spells of work, to make an occasional turn of the dials and see what Italian radio had to offer for Sabbath fare.

As far as possible I wanted to stick to national stuff, listening to other stations

A special "P.W." correspondent gives an amusing account of Sunday broadcasting in Rome and in Civitavecchia, and readers can judge for themselves whether our Sunday radio entertainment is as bad or worse than it is often said to be.

only occasionally for the sake of comparison, so I started off with Radio Roma: and it came in with a bang. No wonder we hear this so well in England. No wonder it is used for advertiser's programmes.

Plenty of Punch.

Its 75 kilowatts seem to work wonders, and as it is relayed down here by Naples, it appears to spread over a wide part of the dial. Here at Civitavecchia there is still an enormous field strength.

Only in the programme matter was I disappointed. On the rare occasions when I have been back in England listening to

foreign stations I know there has been an impression that, on Sundays particularly, Radio Roma, Radio Paris and a few others are really *gay* stations, in contrast to the Germans which stick to classical operas and heavy music on Sunday evenings.

Well, so far as Radio Roma goes, this is rather a mistaken impression, and one which I think has been obtained because English people listen to Rome generally only in the late-ish evening times, when, true, a fairly bright concert is given from about nine o'clock onwards.

For the rest of the Sunday, Rome is surprisingly dull—in great contrast to the national Italian habit, for Sunday is the time when everybody gets out of doors and, in the afternoons and evenings, has a really good time.

I switched on immediately after breakfast to Rome, and found a Bible reading in progress. This was at about ten o'clock, and was the first item on the programme.

My Italian not being quite up to the mark of following a Bible reading, I was about to turn the dials to Milan when the announcer heralded a gramophone-record concert—of sacred music.

Now, good organ music I like. Even Bach cantatas I can bear for a while. But this was neither good organ music in the British style nor singing that I could understand, so I turned over to Milan and found a news bulletin.

Not Very Gay.

After a little non-political stuff had been read out, a local sports bulletin was given and then the station shut down till midday, when it was announced that a light orchestral concert would be given.

Not very exciting, that, so back again to

(Continued on next page.)

THE MAIN STUDIO AT NAPLES



The studio of the Naples station. Naples always works in conjunction with Rome, not only as a relay but sometimes on a programme exchange basis.

A RADIO SUNDAY IN ROME

(Continued from previous page)

Rome. More talk, this time on rather novel lines. There is a scheme whereby once a week an amusement guide is broadcast for the benefit of visitors.

I believe the theatres, cinemas, tourist agencies and amusement parks included in this "guide" pay for their publicity, but it is certainly a very helpful idea, and knowing that I should be going on to Rome within a week I made a few useful notes in case I had time to spare.

A Blank Afternoon.

At eleven o'clock (the time seemed to be passing very slowly) they put on a German lesson from gramophone records. As my German is, fortunately, better than my Italian, I gave this the go-by and turned the dials until something else fairly loud came in.

Something did come in, very loud. It turned out to be Vienna, giving a concert

radio at all on a Sunday afternoon than to have the gloomy stuff which you might have been listening to in England, well over a thousand miles away.

At five o'clock I dropped into a café where a radio set was often going, and found that Rome was giving another light-music concert: quite agreeable stuff.

On the Short Waves.

The waiter, who had a programme sheet, showed me that apart from a shipping report from Naples and a news bulletin at eight o'clock, there was nothing till a short twenty-minute gramophone record concert at 8.10 p.m. After that there was nothing of interest until an Offenbach opera, "La belle Helene," at nine, and you can't blame me for not listening to the wireless any more that day!

During the week I went on to Rome, and managed to borrow my friend's short-waver, together with a set of valves and a very doubtful H.T. battery. On Saturday night, after I had virtually finished all business in Rome, I slung up a length of flex in my room at the hotel and connected up the batteries and phones.

Surprising, but it worked first time. I

B.B.C. stations for the first time since I have been out here, and then realised that being Sunday 5 S W was "off the air." Why is the B.B.C. so short-sighted on this matter of Sunday broadcasts?

Surely there is nothing immoral or unsacred in broadcasting on the short waves on Sundays, and we listeners staying abroad want to hear England just as much on Sundays as on the other days of the week.

On the short waves, of course, there was nothing doing all day until Rome's own concert started at nine o'clock, and I was tempted to tune back to 2 R O again for a short while; it was not terribly exciting, so I turned the dials slowly, a degree at a time, until something else came in. This particular short-waver had a screen-grid stage and appeared to be very sensitive.

Good Old Radio Paris!

I heard America. This, I imagine, must be very good going for this part of the world, where it is by no means dark at nine o'clock at night, and the mileage is abnormal.

I heard music, very strong and clear, for half an hour or so, but no announcement. From the wave-length list I gather it must have been W 2 X A L.

Then in came Russia. I think it was Moscow on about 46 metres. There was some kind of lecture in progress, but fading was bad. Zeesen on 31 metres came in well, and one or two others.

The entertainment value was nil. I went back to 2 R O, and found the orchestral concert still on, with a woman singing in operatic style at what seemed to me to be the wrong intervals in the music.

I went downstairs and begged the girl in the hotel bureau to switch on to Radio Paris, which she did, and I heard a jolly fine gramophone record concert, ending late.

And so to bed!

TO REMIND YOU—

Reaction—Long Waves—Mains Units.

Where R.C. low-frequency follows a detector valve the value of the anode resistance should be checked up if the set will not oscillate satisfactorily. (Too high a value will decrease or stop reaction.)

When using "interwave" or other circuits in which capacity coupling is employed, no departure should be made from the specified capacity or this will seriously affect the working of the set.

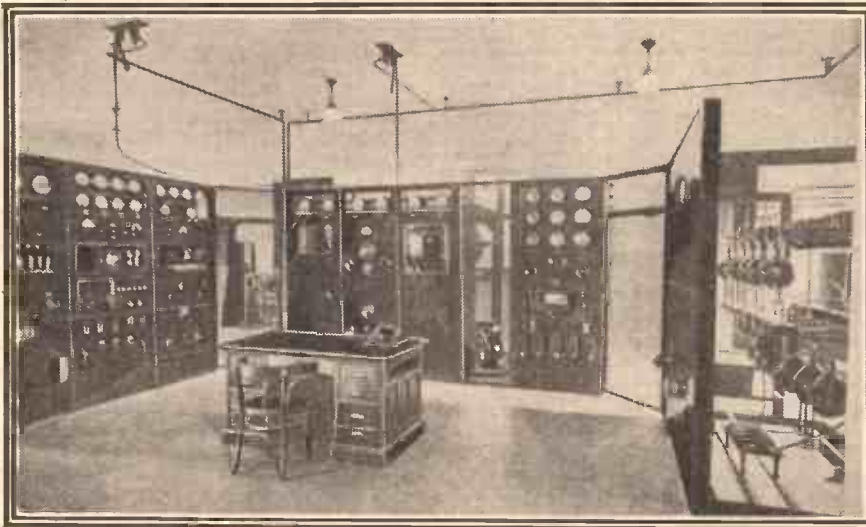
A defective grid condenser will sometimes cause unsatisfactory reaction on the long waves, although the set behaves normally on the medium band.

Sets which utilise super-power valves require mains units with an output of at least 30 millamps.

The use of a wrong type wave-change switch may completely throw out the reaction of a set, so it is always best to use one of the specified makes.

A mains unit should be chosen to conform with the required current output, and it should be borne in mind that those having a rated output of 20 millamps or under are suitable only for supplying up to a three-valve set, if one of these valves is of the power type.

NEW TRANSMITTER AT SANTA POLOMBA



The 50-kw. transmitter that has been installed close to Rome by an American Radio Corporation. The studios are situated in Rome itself.

by the Vienna Symphony Orchestra: really worth while listening to.

I picked up a book and tried to read with Vienna's music as a soothing background—and when I came back to earth again it was just after one o'clock and the Symphony Orchestra had gone! A zither concert was just starting—the zither is that peculiar instrument you can often hear from Vienna—and as lunch was ready I switched back to the first spot of bright music from Rome.

The announcer gave out that there would be a variety concert, but apart from one or two gay songs it was chiefly composed of light orchestral music. In the interval was a news bulletin of trivial importance.

Not being anxious to hear the children's hour at half-past four, and as there was nothing else on till about five o'clock, I gave radio a rest till after tea and went out to have a look at the boats in the harbour.

Idly I wondered if it is better to have no

was then too tired to make an ether search, so I resolved to spend another Sunday at the dials, this time on the short waves.

A programme sheet borrowed from the bureau of the hotel, where they had a broadcast receiver installed, told of the same kind of programme as experienced last week, but with what promised to be a good concert in place of the opera.

Rome at Home.

The first station I found, of course, was 2 R O, the short-wave relay station of Radio Roma, a visit to which has already been described in these pages. It seemed like meeting an old friend to hear Rome's gramophone record concert on 25 metres. The strength was not overpowering, but then the skip effect of these short-wavers is often misleading, and back at Civitavecchia it would probably have been stronger.

For ten minutes or so I searched for Chelmsford, hoping to hear something of



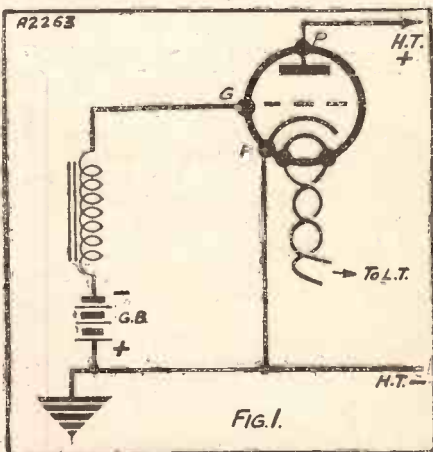
IT seems to be the misfortune of wireless phraseology to choose for itself ambiguous terms to define its special features. Have we not high-tension mains units whose function is to produce high tension (and not eliminate it as the name sometimes given them implies!), high-frequency and low-frequency amplifiers which amplify currents and not frequencies, and detector valves which rectify? Again, if loud speakers had only to reproduce loud speech, how much simpler would be the lot of the designer!

Free Bias That Isn't!

And now as the latest addition to the list, comes "Free Grid Bias" which, strictly speaking, is not grid bias at all, but cathode potential and is certainly not "free," in any of the usual meanings of the word. True, it is sometimes more accurately called "Automatic Grid Bias," but this is only a little less misleading than the former term, which, probably for some psychological reason, has become more popular.

But, lest I should tend to become ambiguous myself, let me say quite definitely that

G.B. FROM BATTERIES.



The connections used in the case of an ordinary G.B. battery used for bias on a mains-driven valve. Simplicity is one of its features.

the free grid-bias system is not to be condemned "in toto." It can be, and very often is, a very valuable refinement. Rather do I wish to point out the pitfalls it contains, chiefly for the benefit of those amateurs to whom cost is an important consideration, and who are, perhaps,

Free Grid Bias, often termed Automatic Grid Bias, is not quite the inexpensive item its name suggests. It is even possible it may be more costly than ordinary battery-bias, and the pros and cons of it are here discussed.

By A. R. ALMOND.

beginning to think that their sets are out of date or inefficient simply because they contain a biasing battery. Despite the name there is still much to be said in favour of the more usual battery method on both the scores of efficiency and cost.

To understand why this should be so it is necessary to have a working knowledge of the way in which the two systems operate. Fig. 1 shows the ordinary battery method of giving the grid of the valve a negative potential relative to the filament.

Two Systems.

This is obtained by joining the + of the battery to the filament (and earth) and the - to the grid. Since H.T. - is also connected to earth and is at zero volts the voltages in the valve will be made up as follows. P at the potential of the H.T. supply; the filament at zero potential and G will be the G.B. volts below zero.

The important point to note is that the useful H.T. voltage is the potential difference between the plate and cathode (i.e., filament) and in this case is obviously equal to that of the H.T. Potential at P.

The "free" grid-bias system as illustrated in Fig. 2, operates on an entirely different principle. The anode current passes from P to F in the usual way but, before reaching F, has to pass through a resistance, R₁, across which, of course, there will be a voltage drop dependent upon the current passed and its ohmic resistance.

For A.C. Sets.

Since H.T. - is at zero potential, the potential at B will also be zero, and that at A, therefore, will have a positive value. Consequently, if we give R such a value that the voltage difference between its extremities is equal to the grid bias required and connect the grid of the valve direct to earth, the cathode will be positive relative to the grid or, to use a more usual expression, the grid will be negative relative to the

cathode, which is a similar state of affairs to that obtained in Fig. 1.

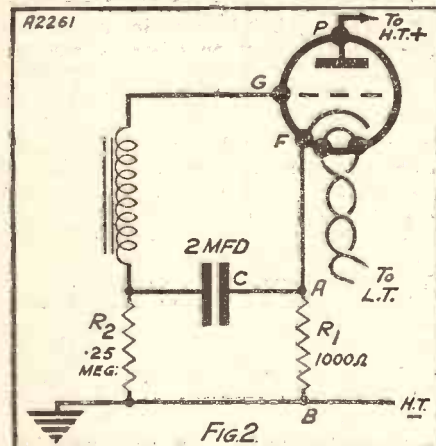
So far so good, the snag comes when we consider our nett H.T. voltage, which as already stated is the voltage difference between plate and cathode, and in this case we find that it is equal to the H.T. supply minus the grid-bias voltage.

This may sound a little involved; a concrete example will illustrate the exact state of affairs and also prove useful to demonstrate the essential drawbacks of the scheme.

Robbing the H.T.

Suppose we have an H.T. unit capable of supplying 30 ma at 200 volts, and that we are using an output valve such as the A.C./P1. This valve requires about 34 volts G.B. at 200 volts H.T. The voltage drop across R₁, therefore, must be 34 volts, making the voltage at F 34 volts positive. Since P is at 200 volts, the nett useful voltage will be 200 minus 34, i.e. 166 volts, against the full 200 obtained if a G.B. battery is used.

VOLTAGE DROP METHOD.



Usual connections for obtaining grid bias with a mains valve. A suitable voltage drop is obtained across the 1,000-ohm resistance, the other resistance being for decoupling purposes.

At first sight this loss of H.T. voltage may not seem a very serious matter and, indeed, it will not be if the H.T. unit is designed to counteract it. If it is not, however, the loss of efficiency is somewhat startling. The

(Continued on next page.)

THE £ s. d. OF FREE G.B.

(Continued from previous page.)

standard by which we must judge the two systems is the amount of undistorted A.C. output each is capable of supplying, and in order to estimate this we shall have to be satisfied with approximations, since it is dependent upon other variables such as the amplification factor, and the ratio of the impedance of the valve to that of the speaker.

Plenty of Power.

However, it can be shown that with 200 volts, the average output would be 550 milliwatts. This is an ample volume for all normal purposes, and is quite sufficient to supply a moving-coil speaker.

If we use automatic grid bias 34 volts of the H.T. potential will be sacrificed for biasing purposes and the output then becomes 370 milliwatts. A loss of some 180 milliwatts, or, roughly, one-third of the available A.C. output, the only remedy for which is a mains unit capable of supplying a correspondingly higher voltage. Unfortunately, mains units rated at 30 m/a and giving over 200 volts are expensive items.

On the other side of the ledger we have the advantage that no battery renewals are necessary, but here again, unless the valve used requires an excessive amount of grid bias, the saving is more apparent than real. Assuming every precaution is taken to ensure stability, the following extra components will be required:

1 600-1000-ohm fixed resistance.
1 2-mfd. fixed condenser.
1 .25-megohm grid leak and holder.

(Say a total cost of 7/-.)

A Doubtful Saving.

Since the life of a grid bias battery may be something over twelve months, it will be seen that no saving will be effected until the set is in the third year of its existence—a long time for a constructor's set to remain unchanged.

The battery system has even more points in its favour. It can readily be adjusted to the exact voltage required for any type of valve, whereas if a different valve is to be used with the "Free" system the biasing resistance must also be changed. Moreover, it is free from any trace of hum.

The difference in cost is even more marked when two stages of L.F. are used, the "Free" system requiring double the outlay already given, whereas the only

additional cost with a G.B. battery is that of a single wander plug!

Not Worth It.

"Free" grid-bias for the S.G. valves can only be regarded as a luxury. The voltage loss here, of course, is not serious, being at the most 3 or 4 volts, but the relative initial costs are incomparable, for, whereas the cost of a 4½-volt biasing battery is negligible, the extra components for obtaining "Free" bias are even more costly than was the case of the output valve. A circuit such as Fig. 3 has the following components:

- 1 .25-megohm resistance and holder.
- 1 1000-ohm variable resistance.
- 1 1-mfd. fixed condenser.

(Costing altogether about 8/-.)

We can summarise the two systems as follows:

For Grid Bias from Batteries.

1. Cheaper initial cost, especially if two stages of L.F. are used.
2. Cheaper cost for same undistorted A.C. output, or, alternatively, larger undistorted A.C. output for the same value of Anode voltage.
3. No extra cost if valve is replaced by one having different characteristics.
4. No danger of hum or instability.
5. Biasing point can be readily adjusted.

For "Free" Grid Bias.

1. No battery replacements.
2. G.B. voltage varies with plate voltage.
3. Fool-proof, i.e., no valve can be under-biased due to G.B. battery becoming exhausted or due to the wander-plugs being moved whilst the set is in action.

The "Pros and Cons"

Taking these three points in order, we have seen that the first is a somewhat doubtful advantage and, since we are using the mains for supplying H.T., the anode voltage will not vary much, thus depriving the second point of most of its value. The only intrinsic value, therefore, is the third, and if the set is to have a non-technical owner it certainly should be as foolproof as human ingenuity can devise, but if it is to be used by the constructor himself—well, constructors are not usually fools!

USING L.F. VALVES.

A tip about the correct way to adjust grid-bias.

MOST set-builders find that they can take liberties with the mounting of valves at the L.F. end of the set which they must carefully avoid with H.F. and Detector valves. But this must not be carried too far.

True, the first and second L.F. valves are but seldom placed near screens or cramped for room, and they rarely give rise to microphonic troubles. In fact, with this type of valve the main thing to watch is that they are getting their correct grid-bias and H.T. voltage, and if this is done consistently it is very unlikely the valve will ever give trouble.

A Point to Remember.

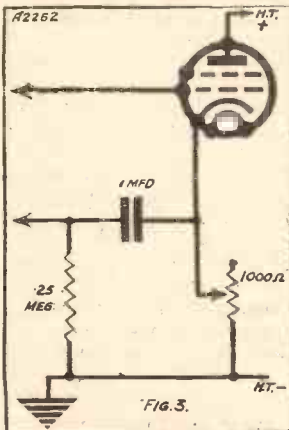
Power valves, on the other hand, need careful using. So far as situation in the set goes they are generally well placed, with plenty of room around them, their chief peculiarity being that a power valve gets hot—quite hot in some cases. There is nothing to worry about in this—it is an inevitable result of the handling of considerable power.

What is very important is the power valve's grid circuit. To shift a grid-bias plug whilst the set is on is criminal from the power valve's point of view.

The idea that to shift from, say, 21 to 18 volts negative cannot possibly hurt the valve, even if it is working all the time, is based on a fallacy. What you do when you shift the plug from 21 to 18 is not merely to alter the voltage between those figures, but to change from 18 volts negative to zero grid bias, and then back to 21 volts negative.

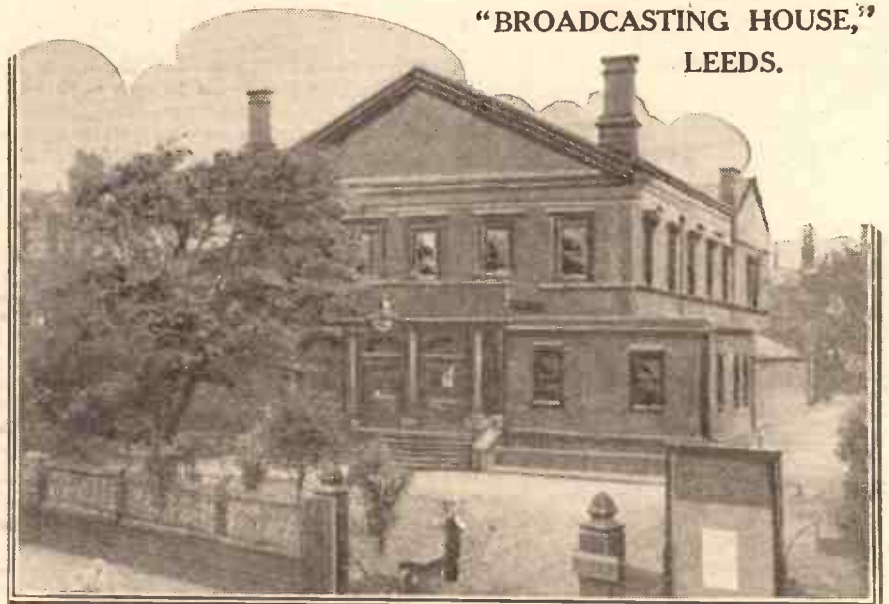
It is the zero grid volts (applied while the plug is being changed over) that do the damage. Power valve's grid bias is really very important, and the only safe method is never to alter the plug unless the L.T. switch is off.

EASILY VARIED.



By having a rheostat for the voltage dropping resistance, the exact value of bias required is obtainable.

"BROADCASTING HOUSE," LEEDS.



It's somewhat different from Broadcasting House, London, but it serves its purpose admirably. It is an old Quaker Meeting House, and has been taken over by the B.B.C. for studio, offices, etc.



Home Rule for Northern Listeners

SHOULD the North Regional programme be a 100 per cent North of England programme? That it is not is, of course, obvious.

Certain features broadcast on the Regional wave-length of the Moorside Edge station are relayed from the other regions; Savoy Hill dramatic productions and so forth are included in the North Regional fare, though the main part of the programme is filled with material from the Manchester, Leeds, and Newcastle studios, and other sources in the North.

My "Open Letter to the North Regional Director," which was recently published in POPULAR WIRELESS, has prompted a Huddersfield reader to write a long letter to me in support of the suggestions I put forward.

An Enthusiastic Claim.

He goes further, however, and devotes most of his letter to an enthusiastic claim that the North Regional programme should be 100 per cent of Northern origin.

My correspondent says he has sought widely the opinions of other wireless listeners and he makes a bold statement that "our Northern peoples expect nothing less than complete autonomy"—i.e. absolute responsibility for all broadcasting on the North Regional wave-length to rest on the North Regional staff of the B.B.C.

I would not go so far as that myself, nor do I think that at the moment Northern listeners as a whole have any burning desires in the matter. It is obvious that the Northern programmes are widely welcomed, and if they maintain a high standard of merit the people of the North will ask for more. Then will be the time to clamour, if that is necessary, for something more approaching a 100 per cent Northern programme.

After a Struggle.

The present arrangement, under which the Northern administration of the B.B.C. is responsible for the main part of the North Regional programme, has

* * * * *

Our Northern Correspondent, Leslie W. A. Baily, comments upon an interesting communication he received from Huddersfield subsequent to the publication in "P.W." of his "Open Letter to the North Regional Director."

* * * * *

only been obtained after a struggle. There have been strong influences for a much greater degree of centralisation on London.

Having been given a certain measure of "home rule," however, the Northern officials must now justify—by the standard and variety of their programmes—the present arrangement. If they justify it up to the hilt, the 100 per cent Northern programme visualised by my correspondent will be more likely to materialise than it would be if a "shout" were made for complete autonomy at the present juncture.

Savoy Hill should, however, give the North Region a very full freedom within its present range of responsibilities. The

work of the Northern programme-organisers must not be subject to pettifoggish interference from London.

If Northern programmes are to have a chance to justify their existence it is only fair that they should have a free hand to develop in their own way, and not necessarily in the way that Savoy Hill may think they should develop.

In this connection I fully agree with my Huddersfield correspondent that "there are a great number of broadcasts from London to the North which do not suit the Northern temperament." I am forced to the opinion that some of the programme officials, and also the artistes, in London have a poor notion of the psychology of their provincial audience.

Differing Tastes.

If they would travel through the provinces and seek the opinions of Yorkshiremen, and Scotsmen, and Welshmen, and others, they would realise how enormously the public taste varies in different districts.

The Cockney type of humour which is so common in London-made programmes is a complete "frost" in Scotland, for instance. The sophisticated cabaret stuff that makes up so many vaudeville or "feature" programmes is completely lost on many folk in the provinces. And so on.

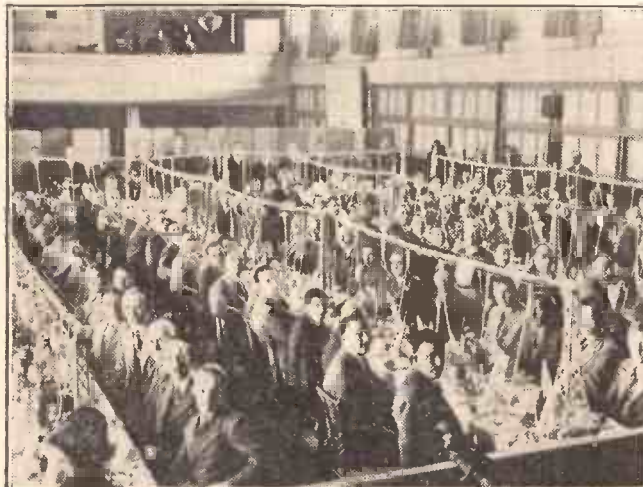
The existence of these distinct provincial tastes is, of course, the chief justification for Regional programmes.

A Precedent.

The Northern Ireland station, Belfast, always has had a full measure of independence, probably because the dividing sea has tended to emphasise the sharp division of characteristics existing between the two parts of the British Isles concerned.

Apparently, however, it is not realised that Northern and Southern English tastes in entertainment tend to differ every bit as much in certain respects, more especially in regard to the lighter aspects of the radio programmes.

RECORD RADIO SEASON EXPECTED



Hundreds of Press representatives and wireless traders met at the G.E.C. luncheon at Coventry, and many were the interesting conversations which resulted. Views were exchanged and universal optimism as to the prospects of a record radio season was expressed. Tenth from the front on the left of the central table is "P.W.'s" Technical Editor, and on his right Mr. Johnson Randall's head just manages to get into the picture!

RADIO IN BERLIN

An Interesting Article from The Editor, who is now in Berlin investigating German Radio Conditions.

IF any of my readers have been in Berlin lately, and have visited the German Radio Exhibition, they will probably agree with me when I say that it was a very magnificent show. And, if, during their stay in Berlin, they had the opportunity of being shown over the Berlin Broadcasting House—which faces the Exhibition—I feel sure they will again agree with me when I say that it is the finest of its kind in Europe.

About the Exhibition I am not going to say much this week, for it is a subject which calls for a separate article, and I have not yet had time to sift the multitudinous notes I made of the various outstanding items of interest at the Exhibition.

Plenty of Purchasers.

And, further, as my German is distinctly of the "poor" variety, it will probably take me a day or two to work out the translations of the various documents, pamphlets, brochures, etc., which, as any reader knows, are to be had in their thousands at an exhibition.

One thing did strike me very forcibly when visiting the Berlin Exhibition, and that was the tremendous interest taken in radio by the average German citizen. We hear a good deal via our newspapers of the poverty existing in Germany to-day.

That may be very true of Germany as a whole, but for a casual visitor like myself, it strikes me that the Germans I have seen at the Exhibition have plenty of money to spend on radio apparatus. And it is money well worth spending, for the German sets this year are not only greatly improved in workmanship, but the prices are most reasonable.

However, that is by the way. I hope to tell you in detail all about this German Exhibition—and, believe me, there is a good deal worth telling—in another article in an early issue of POPULAR WIRELESS.

A Stupendous Studio.

Apart from the Exhibition, what struck me most was the German equivalent of our Broadcasting House. It is a tremendous building, but in a talk with Dr. Magnus, who is one of the heads of the German broadcasting concern, I learnt with surprise that even now Berlin's Broadcasting House is not big enough, and that additions to the building will shortly have to be made.

The Berlin Broadcasting House cost over a quarter of a million pounds, and it contains one of the most impressive studios I have ever seen. It is not quite finished yet, but when it is ready it will be able to accommodate at least a thousand performers, while the large public gallery running round three sides of the studio will hold probably another thousand spectators.

I should say this studio is roughly 170 ft. long, about 80 ft. wide, and nearly 35 ft. in height.

The main studio in use contains, among other things, an organ with special ap-

paratus for "effects." The organist operator was kind enough to give me a demonstration of a thunderstorm, a train coming into a station, rain, hail—in fact, everything you can think of in the way of off-stage effects.

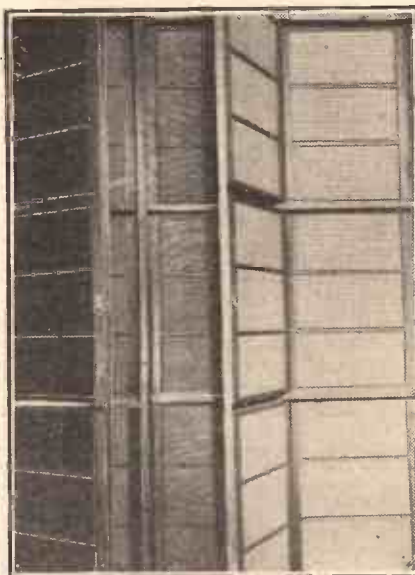
In the testing laboratories, which I was able to inspect, thanks to the courtesy of the Chief Engineer, Herr Doctor Scheffer, I found equipment of the most elaborate and comprehensive order.

Tectonic Thoroughness.

The German engineers at Broadcasting House in Berlin are particularly interested in sound recording, and they have a magnificent collection of "data" records which has enabled them to adjust to an extraordinarily accurate degree the acoustics of various studios.

It was certainly interesting to hear a record of His Majesty the King's Naval

CHANGING WALLS



By means of an ingenious shutter system the walls of one of the main studios at Berlin's Broadcasting House can be varied to produce different acoustic conditions.

Disarmament speech played in this experimental studio!

Another fine record, or rather series of records, dealt with a train leaving one of Berlin's big railway stations. The first record was an awful effort—blasting, chaotic noises, and so on.

The next was just a little better, and gradually we worked through a series which the engineers had made until the last record was reached.

Realistic Railway Noises.

This was the result of many weeks of experiment and gave a magnificent rendering of a train letting off steam, the doors being banged, guards whistling, etc., etc.

—in fact, the whole bag of tricks of railway station "effects."

Dr. Scheffer, by the way, besides being the Chief Engineer and one of Europe's leading radio experts, has done a considerable amount of research work in connection with home recording and gramophone reproduction generally, and a little idea he has recently inaugurated, when on a trip to America, should, I think, eventually prove of world-wide popularity.

A Sort of "Speak-Easy."

Dr. Scheffer took with him a series of small gelatine gramophone records, not more than three or four inches in diameter, and on the boat he introduced the idea of passengers making a "record letter" which, when taken off the recorder, could be posted back home.

Thus, in the near future, it is likely that when you go on a journey you will be able not only to write a letter but, better still, make a record of one, so that you can send it back home and your folks can hear your voice via the home gramophone.

Germany has no direct broadcasting monopoly, as we have in this country. Although the Post Office has control, and the German Government takes quite a large proportion of the licence revenue, several broadcasting concerns are allowed to operate.

Two of the most important concerns are the Funk-Stunde and the Deutsche-Welle. The latter firm owns Königswusterhausen; while the former operates the Witzleben station in Berlin, and various other well-known broadcasters.

Curing Interference.

These two firms in conjunction have been responsible for Berlin's magnificent Broadcasting House, and all the broadcasting companies concerned operate from this one main headquarters building.

The Germans are very interested in the question of suppressing interference, not only from the amateur or listener who lets his set oscillate, but from such sources as tramways, power stations, etc.

An organisation has been specially formed to deal with this particular type of nuisance, and quite a large number of electrical firms, tramway firms, electrical railway corporations, etc., have joined together in order to make a determined attempt (with the aid of broadcasting authorities) to reduce this source of interference to a minimum.

Furthermore, the broadcasting authorities have a special department which investigates this sort of interference, and, where it can be proved that it is through negligence, prosecutions are made in the courts. I forget exactly the figure, but I think I was told that out of eighty prosecutions undertaken, the broadcasting authorities have been successful in winning fifty.

The Radio Exhibition.

Space in this issue of POPULAR WIRELESS will not allow me to tell you more about my talks with Dr. von Bronk, of the Telefunken Company; nor of my visit to Nauen, where the Chief Engineer was good enough to devote an afternoon to showing me all over the station; nor can I tell here, in detail, of the German Radio Exhibition itself, but I hope to send off another article in a day or so which should reach London in time for publication in next week's "P.W."



The B.B.C. RECEIVERS

“WHAT kind of sets do the B.B.C. engineers use for reception? Are ordinary listeners likely to be able to make use of any of the special ideas?”

These are questions a friend of mine put to me recently, and I in turn put them to a Savoy Hill engineering department official. He told me the whole story.

Part of the B.B.C. apparatus is housed in the basement of Savoy Hill and in one of the upper rooms at the Piccadilly, Manchester, headquarters. These are the finished products ready for use in various broadcasting departments, but long before this stage is reached apparatus is built and tested out at Clapham.

At Clapham the engineers took over a private house and converted it into a very useful constructional and test depot. Here many quaint pieces of apparatus, such as the interval signal clock, the strange devices for the radio play “effects” department, and the talking tape machine are made up and tried out long before they ever reach the microphone.

Then there is the Tatsfield station, which has already been described and where very little set-building is done, but where the large receivers are used for American and Continental reception and for frequency checking.

Home Construction.

The engineers make their own apparatus for outside broadcasts. There are some special occasions, such as the Boat Race, when it is quite impossible to use a land-line link between the outside broadcast microphone and the control-room.

Then the radio link is brought into use, and the B.B.C. uses short-wave receivers to pick up the transmissions, which are afterwards passed on by normal land-line to the control-room.

Once upon a time it was usual to have short-wave super-hets for this radio-link work, but now they have been discarded in favour of Reinartz sets.

The specification will interest short-wave enthusiasts. An L.S.5B. valve is used as the de-

An exclusive article by a special “P.W.” representative, in which the reception apparatus used by the B.B.C. is interestingly described.

detector with anode-bend rectification. The tuning condenser is of .0002-microfarad capacity (this is a short-wave receiver, remember) and, by means of an iron-cored choke, a .5-mfd. coupling condenser and an ordinary L.F. transformer, the detector is coupled to the following low-frequency stages.

With a receiver of this kind the B.B.C. “A” amplifier, a four-valver having resistance-coupled stages and embodying a tone control, is used.

The output of this is more than sufficient for the land-lines through to the control-room, and this gives a latitude should it be necessary to shift the tone to suit the characteristics of the line.

For instance, if any particular land-line does not transmit bass well, then the tone is shifted in just the same way that a tone control is varied in a radio-gramophone, and the tone is shifted up at one end of the line and down at the other. In this way low-note distortion is prevented.

“Juice” for the amplifiers and the detector stage is provided by means of a bank of accumulators. The B.B.C. still relies on large-capacity accumulators for high-tension, low-tension, and grid bias, and although these are rather cumbersome, provision is made in the O.B. van for accumulator-fed supplies for each circuit.

For wave-length checking, as at Tatsfield, super-hets are used almost entirely. This is largely on account of the spaced-aerial reception method favoured by some of the B.B.C., for which a super-het is particularly suitable.

For ordinary reception, sets having two H.F. stages are used, and either these or the super-hets can be switched on to a pair of resistance-coupled amplifier panels, one being kept in reserve.

Parallel Feed.

Generally speaking, the B.B.C. use iron-cored transformers, choke-and-condenser fed, for the input to an amplifier, resistance coupling between the various stages, and an iron-core transformer output.

This point might certainly be worth noting by amateurs.

A good idea of what sort of circuit is favoured by the B.B.C. can be gained from an examination of the re-broadcast sets which were previously used a great deal by Northern stations for picking up 5 X X. These replace the land-line link between London and Daventry, and the station wishing to take the 5 X X programme. These sets are six-valvers.

(Continued on next page.)

PROWLING AROUND THE “POOL”



On a B.B.C. launch, investigating the possibilities of broadcasting scenes from the Port of London.

THE B.B.C. RECEIVERS

(Continued from previous page.)

Ordinary loose-coupled coils on open formers are used for coupling the aerial to the first H.F. stage and a somewhat similar coil is used for the detector.

The first two high-frequency stages of the set are resistance coupled, the valves having a fairly low impedance, 6,000 ohms, the anode resistance is 50,000-ohms, the grid condensers .0002-mfd., and the grid leak .25-megohm. These are rather exceptional values and are worth noting.

An Aperiodic H.F. Stage.

The third H.F. stage is a screen-grid valve with an aperiodic H.F. choke in the anode circuit. A .0002-mfd. condenser is used for coupling, and the detector valve is operated on the bottom bend by plenty of negative grid bias. A 20,000-ohm impedance valve is used.

The first stage after the detector is resistance coupled with a 50,000-ohm anode resistance, a .5-mfd. coupling condenser, and a 1-megohm grid lead. It is interesting that although these sets were made several years ago, there is a .1-megohm stopper re-

end of the room gives out the broadcast without echo and the sound output plus natural echo is picked up by a microphone at the other end. For this a moving-coil speaker energised by an accumulator bank is used.

Where Good Quality is Needed.

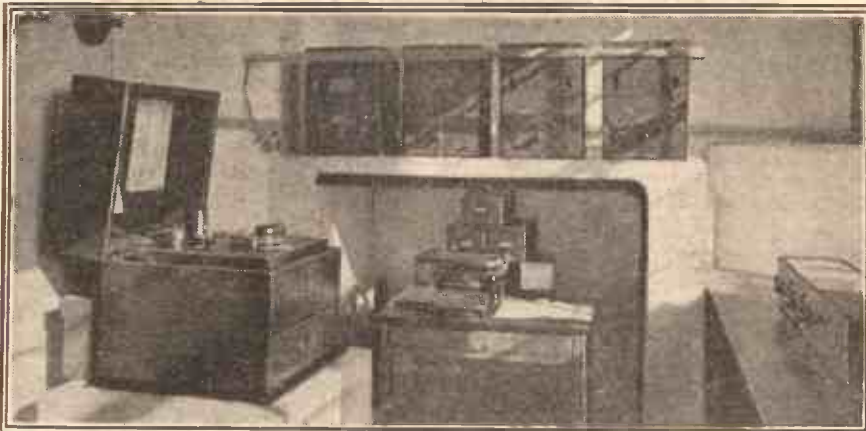
There is just one other place where there has to be a good quality speaker, and that is in the Visitors' Drawing-Room, at Savoy Hill. A moving-coil speaker with a very large wooden baffle is used.

CONNECTING THE MAINS

The "safety-first" method of wiring plugs and sockets for mains apparatus.

IF you make up your own mains unit, or if you fit the connection between the supply mains and your set, make sure that you arrange the plugs and sockets correctly. The principle adopted in making plug-and-socket connection points for lamps and power appliances in the house is the one to follow, namely that the half of the connector which can at any time be "live" is made the socket.

THE TUNING SENTINELS AT TATSFIELD



The Brussels and Sullivan wave-meters at Tatsfield where the B.B.C. check the wave lengths of their own and other stations.

sistance in the grid lead to the power valve.

There is a choke-coupled output circuit leading to a step-down transformer for connection to the land-lines through to the control-room. In most B.B.C. receivers of this kind the main volume control immediately follows the detector.

Plenty of Meters.

A characteristic of practically every piece of B.B.C. apparatus is the large number of meters provided. It is a general practice to have a 0-50 milliammeter in the high-tension lead to each separate group of valves.

For instance, in the re-broadcast receivers there is a meter of this type for the three H.F. valves and another similar meter for the low-frequency valves.

There are not very many occasions when B.B.C. engineers have to use loud speakers for really important work. Small moving-coil speakers are used as "pilot" checks of quality, and one of the few places where it is essential to have a good quality speaker is in the echo room, where a speaker at one

Then there are no "live" projecting points to cause possible injury or damage. If the plug is accidentally pulled out when the current is on, no harm is done, and it is unlikely that anything will come into contact with the recessed sockets.

At the other end of the flexible connecting wire, it is usual to have an adaptor plug, inserted into a lamp holder on the set. You may prefer to use a similar plug and socket to that on the wall, or possibly an ebonite mounted plug and socket of the type used for interchangeable plug-in coils.

In either case it is the plug which should be fixed on the set, while the socket is put on the end of the flex cord. Otherwise, in the event of the plug being pulled out, the "live" points of the plug on the end of the cord would be a source of danger.

If standard house-wiring wall plugs and sockets are utilised, it may be found a little more difficult to mount the components in this way, but the greater safety resulting from such an arrangement makes the extra trouble well worth while. A. V. D. H.

COMPENSATION FOR MAINS CHANGES

A correspondent passes on the opinions of some authorities who are dealing with this question.

UNDER the "grid" scheme of electricity distribution many electricity supplies are now being changed from direct current to alternating current, and the position of wireless listeners who have D.C.-type all-mains sets, or battery eliminators requires clarifying.

When such apparatus is rendered useless by a change to A.C. is the owner entitled to compensation? It is evident that there are serious differences of opinion among electricity suppliers as to the extent of their responsibilities.

Unnotified Radio Apparatus.

The conditions of supply usually state that the consumer is required to notify the authority if he wishes to connect any fresh apparatus to the mains. This condition is, of course, widely evaded. Wireless sets are commonly connected to the mains without the sanction of the supply authority.

Many electricity undertakings are willing to pay compensation, or to convert the apparatus for A.C. use, if this condition has been observed. Manchester is understood to be one of these.

Even when this requirement has been complied with, however, there are some electricity authorities who refuse to accept any responsibility for wireless apparatus.

The Salford Corporation is reported in a Manchester newspaper to hold the attitude that "We do not give permission for current to be taken from the mains. Those who do so are acting without authority and cannot expect compensation."

On the other hand (and indicating the clash of opinion to which I have referred), the secretary of the electricity authority in another large city which is changing over to A.C. told me recently that his department is willing to come to an amicable arrangement with every consumer, even in cases where the use of wireless apparatus on the electricity mains has not been notified.

A Moral Obligation.

He said that the average cost of converting wireless apparatus to A.C. use was about £2 7s. 6d. They had found that in the total bill of costs for a change from D.C. to A.C. this item of compensation to wireless listeners was a very small item, and it was not worth making a song about.

This authority added, moreover, that he was of opinion that the undertakings which refused to accept responsibility would not receive much support if the matter was brought before the Electricity Commissioner for a ruling.

"My opinion," he said, "is that the Commissioner would support the consumer, even when he had not complied with the regulation requiring the use of this apparatus to be notified. To refuse liability on this account, is to shelter behind a purely technical offence. It comes down to the supply authority trying to evade its moral obligations."



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THE MIRROR OF THE B.B.C.

ANOTHER CRISIS

IMPORTANT ITEMS—OUR
SCIENTIFIC ADVISER—WHO
STARTED "FOUNDATIONS?"

THERE are enough crises about without anyone making an effort to add to them! I have been trying to avoid this comment for a long time, but the situation has become so serious that I am now bound to speak.

Here it is in a nutshell: the B.B.C., mindful of the troubles of last winter with interference from foreign stations, has been negotiating for months past to secure something to amend or replace the Prague Plan.

The B.B.C. has gone so far as to offer a considerable sacrifice, *in extremis*. But there is inadequate response on the Continent. They see in this move another manifestation of "perfidious Albion."

Therefore, the Continental interests are not supporting the B.B.C. claim for a new plan based on the deliberations of a new conference of "Administrations."

Write a Postcard.

Then, of course, the Post Office, as of yore, is rather pleased to see the B.B.C. in difficulty, and is doing no more than it has to about the October conference. Here is a clear case for the use of public opinion.

As the B.B.C. either does not dare or care to solicit support, it is left to people such as I to focus opinion. I invite all my readers to communicate at once with the Postmaster-General and their local M.P.: a postcard is enough: just write your characteristic variation of:

"As a subscriber to the broadcasting service, I ask you, the titular authority of enforcement, to do something about the wave-length situation; demand a revision of the Prague Plan, even if the result is apparently to the disadvantage of Great Britain. I warn you that in a time of grave difficulty nationally you should not contemplate glibly the blanking-out of whole programmes, as is now not uncommon."

Do write and we shall see what happens. But help me to this extent, namely, by sending on the replies you get from the P.M.G. and the M.P.

Important Items.

The Marchese Marconi, Lady Tree, General Smuts, Sir Oliver Lodge and Mr. Filson Young are names which will bring quite a lot of distinction to the programmes of the next few weeks, and at a time of year when the importance of broadcasting becomes greater as the hours of daylight get fewer.

It may be coincidence, of course, but there is nothing like a good start, whether it be with the autumn season of wireless programmes or anything else that really matters.

The microphone is no stranger to any of these well-known personalities. Lady Tree, you will remember, took part in a vaudeville entertainment a few weeks ago, and now, on Tuesday, September 15th, she is sponsor-

ing a special programme for children, thus adding her name to those others, also well known—L. du Garde Peach, A. P. Herbert, Sir George Dunbar, the cricketer Gilligans, Bevil Rudd and Stephen King-Hall, who have written or broadcast for the Children's Hour during the last few months.

Lady Tree is certain to arrange just the kind of entertainment that children like. Her work for the League of Mercy brings her in such close touch with young people that she thoroughly understands them and their needs, which I am afraid are not only much more exacting than when I was a child, but more easily extracted from a generation of indulgent parents.

Marconi, the man whose inventions made wireless and broadcasting possible in our

time, will keep many people at home on Saturday, September 19th, when he gives a talk on "The Beginnings of Wireless." He would have given this talk several weeks ago, but was unfortunately prevented by indisposition.

There are lots of people who think that the Marchese invented wireless telegraphy. He did not, but he did place it on a practical footing, and gave his name to the world-renowned corporation which developed it.

As far back as 1838 wireless telegraphy was suggested, more than a quarter of a century before its practicability was established, theoretically, by Clerk Maxwell. Very little worth noting was established, beyond lecture-room demonstrations and

(Continued on page 900.)

NEXT WEEK

OUR TREMENDOUSLY ENLARGED
SPECIAL EXHIBITION NUMBER
DON'T MISS IT!—SURE TO SELL OUT

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FOR THE LISTENER

By "PHILEMON."

Our popular contributor reviews the autumn programmes and comes to the conclusion that they are good—but might be the better for a few mistakes!

"LIVING dangerously" is blazoned on the pages of the recently published syllabus of Autumn Talks; but there is not much "living dangerously" about the syllabus itself.

There is a list of imposing titles, and a list of still more imposing names; but, considering the resources at the disposal of the B.B.C., and the solidity of its position in the national life, the syllabus seems to me to be strangely lacking in imagination and adventure. It is good routine work, but there is no feeling of leadership about it.

B.B.C. Getting Humdrum.

The chief weakness of the B.B.C. at the moment seems to me to be this lack of imagination. It is fast settling down into the humdrum. There are signs that sound committees are at work, but few signs that any outstanding personalities are at work.

In the beginning the B.B.C. depended on the brains, the genius, the flair of a group of

bright young men who made any amount of mistakes; now it depends on a group of committees who rarely make mistakes, not because they are particularly wise, but because they attempt little. In my view, the mistakes of a man full of imagination and enterprise are worth more than all the sound decisions of all the committees put together.

New Ideas Wanted.

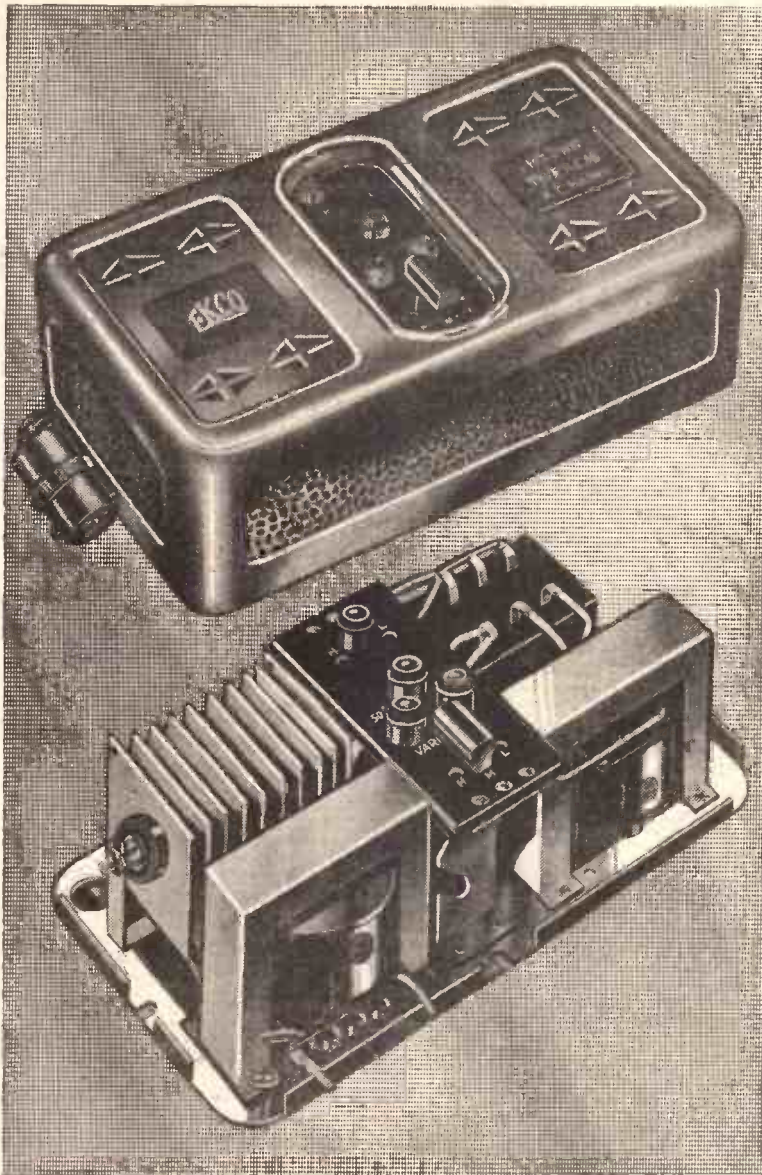
We live in rather nerve-racking times. It becomes more and more obvious every day that the old lines on which we have been running will not carry us very much farther.

The old ideas are proving inadequate to the present situation as it is forming. What the intelligent, alert, and eager man wants to know is: What are the new lines? What are the new ideas?

The speakers he wants to hear are not the

(Continued on page 896.)

New Ekco Power Units . . . a triumph over all previous standards



EKCO—leading specialists in All-Electric Radio—introduce their unique range of 1931-32 Power Units . . . surpassing all previous achievements. Wonderfully compact . . . triumphs of efficiency . . . housed in beautifully designed bronze-metal cabinets . . . embodying unique features . . . combining highest efficiency with greatest simplicity.

Immediately adjustable for different output voltages by a method which eliminates all variable resistances and their attendant defects. Adjustable to every type of receiver and valve. All the controls compactly arranged, readily accessible, clearly marked. Cleverly recessed, too, so that they do not protrude above the surface of the cabinet. Measuring 9 ins. by 5 ins. by 3½ ins. . . . ideal for portable sets . . . and for all other receivers. Banish all battery worries, renewals and expenses for ever . . . and give you better radio . . . permanently . . . for only a few pence a month.

EKCO NEW H.T. UNITS

(For A.C. Mains.)
 Model A.C.12 for 1 to 3 valve sets (12 m/a output) £2 15 0
 Model A.C.18 for 1 to 5 valve sets (18 m/a output) £3 7 6
 Model A.C.25 for multi-valve sets (25 m/a output) £3 17 6
 Model D.C. 15/25 for D.C. Mains (15 or 25 m/a output) £1 19 6

EKCO NEW COMBINED H.T. AND L.T. CHARGER UNITS

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 Model K.12 for 1 to 3 valve sets (12 m/a output) £3 19 6
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 All obtainable on EASY PAYMENT TERMS from as little as 3/8 per month!

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Please send me full descriptions of EKCO Power Units with which I can finish with batteries for ever and obtain permanently perfect radio at a cost of only a few pence a month.

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(If you require details of Easy Payment Terms put a cross here. . . .)



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AMPLION M.C.6 MOVING-COIL SPEAKER, with output transformer and permanent magnet. Complete. Cash Price £3:7:6. Balance in 11 monthly payments of 6/2. **Send 6/2 only**

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LAMPLUGH OR FARRAND INDUCTOR SPEAKER for perfect reproduction. Unit and chassis complete, ready mounted. Cash price or C.O.D. £3:10:0. Balance in 11 monthly payments of 6/5. **Send 6/5 only**

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EXIDE 120-VOLT W.H. TYPE ACCUMULATOR, in crates, Cash Price £4:13:0. Balance in 11 monthly payments of 8/6. **Send 8/6 only**

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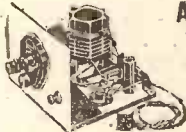
for which I enclose
Cash/H.P./Deposit £ s. d.

Name

Address

P.W. 12/9/31

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37/6 operated receiver. Complete with instructions. Sent C.O.D. Postage free. Pay the Postman! No valves to buy or any extras whatsoever. Handsome Mahogany Cabinet 7/6

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built by Peto-Scott Test Engineers. As described in "Popular Wireless." Completely assembled, wired and tested, ready for use. Actually as specified—no substitute parts. Sent C.O.D. Postage Free. **22/6**

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Consisting of R.I. Selector Coil, one pair Peto-Scott P.V.1, P.V.2 Coils, and one Ready Wound Peto-Scott Coil Quilt. Post Free. **21/-**

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VARLEY SQUARE-PEAK COIL

Pay the Postman 15/-
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VARLEY H.F. INTERVALVE COIL for use with Square-Peak Coil 8/6

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COSSOR MELODY MAKER Screened-Grid, Detector and Power. Complete with specified valves and cabinet **£6-15-0**
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V.3. THE MILLION Powerful, selective and ultra modern. Screened-Grid, Detector and Pentode. With valves less cabinet. **£5-17-6**
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—exactly to specification

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KIT "B," with valves, less cabinet, **£10.14.6**, or 12 monthly payments of 19/8.
KIT "C" complete with valves and cabinet, **£11.14.6**, or 12 monthly payments of 21/6.

(as described in "Popular Wireless.") Sent post free.
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A.C. KIT "A" (less valves and cabinet) **£10:13:3**
or 12 monthly payments of 19/7.

"POP-VOX" KIT "B" with valves, less cabinet, **£13.11.9**, or 12 monthly payments of 24/1.
KIT "C" complete with valves and cabinet, **£15.1.9**, or 12 monthly payments of 27/8.

(Described Aug. 29th.)
"COMET" THREE KIT "A" (less valves and cabinet) **£4:0:0**
C.O.D. or CASH with ORDER, or 12 monthly payments of 7/4.

KIT "B" (with valves) but less Cabinet, **£5.7.6**, or 12 monthly payments of 9/10.
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Any parts supplied separately. Post charge paid if value over 10/-.

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CAPT. ECKERSLEY'S QUERY CORNER



THOSE ADDED HARMONICS—
VALUE OF ANODE RESISTANCE.

Under the above title, week by week, our Chief Radio Consultant comments upon radio queries submitted by "P.W." readers. Don't address your questions to Capt. Eckersley, however—a selection of those received by the Query Department in the ordinary way will be answered by him.

Those Added Harmonics.

L. B. (Leigh-on-Sea).—"A 'harmonic' is, I believe, a frequency (electrical or mechanical) bearing a definite relationship to another frequency called the 'fundamental.' To me, it is fairly easy to understand how such subsidiary frequencies are generated along with the 'fundamental' in the case of, for instance, the vibrations set up in a violin string.

"I cannot, however, understand at all how incorrectly 'loading' a power valve gives rise to the generation of harmonics. Is there any simple explanation of the fact that the use of a loud speaker of incorrect impedance gives rise to two (or more) frequencies in the anode circuit when only one is applied to the grid?"

The point to remember is that any curve of the form shown in my sketch can be resolved into the resultant of a lot of sine curves of different frequency.

This infinitely diaperiodic form is shown in my second sketch. So that if we apply a pure sinusoidal input to the grid of a valve and anything else in the (say) anode circuit distorts the output, that output is no longer sinusoidal but it can nevertheless be shown to be a combination of sine curves of different frequencies; it will in practice consist of the fundamental (as applied to the grid) and harmonics.

An insufficient anode impedance produces distortion because the grid voltage excursion in one direction produces a different amount of sudden anode current change from that produced by the opposite grid voltage excursion.

FINDING THE VALUE

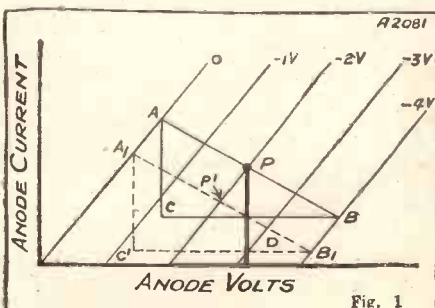


Fig. 1

Characteristic curves for finding the best value for an anode resistance.

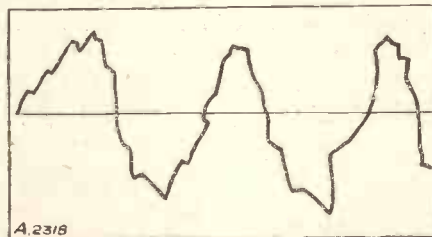
This can be seen from an anode volts/anode current curve with the load-line drawn in.

Value of Anode Resistance.

R. M. (Wolverhampton).—"I understand that the value of an anode resistance in a resistance-capacity coupling unit should be four or five times the impedance of the valve.

"If I use a valve with an impedance of 20,000 ohms. in conjunction with an anode

A DISTORTED OUTPUT



Any curve of this irregular class can be shown to consist of a combination of sine waves.

resistance of 100,000 ohms, shall I get anything approaching the full magnification?"

This is a very difficult question to answer without going into the whole story. But I will state how I should work out this case. I should take a set of anode current/anode volts characteristics, as in Fig. 1, and should find a point (P) where the grid negative was of reasonable value.

I should draw a line APB where AP = PB within 5°. I should make the line as steep as possible.

I should then divide the volts CB by the current in amperes, AC. This would give me a resistance which I should call the optimum resistance.

This is the value of resistance to put in the anode. But

SINE WAVES COMBINED

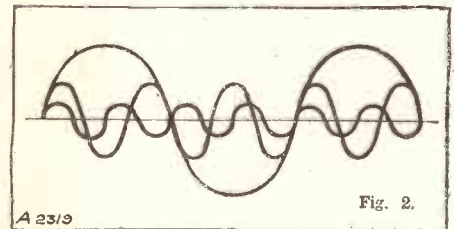


Fig. 2.

The fundamental wave is here shown accompanied by a "family" of smaller waves, which are the harmonics.

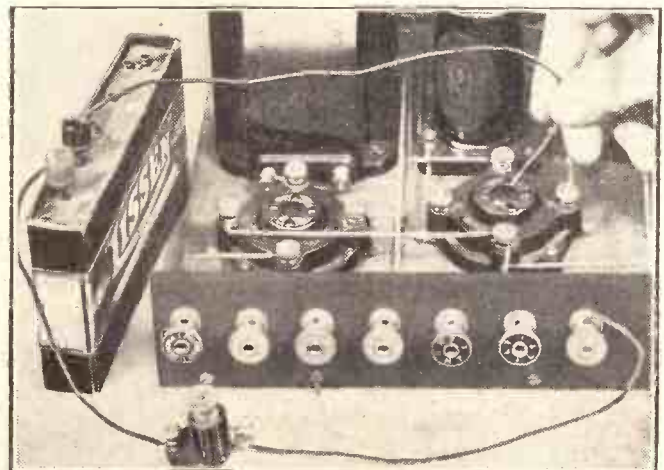
I might find that the current PD passing through this resistance dropped volts, so that APB of the volts in the anode was unobtainable without increasing my H.T. unduly.

I should then shift the triangle downwards to A₁, B₁, C₁, when I should hope to be able to use the normal H.T.

ONLY IN "THE BIG THREE"

—"P.W.," "MODERN WIRELESS" and "THE WIRELESS CONSTRUCTOR"—are Captain Eckersley's technical articles to be found. And he answers queries ONLY in "POPULAR WIRELESS."

TESTING THE WIRING



By means of a low voltage battery and a flash-lamp you can easily test out the wiring of filament circuits, etc., before plugging in the valves and connecting H.T. The scheme also enables shorts to the copper-foil or screen to be detected.

NOW that we are into September we can look forward to the autumn, and a good time for long-distance wireless reception. We may look back, too, at the past travesty of a summer and sum up its record. Usually bad weather is rather good for DX work. This

year we have had our fill—and more—of bad weather, and conditions for the reception of far-away stations have been worse than in any summer that I can remember during the last ten years.

It was not that strength was wanting or that fading was more of a nuisance than is usual in the warmer months. Taken all round, strength was, as a matter of fact, better than it was in the summer of 1930, and fading was seldom very marked. The whole trouble was atmospherics, which were more persistent than I have ever before known them to be over so long a period.

Those Atmospherics!

Anyhow, what the true wireless man regards as the worst part of the year is now behind us. Dame Nature does not yet seem quite to have finished with her fireworks displays, for crackles and fizzes still occur on some evenings. But things are definitely improving, and it will not be long before atmospherics are rarely a nuisance on the medium and long waves.

This does not mean that there won't be any during the coming autumn, winter and

STATIONS WORTH HEARING

Some practical distant-programme notes compiled by a special contributor who nightly searches the ether in order to obtain really up-to-the-minute information for "P.W." readers.

spring; it means that though they occur—and there is probably no time of the day or night throughout the year at which they do not—we shall not be bothered by them. There are two reasons why atmospherics cause less interference in winter than they do in summer.

The first is that those picked up by acrials in this country in winter originate from great distances—Northern Africa is the chief hotbed. They cannot therefore cause the same shock-excitation effects. The second reason is that stations come in more strongly. The wanted transmission drowns the unwanted atmospheric and the process is aided by the fact that we do not need to bring our sets into such a sensitive condition.

The New Radio-Paris.

The new Radio-Paris is going to be a wonderful station on the long waves. During a recent visit to the West Country, I found that his test transmissions allowed reception at the fullest loud-speaker strength with a small portable. He was, in fact, as well received as 5 X X, though at much longer range. I notice some improvement in

Motala. Oslo, though, is weak, and he is often heterodyned by no less than two Russian stations! Have you ever heard Lahti, the big Finnish station on 1,796 metres?

I can sometimes pick him up with my big stenode superhet at fair strength—but he seldom makes a noise like 54 kilowatts!

On the medium-wave band Goteborg is remarkable just now; try for him if you have not heard him lately. Nurnberg has been coming in very strongly, and other stations worth attention between 240 and 260 metres are Hörby, Toulouse P.T.T., Leipzig and Gleiwitz.

Higher up, Budapest has not yet quite settled down, though he has excellent nights.

Munich and Milan.

Milan is strengthening up and Vienna should return to form ere long. I have heard Munich much better than for some time past, and Prague has shown wonderful strength and quality on many recent occasions. Barcelona EAJI is good rather late in the evening; Lwow (Lemberg) has been strong, though interference occurs at times; Stockholm is distinctly improving, and Briinn (Brno) is frequently quite strong.

Other medium-wave stations worth attention this week are: Brussels No. 1, Langenberg, Rome, Witzleben, Katowice, Frankfurt, Breslau, Hilversum, and Bratislava.

SHORT-WAVE conditions continue "patchy," but in a rather unusual way. I find that W 2 X A D on 19.56 metres is uniformly good, and so are the 40- to 50-metre group; the 32-metre stations, however, are decidedly poor. Until this week the 40- to 50-metre stations were practically "non est," but they have suddenly returned almost to their normal strength.

Some of my readers may remember that about two months back I logged W 3 X L, Bound Brook, on about 46.7 metres. The transmission that I heard was one of his very first, and I do not recollect having heard him since.

I had intended to ask, this week, whether anyone had ever found him, but here is a letter from A. R., of Co. Durham, who has recently logged W 3 X L at good strength. Apparently the latter station has a schedule with the "Nautilus," which does not very often come off!

The 31-Metre "Mystery."

Well, A. R., if, in your location, you cannot find 5 S W, I should be inclined to say that it is because you cannot tune to 25 metres! He should be quite a good signal in your part of the world, judging from other reports that I have heard.

S. D., of London, S.W.2, is kind enough to correct me about my recent guess at the "mystery station" on 31 metres with a lady announcer. I hazarded a guess that it might be Poznan, but S. D. informs me that it is Leningrad, R V R I, working on 31.1.

Other interesting points on this transmission may be quoted. "Testing from 7 to 8 p.m. B.S.T. Day and time of trans-

SHORT-WAVE NOTES



News and views regarding an exciting and fascinating wave-band.

By W. L. S.

missions announced at the end of each transmission. Announcers man and woman. Man usually whistles or sings 'Ramona' or 'Madame,' always out of tune." Many thanks, S. D.

B. S. M., of Southend-on-Sea, asks a series of very interesting queries, which may as well be dealt with "in public." First, what causes "double reaction" or "reversed reaction." If by double reaction is meant the effect whereby a set seems to start oscillating although it is *already* oscillating, but at a point much further up the reaction condenser scale, I believe that is a spurious kind of oscillation at some super-audible frequency. A set in this condition will often work as a mild kind of super-regenerative circuit.

"Reversed reaction" is very often caused by an unsuitable size of reaction coil. Increasing the reaction condenser will then start the set oscillating, but going still further will stop it again, and at this second point the "reversed" effect is noticed.

Second question: "Have you tried 7/30 picture wire sold by Woolworth's? Six strands are copper, one steel." No, I have not, but it sounds worth a visit to the nearest branch!

Third: "Have you tried winding 30 turns of 30 D.C.C. round the double part of the 'phone leads to cure hand-capacity?" Here again I must confess that I have not. I find an H.F. choke in series with the 'phones does something of the sort, but this new one sounds worth trying!

Lastly: "Is it in order to use a 5-turn reaction coil both for a 5-turn and a 10-turn grid coil?" Yes, certainly if the set oscillates smoothly on both wave-bands. Personally, I try to keep the reaction coil smaller than the grid coil so as to obviate the risk of a "dead spot" caused by the natural wave-length of the reaction coil coming within the tuning range.

Watching W 2 X A D.

Regarding the system of tuning only a portion of the grid coil, there is never a loss in efficiency, but naturally the wave-band covered is reduced quite materially. In some cases this is a help rather than a hindrance. Many thanks, B. S. M., for the interesting letter.

Next week I am going into details in connection with a log I have kept of W 2 X A D from night to night, and I should be grateful if any readers that keep similar logs would write and tell me whether they check up with my own. From now on I am going to log weather conditions as well, in the hope of accumulating some definite information.

Telsen for better reception

DUAL RANGE
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H.F. TRANSFORMER
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Telsen's first claim to fame



TELSEN L.F. TRANSFORMERS

Telsen transformers have achieved fame in the radio world on account of the high standard of their quality and performance. Designed and built on the soundest of engineering principles, these robust, full-size transformers give not only efficient but enduring service.

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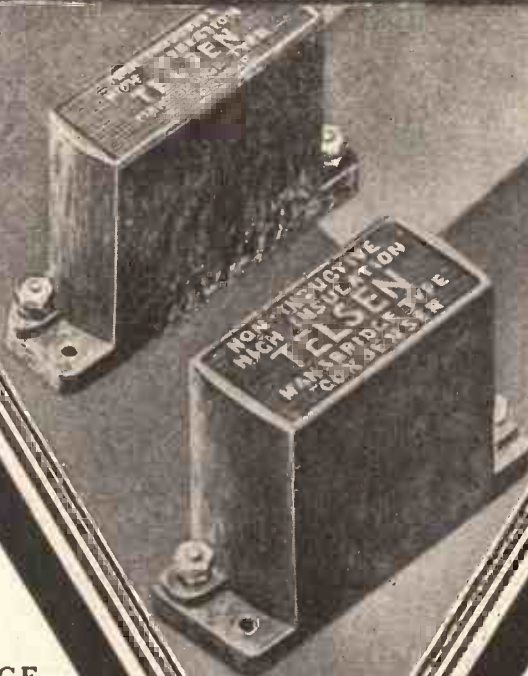
TELSEN L.F. CHOKES

- Telsen L.F. Intervalve Coupling Choke, 40, 100 & 125 henrys. Price 5/-
- Telsen Output Choke (Plain), 20 henrys. Price 8/-
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Telsen have installed the most advanced plant in the world for the manufacture of Mansbridge Type Condensers. Only genuine Mansbridge foil paper and the finest linen tissue are employed in the exclusive method of manufacture. Every Telsen Mansbridge Type Condenser is hermetically sealed from the atmosphere and Post Office standards of insulation are adopted throughout.

The preliminary research, the most modern plant in the world, the finest raw materials, the latest

methods of manufacture and the final test, all combine to give Telsen Mansbridge Type Condensers a high insulation through years of service with freedom from breakdown. The type of construction employed makes them genuinely non-inductive.

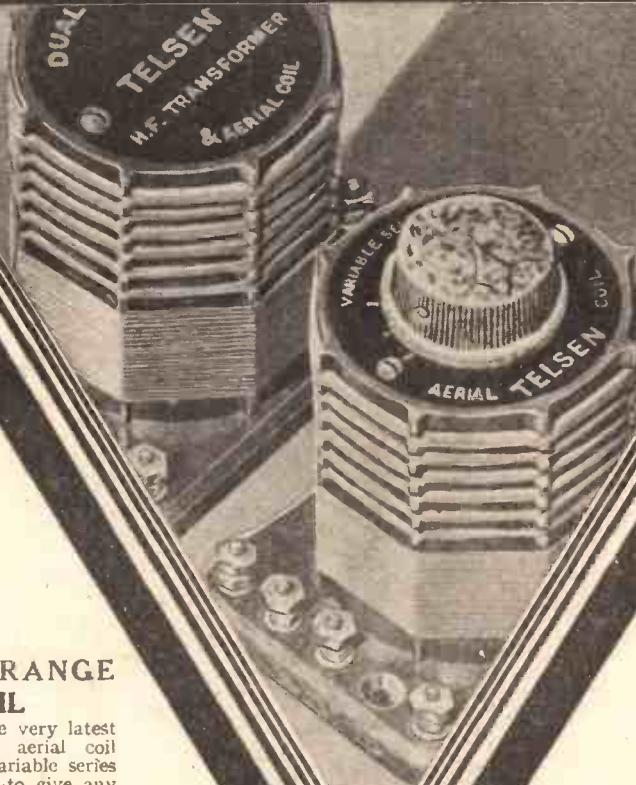
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.01	1/6	2/6
.04	1/9	2/9
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ALL BRITISH RADIO COMPONENTS

Another Telsen achievement



TELSEN DUAL-RANGE AERIAL COIL

The Telsen Aerial Coil is the very latest development in dual-range aerial coil design. It incorporates a variable series condenser which can be set to give any desired degree of selectivity, making the coil suitable for all districts, whatever reception conditions may be. It has been tested in various parts of the country, and down to distances of four miles from Regional stations, a single tuned circuit will definitely separate the Regional programmes. This adjustment also acts as an excellent volume control and is equally effective on long and short waves. The waveband change is effected by means of a three-point switch. A reaction winding is provided and the primary and secondary windings are separated so that the aerial circuit can be isolated in mains driven or screen grid receivers.

Telsen Aerial Coil with Variable Series Condenser incorporated .. Price 7/6

TELSEN H.F. TRANSFORMER AND AERIAL COIL

This Coil is primarily designed for H.F. amplification in conjunction with screen-grid valves. It is arranged so that it can be connected as a tuned-grid or tuned-anode coil, or alternatively as an H.F. Transformer. It also makes a highly efficient aerial coil where the adjustable selectivity feature is not required. A reaction winding is incorporated. When used as an H.F. Transformer the wave-change is effected by means of a two-pole switch. When connected otherwise a three-point switch should be used.

Telsen H.F. Transformer and Aerial Coil. Price 5/6

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They build better on Telsen



TELSEN BINOCULAR H.F. CHOKE

An inductance of 180,000 microhenrys—a self-capacity of 000002 microfarad—figures which prove that the Telsen Binocular H.F. Choke fulfils its purpose to the utmost and meets the demand of modern set designers and builders. Owing to the binocular formation the external field, and therefore unwanted reaction effects, are reduced to an absolute minimum. It covers the whole broadcast band and it is free from parasitic resonances.

**Telsen Binocular H.F. Choke,
Price 5/-**

TELSEN STANDARD H.F. CHOKE

The Telsen Standard H.F. Choke utilises the minimum of baseboard space. It is designed to cover the whole broadcast band and has an extremely low self capacity. The inductance is 150,000 microhenrys and the resistance 400 ohms.

It has proved very popular, and has been incorporated by set designers in many of the leading circuits.

**Telsen Standard H.F. Choke,
Price 2/-**

TELSEN

**ALL BRITISH
RADIO COMPONENTS**

THOSE of you who go to the National Radio Exhibition at Olympia this year should make a special point of examining our new "P.V." sets. These will be on show at our stand (No. 67) together with various other interesting things.

There are two of these "P.V.'s," and I am confident that they will arouse very considerable interest, for they are most attractive instruments from every point of view.

We are calling them "P.V. Plus" and "P.V. Star." And, of course, both designs incorporate Extenser tuning.

From a technical aspect they are fundamentally similar and each comprises a screened-grid H.F. valve, grid-circuit detector and one L.F. valve. But "P.V. Plus" is pre-eminently the set for the economist—the man who wants to get every ounce of result for the smallest possible outlay, and who wants to be able to do this with the minimum expenditure of time and trouble in assembly.

On the other hand, "P.V. Star" is the

Instead of compromising right and left in an endeavour to produce one receiver to satisfy the greatest number of people, we have gone all out on two with the object of catering for constructors of two distinct categories.

And I can assure you that in our "P.V.'s" we have the "real goods." We have had striking successes in the past; indeed, so striking have been some of these successes that many constructors have been led to believe that the pinnacle of achievement has already been reached.

But, however, good such sets as the terrifically-famous "Magic," the "Titan" and "Comet" undoubtedly are, there is nothing more certain than that the "P.V.'s" can give all of them several points and still maintain an all-round superiority.

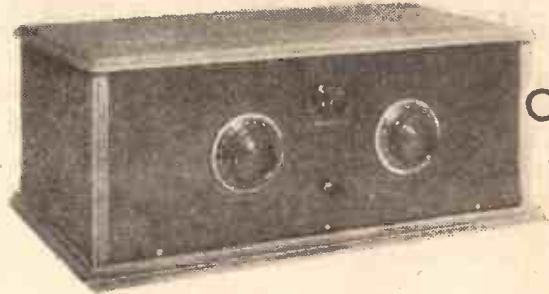
I can almost hear thousands of, for example, "Magic" enthusiasts, negating this most vociferously. Nevertheless, it is hard fact. And I for one shall have no qualms at all if the two or three hundred thousand "Magics," which probably still exist, are all replaced by "P.V.'s."

On the contrary, the whole of the "P.W." Technical staff will be very pleased, for the front name of "P.V." could well be Progress—note the capital P!

The Best Yet!

We have very complete testing gear at Tallis House (there are, for instance, standard transmitters and valve voltmeters for over-all "gain" tests) and I am going to place on record that the new "P.V.'s" are superior in selectivity and sensitivity over both long and ordinary waves to any equivalent apparatus "P.W." has ever produced.

OUR NEW "P.V."



by
G.V. DO
ASSOC

The introduction of "P.V.'s" Exhibition Receivers in trade and constructor circles, and this year's des

Added to this they have advantages in assembly and operating that have been made possible only by certain recent developments.

The utter simplicity and inexpensiveness of "P.V. Plus" will cause some considerable surprise. But I must point out right away that in this design we have again introduced the now well-known and very well-liked "Progressive" principle.

Progressive Construction.

That is to say, the set will appear in two forms. There will be first of all, the original or foundation model. This will be absolutely complete in itself, and a large number of you will find it all-sufficing. Subsequently, however, we will tell you how certain refinements can be added as and when you feel disposed to make the extensions. And these additions can be carried out without in any way interfering with the first form of the receiver.

Yet, I will repeat, the "foundation" is no "bare bones" skeleton, but is quite complete in itself and capable of holding its own in looks and efficiency with any other equivalent design.

And if and when the "extras" are incorporated the result is not a "bodge," but a really fine ensemble.

To give you something of an idea of the effect, I can say that in the first instance there are only four symmetrically disposed controls and these are, of course, on the front panel. These are the tuning dials, an on-off switch and a reaction knob. The extensions necessitate the inclusion of several further panel items, but these fall into a graceful patterning and do not constitute irregular eyesores—obvious additions.

And now for a few words about "P.V. Star." This is, indeed, a magnificent affair, and we feel very proud of it.

Artistic Appearance.

After the circuit had been evolved, and thoroughly tested in the Research Dept., we gained the co-operation of one of our trade friends and designed a new cabinet on the most modern artistic and technical lines.

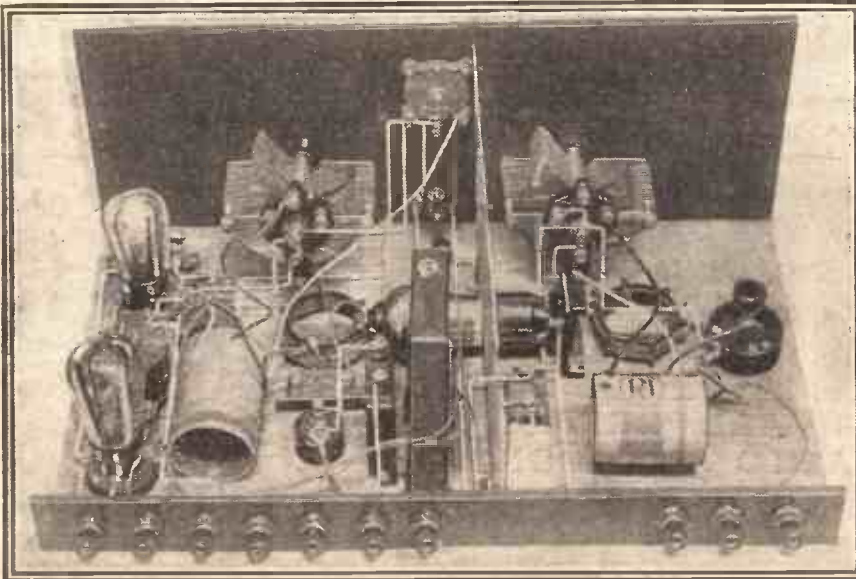
If you glance at the heading photograph

"P.V. PLUS" AND "P.V. STAR" ARE THE BEST PAIR OF RECEIVERS "P.W." HAS EVER PRODUCED, AND YOU CAN BUILD EITHER OF THEM WITH THE ASSURANCE THAT IT IS THE VERY LAST WORD IN RADIO-RECEIVER TECHNIQUE.

last word in radio receiver technique both in regard to appearance and in the technical refinements included in it. Indeed, it embodies several entirely original features, and I think you will agree that there is no other outfit of either kit pattern or factory-assembled type that can hold a candle to it.

However, in its way "P.V. Plus" strikes an equally outstanding note, and I will not attempt to forecast which of the two will achieve the greater popularity. But that both will prove immensely successful I have not the slightest doubt for I sincerely believe that together they will offer a wider appeal than any other pair of sets that has ever been introduced.

A PEEP BEHIND THE PANEL OF "P.V. PLUS"



You will find it a very straightforward set in assembly and surprisingly inexpensive. We regard it as the 100% S.G. Three arrangement.

NEXT
THE GREAT
SPECIAL
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CONTAIN CO
DETAILS
THESE P.V.
FIRST PAR
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YOU WILL SEE T

"P.V." SETS

WIRING
DATE I.E.E.



...always an event that creates enormous interest both signs will undoubtedly break all our previous records.

you will be able to see something of what it looks like though, naturally, the camera is, in this instance anyway, a poor substitute for your eyes. The original thing has to be seen fully to be appreciated.

Improved Reaction Control.

But note the gentle "rake" given to the front and the modernistic side pieces. By the way, these sidepieces practically conceal one of the outstanding features of "P.V. Star." This is a new type control developed especially for this set. It comprises a large diameter milled disc similar to those which figure in drum drives. But it is arranged horizontally and projects through a slit between two of these "wings."

There is one of these controls at each side, and to adjust them you merely lay your hands on the sides of the cabinet and turn them round with your fingers. It is one of the easiest and most natural actions that could possibly be conceived, and no words of mine can be sufficiently expressive to describe it at its full worth.

With a gentle stroking movement you get the closest adjustment in the simplest imaginable manner, and it is a great advance on the old side-knob scheme.

On the ornamental vignetted front panel of "P.V. Star" there is nothing else except the one station-selecting dial and an on-off switch. These are the controls that concern the non-expert members of the household,

and, by referring only to these, they will get all the powerful long- and ordinary-wave programmes.

Easy to Assemble.

The two side controls mainly concern the weak and distant transmissions.

The "innards" of this set embody everything that is needed to produce the best results with freedom from all the failings usually encountered.

However, I must hasten to add that this *de luxe* instrument has not been designed regardless of cost. As a matter of fact, it is, in view of its attractive features, remarkably inexpensive. After all, everybody wants to get the most possible for his money!

For example, the cabinet may be luxurious in appearance, but it costs little if anything more than one of those normal panel and baseboard kinds.

And the "P.V. Star" is by no means a complicated outfit to assemble. There are no intricate screening arrangements and none of the leads needs soldering. And the Extender reduces the wiring and greatly simplifies the general assembly.

In fact, it is a receiver no one need hesitate to tackle even without previous experience of set construction.

Just before sitting down to write this article I was running the "P.V.'s" through their paces on a normal aerial under normal home-reception conditions. And the experience was thrilling to the extreme. Both sets seemed to be quite a lot better even than they had measured out to be in the laboratory and during their series of formal tests.

At first I wondered why this should be, for no alterations had been made. Then I saw the reason. As the years go by the rules and regulations governing the "passing" of sets in the Research Dept. get tighter and tighter.

Passed by the "Snag Sleuths."

I should mention that nowadays no set can be sent to the drawing office where the diagrams are made before a small committee has signed a "guarantee" certificate.

One of the members of this committee is our Chief of Queries, whose work would be magnified considerably by the slightest of snags!

And the committee members do not look for virtues—it is their job to search for faults, and their attitude grows more and more critical with the raising of the general standard of performance that is the inevitable accompaniment of modern progress. And no doubt they consider the time they spend on a job of set-passing is justified more by any faults they may be able to point out for rectification than by praise for the efforts of the Research staff!

Exhilarating Distance Results.

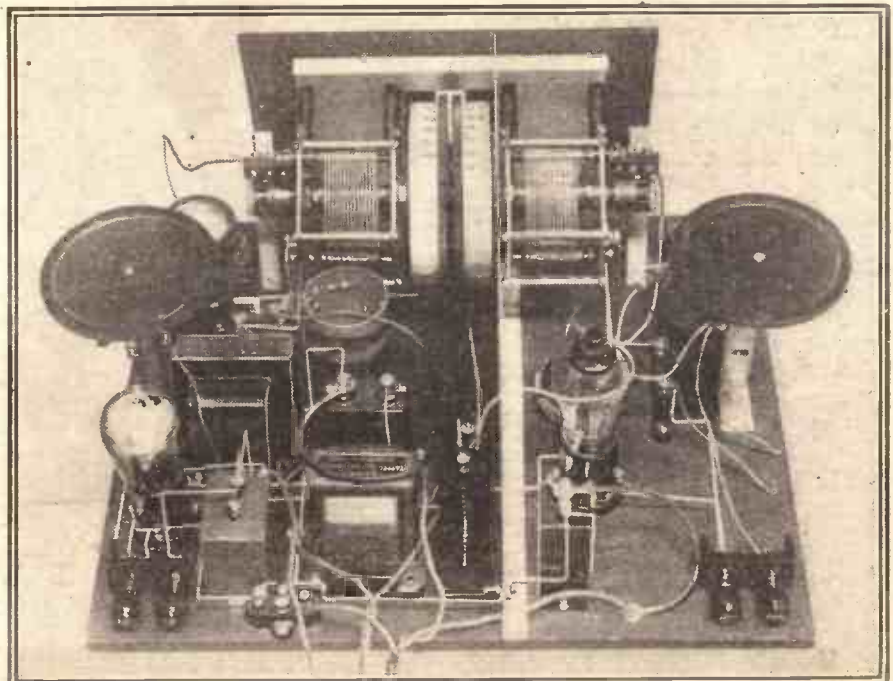
So when the final O.K. is given—generally after the receiver has been "referred back" a few times, the designer's impression of the outfit is more of a device in which a hundred and one little snags have been overcome rather than as a snag-free set possessing definite virtues. He thinks more of the receiver as it was than as it is!

ALL THE LATEST AND BEST OF OUR SPECIAL TECHNICAL DEVELOPMENTS ARE FOUND IN PERFECTED FORMS IN "P.V. PLUS" AND "P.V. STAR"—TWO SETS THAT CAN GIVE POINTS TO ANY DESIGNS PREVIOUSLY DESCRIBED.

And so with our new "P.V.'s"; removed from the atmosphere of the laboratory, I saw them with new eyes and heard them with new ears; I became an ordinary programme-hunter instead of a technician.

It was an exhilarating experience, with dozens of stations silkily sliding in. I said to myself, "Our readers are going to like these sets—going to like them very much." And you will.

NOW LOOK AT THE "WORKS" OF "P.V. STAR"



Despite its artistic appearance—and you can get some hint of this from the heading photo, (right) "P.V. Star" is well within the scope of the skill of the average home constructor.

THEM AT OLYMPIA

Telsen for better reproduction



**TELSEN LOUD SPEAKER
UNIT**

The Telsen Loud Speaker Unit is pleasing to the most sensitive ear. The deep notes of the bass, the brilliance of the soprano, and the crispness of diction are clearly reproduced without any distortion.

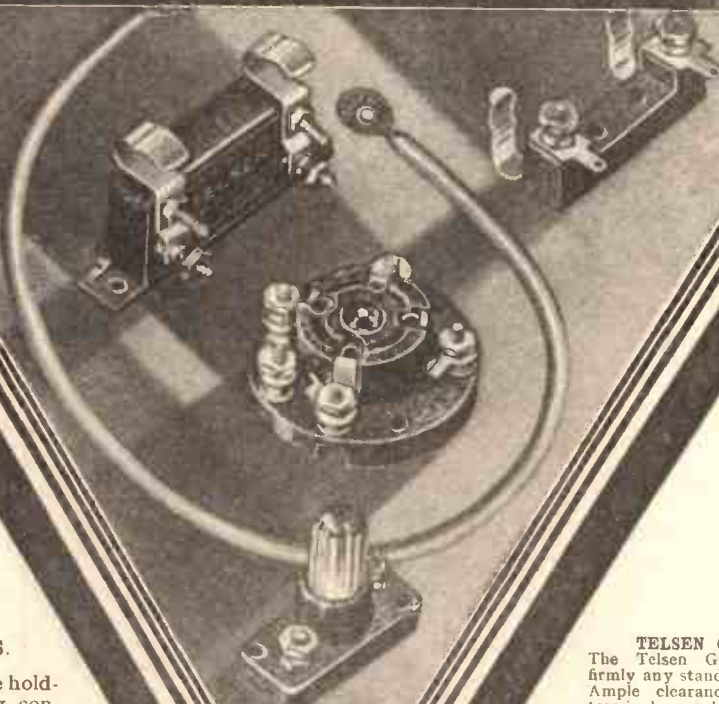
It employs cobalt steel magnets, and the detachable rod which carries the cone is fitted with cone washers and clutch. The entire unit is enclosed in a beautifully moulded bakelite dust cover.

**Telsen Loud Speaker Unit,
Price 5/6**

TELSEN

**THE LARGEST RADIO COMPONENT
MANUFACTURERS IN THE WORLD**

Typical of Telsen value



6^D
EACH

TELSEN VALVE HOLDERS.

(Prov. Pat. No. 20286/30).

The Telsen four and five-pin valve holders embody patent metal spring contacts, which are designed to provide the most efficient contact with split and non-split valve legs, and are extended in one piece to form soldering tags. Low capacity and self-locating.

Telsen 4-pin Valve Holder. Price 6d.
Telsen 5-pin Valve Holder. Price 8d.

TELSEN FIXED MICA CONDENSERS.

(Prov. Pat. No. 20287/30).

Telsen fixed mica condensers are made in capacities from .0001 mfd.—.002 mfd. They can be mounted upright or flat, and the .0003-mfd. Telsen fixed mica condenser is supplied complete with patent grid leak clips to facilitate series or parallel connections. All Telsen fixed mica condensers are tested at 500 volts.

Telsen Fixed Mica Condensers. Price 6d.

6^D
EACH

TELSEN GRID LEAK HOLDER.

The Telsen Grid Leak Holder will hold firmly any standard size or type of Grid Leak. Ample clearance is provided between the terminal screw leads and the baseboard (underneath), preventing any surface leakage upsetting the value of the Grid Leak. The terminals and fixing holes are accessible without removing the Grid Leak.

Telsen Grid Leak Holder. . . . Price 6d.

TELSEN SPAGHETTI FLEXIBLE RESISTANCES.

These are made in a range of values from 300-200,000 ohms, with a maximum current varying from 42 mA-1½mA. The terminal tags are firmly fixed to the wire and clearly marked with their respective resistance values; they are impregnated with special insulating compound which renders them proof against corrosion.

Telsen Spaghetti Flexible Resistances. From 6d.

TELSEN FUSE HOLDER.

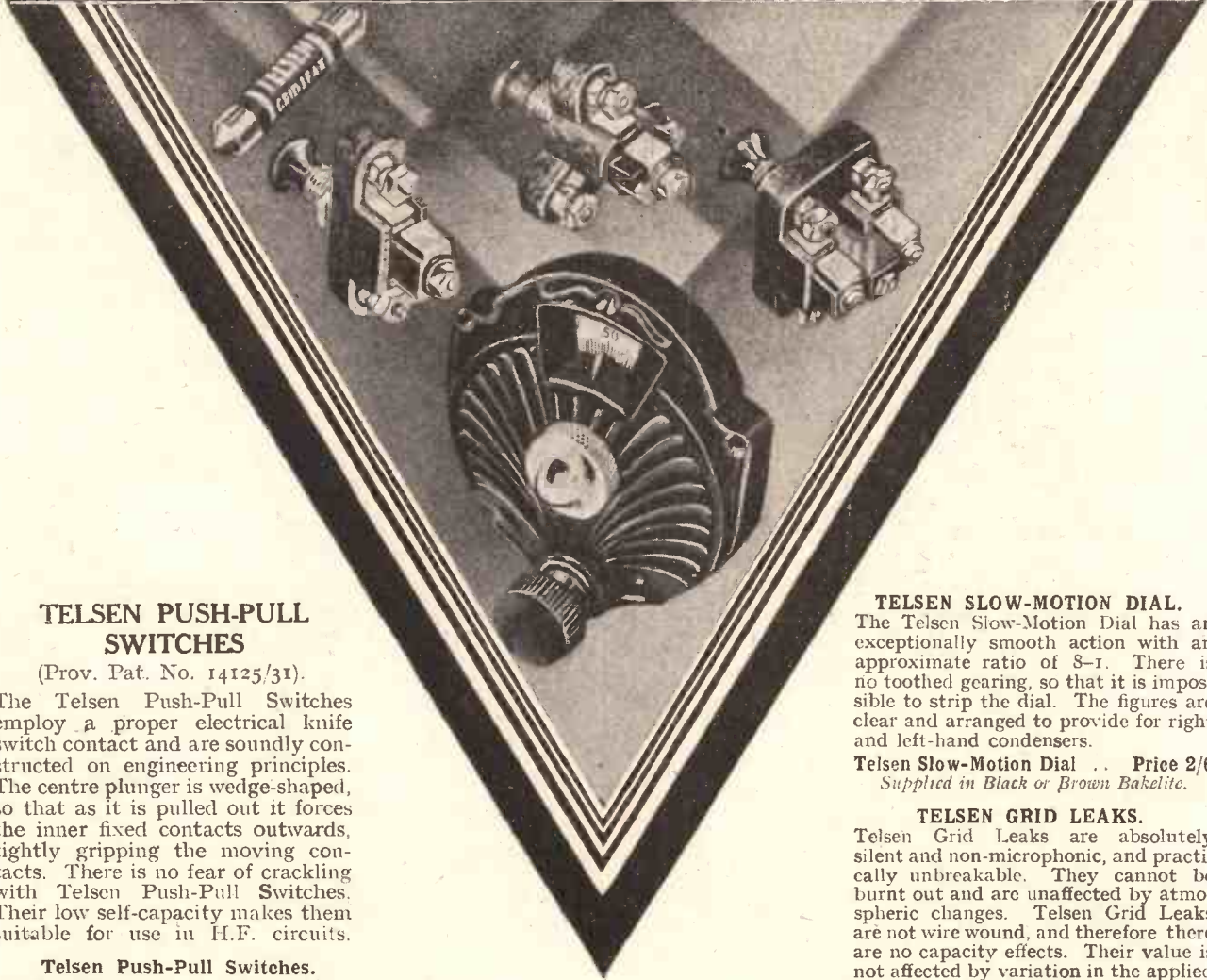
This is a neat and inexpensive device which should be incorporated in every set as a precaution against burnt-out valves.

Illustration shows the Telsen fuse holder in use with the standard type of radio fuse.
Telsen Radio Fuse Holder Price 6d.

TELSEN

**ALL BRITISH
RADIO COMPONENTS**

Switch over to Telsen



TELSEN PUSH-PULL SWITCHES

(Prov. Pat. No. 14125/31).

The Telsen Push-Pull Switches employ a proper electrical knife switch contact and are soundly constructed on engineering principles. The centre plunger is wedge-shaped, so that as it is pulled out it forces the inner fixed contacts outwards, tightly gripping the moving contacts. There is no fear of crackling with Telsen Push-Pull Switches. Their low self-capacity makes them suitable for use in H.F. circuits.

Telsen Push-Pull Switches.

- | | |
|---------------------|-------------|
| Two-point | Price 1/- |
| Three-point | Price 1/3d. |
| Four-point (2-pole) | Price 1/6d. |

TELSEN SLOW-MOTION DIAL.

The Telsen Slow-Motion Dial has an exceptionally smooth action with an approximate ratio of 8-1. There is no toothed gearing, so that it is impossible to strip the dial. The figures are clear and arranged to provide for right and left-hand condensers.

Telsen Slow-Motion Dial . . . Price 2/6
Supplied in Black or Brown Bakelite.

TELSEN GRID LEAKS.

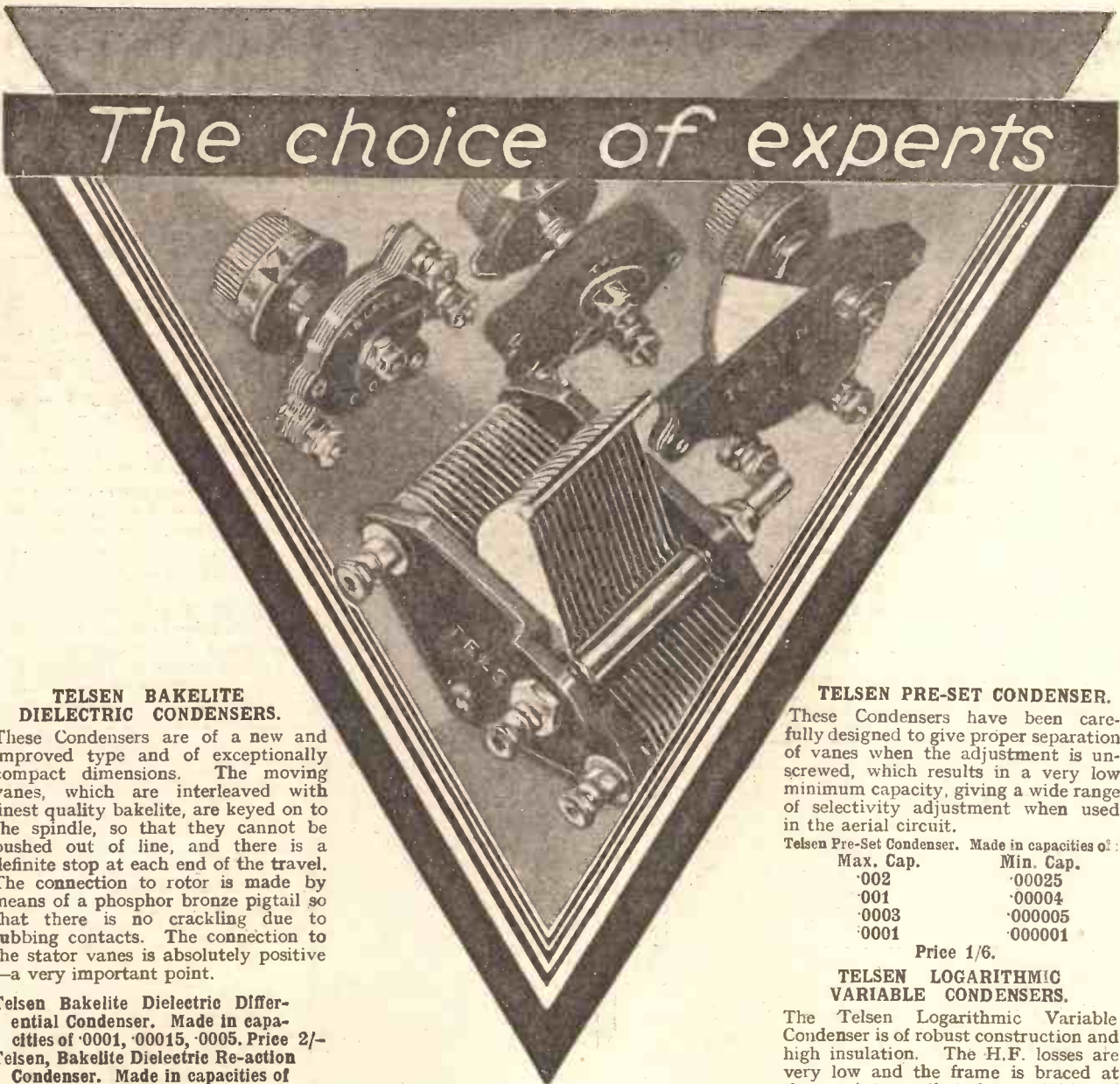
Telsen Grid Leaks are absolutely silent and non-microphonic, and practically unbreakable. They cannot be burnt out and are unaffected by atmospheric changes. Telsen Grid Leaks are not wire wound, and therefore there are no capacity effects. Their value is not affected by variation in the applied voltage. Made in capacities ranging from 1/5 megohms.

Telsen Grid Leak Price 9d.

TELSEN

THE LARGEST RADIO COMPONENT MANUFACTURERS IN THE WORLD

The choice of experts



TELSEN BAKELITE DIELECTRIC CONDENSERS.

These Condensers are of a new and improved type and of exceptionally compact dimensions. The moving vanes, which are interleaved with finest quality bakelite, are keyed on to the spindle, so that they cannot be pushed out of line, and there is a definite stop at each end of the travel. The connection to rotor is made by means of a phosphor bronze pigtail so that there is no crackling due to rubbing contacts. The connection to the stator vanes is absolutely positive—a very important point.

- Telsen Bakelite Dielectric Differential Condenser. Made in capacities of .0001, .00015, .0005. Price 2/-
- Telsen, Bakelite Dielectric Re-action Condenser. Made in capacities of .0001, .00015, .0003. Price .. 2/-
- Ditto .0005, .00075. Price .. 2/6
- Telsen Bakelite Dielectric Tuning Condenser. Made in capacities of .0003, .0005. Price 2/-

TELSEN PRE-SET CONDENSER.

These Condensers have been carefully designed to give proper separation of vanes when the adjustment is unscrewed, which results in a very low minimum capacity, giving a wide range of selectivity adjustment when used in the aerial circuit.

Telsen Pre-Set Condenser. Made in capacities of:

Max. Cap.	Min. Cap.
.002	.00025
.001	.00004
.0003	.000005
.0001	.000001

Price 1/6.

TELSEN LOGARITHMIC VARIABLE CONDENSERS.

The Telsen Logarithmic Variable Condenser is of robust construction and high insulation. The H.F. losses are very low and the frame is braced at three points, so that the possibility of distortion and short-circuiting is negligible. Substantial terminals are provided with alternative connection to the stator.

Telsen Logarithmic Variable Condenser. Made in capacities of .005, .00025, .00035. Price .. 4/6

TELSEN

ALL BRITISH RADIO COMPONENTS



AN "EXTENSER" CRYSTAL SET

This little receiver will revise your ideas of the capabilities of crystal sets. It tunes in both long and medium waves without even a wave-change switch, for it employs the wonderful Extenser as a station selector.

By F. BRIGGS.

So I am going to tell you all about a little beauty.

It will receive long and medium waves without coil changing, or even a wave-change switch. All this is done for you automatically by the Extenser. Yes, it incorporates an Extenser, that clever contrivance which enables you to sweep right through the whole range of medium and long waves with one turn of the dial.

High Degree of Selectivity.

If you look at the accompanying theoretical circuit you will see that it also makes use of a loose-coupled aerial circuit. This is a great advantage, especially if you live near to a powerful station. Thanks to the excellent selectivity of this arrangement I was able to separate London National and Regional with ease at a distance of about 10 miles.

A little further up the dial there was Midland Regional at quite good strength, and still

It is used to give the final touch to the tuning of the closed circuit, and the adjustment is not at all critical. However, it is one of those little things that make all the difference.

Simplicity of Construction.

Before you finally fix the panel to the baseboard, screw down the remaining components. These consist of the two coils, a compression type condenser, and the crystal detector. The latter, by the way, is supported by a small bracket made from strip metal.

The reason why the detector is not fixed on the panel is because adjustment is very seldom necessary. In fact, it might almost be said that the more it is left alone the better. If you would rather have it on the panel, though, you can easily do so, a sit is only necessary to drill one hole.

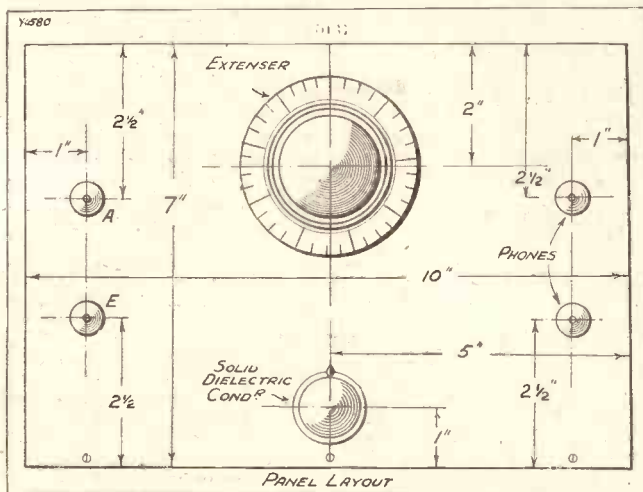
Regarding the coils, these are best made at home, and they are very easy to wind, so there is nothing to worry about. The same gauge wire is used in both, namely No. 30 S.W.G., and the formers are 3 in. in diameter and 4 in. long.

The closed circuit one—that is, the coil nearest the crystal—consists of 225 turns with a tapping at the 45th turn. (Beginning "3," tap "E" and end "2"). The smaller

(Continued on page 874)

IN these days of powerful valve receivers the inoffensive crystal receiver is liable to be more or less forgotten. This is a pity because if such a receiver is well designed, and a reasonably good aerial employed, it can give very useful results. Some years ago, before valves became popular, all sorts of wonderful achieve-

A PLAIN BUT PLEASING PANEL



Although there are two tuning controls on the panel, only the large Extenser dial is used for main adjustments. The smaller knob is simply for getting that little extra bit from the set, and need hardly be touched until you have found your programme.

ments were attributed to these little sets. To mention my own experience, I have heard Daventry 5 X X at a distance greater than 300 miles, and on one particular night about seven years ago I received most of the British broadcasting stations that were then in operation.

A Good Stand-by.

Mind you, I was using an exceptionally good aerial. That is half the battle with a crystal receiver—use a good aerial. If you are fairly near your local station you would probably hear him with one slung across the room, but it is not to be recommended.

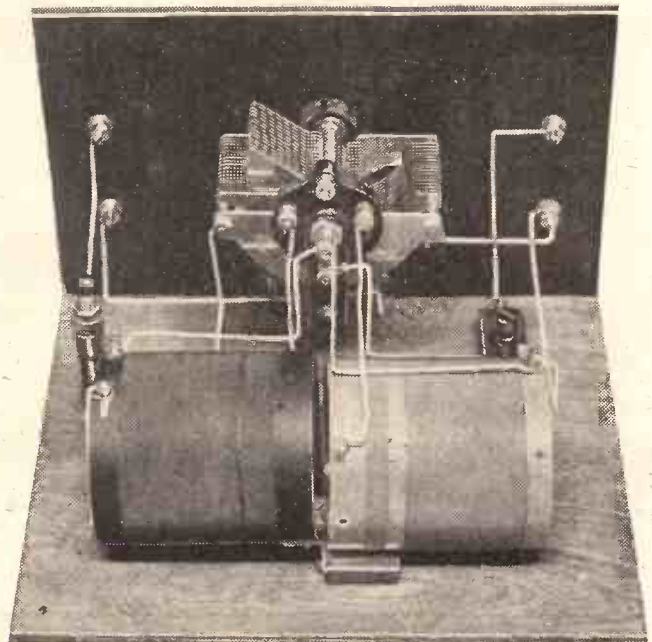
You may say, you don't want another set, as you already have a nice three-valver. What happens if your batteries run down? Or if you blow a valve? A crystal receiver makes a very useful "second string."

farther round, on the long waves, Daventry fairly romped in.

The two London stations, by the way, could be heard several feet away with the 'phones on the table—and not on a very large aerial, either.

Now, regarding the actual construction of the set, you should first of all drill the panel and mount the Extenser, Brookmans condenser, and the four terminals. This small condenser is another valuable asset to the receiver.

IT IS DELIGHTFULLY SIMPLE



The coil on the right is in the aerial circuit, and by varying the distance between it and the other coil the selectivity can be altered to suit different conditions. The farther the two inductances are apart the sharper the tuning, and the greater the station-separating powers of the set.



Mr. Kendall's services are at the command of every Ready Radio customer

As still further proof of our aim to maintain an unrivalled service, both before and after sales, we have now taken on the full-time services, as our Chief Engineer, of Mr. G. P. Kendall, B.Sc., for many years the well-known Chief of Research for "Popular Wireless" and "Modern Wireless."

When you buy Ready Radio Kit Components you are definitely assured that they are the finest possible for their particular job. Mr. Kendall is your surety. Every Ready Radio Kit Component is chosen by him *only* after submission to stringent laboratory and broadcast tests. And again, before despatch, they are tested and passed under his personal direction.

Should you ever be in difficulties with your set, you can avail yourself of his wide and experienced technical knowledge, free. Mr. Kendall controls the new Ready Radio Technical Department, formed mainly for the purpose of helping you out of your radio troubles.

"SUPER-QUAD" A.C. "POP-VOX"

Kit "A" (less valves and cabinet) £7-17-0	Kit "A" - - £11-4-0
or 12 equal monthly payments of 14/3	or 12 monthly instalments of £1-0-6
Kit "B" (with valves less cabinet) £10-19-0	Kit "B" - - £14-2-6
or 12 equal monthly payments of £1-0-0	or 12 monthly instalments of £1-6-0
Kit "C" (with valves and cabinet) £12-1-6	Kit "C" - - £15-12-6
or 12 equal monthly payments of £1-2-3	or 12 monthly instalments of £1-8-9

TO INLAND CUSTOMERS. Your goods are despatched post free or carriage paid.

OVERSEAS BUSINESS. Everything Radio can be supplied against cash. In case of doubt regarding the value of your order, a deposit of one third of the approximate value will be accepted and the balance collected by our Agent upon delivery of the goods. All goods are very carefully packed for export and insured; all charges forward.

IMMEDIATE DESPATCH ORDER FORM

To READY RADIO, 159, Borough High St., London Bridge, S.E.1.

CASH ORDER. Please despatch to me at once the goods specified for which I enclose payment in full of £

C.O.D. ORDER. Please despatch to me at once goods specified for which I will pay in full the sum of £

EASY PAYMENT ORDER. Please despatch my Easy Payment Order for the goods specified for which I enclose first deposit of £

Name.....

Address.....

Kit required.....

Mr. Kendall will be in attendance daily at our Stand No. 6, National Radio Exhibition, Olympia.

at your command
G.P. Kendall
 now Chief Engineer,
 Ready Radio

AN "EXTENSER" CRYSTAL SET

(Continued from previous page.)

section is for medium waves, and the larger one is the long-wave loading coil.

The aerial coil is very similar except that it only has 210 turns, the medium-wave tapping being taken at the 30th turn. As you can see from the accompanying photographs, these coils are placed end to end, and this gives all the coupling effect that is required.

They should be placed with their medium-wave windings together so as to obtain fairly tight coupling. When receiving on

long waves the full number of turns are in circuit, but when listening on medium waves the switch on the Extenser comes into action, and short circuits both long-wave loading coils—very simple and very effective.

Using Ready-made Coils.

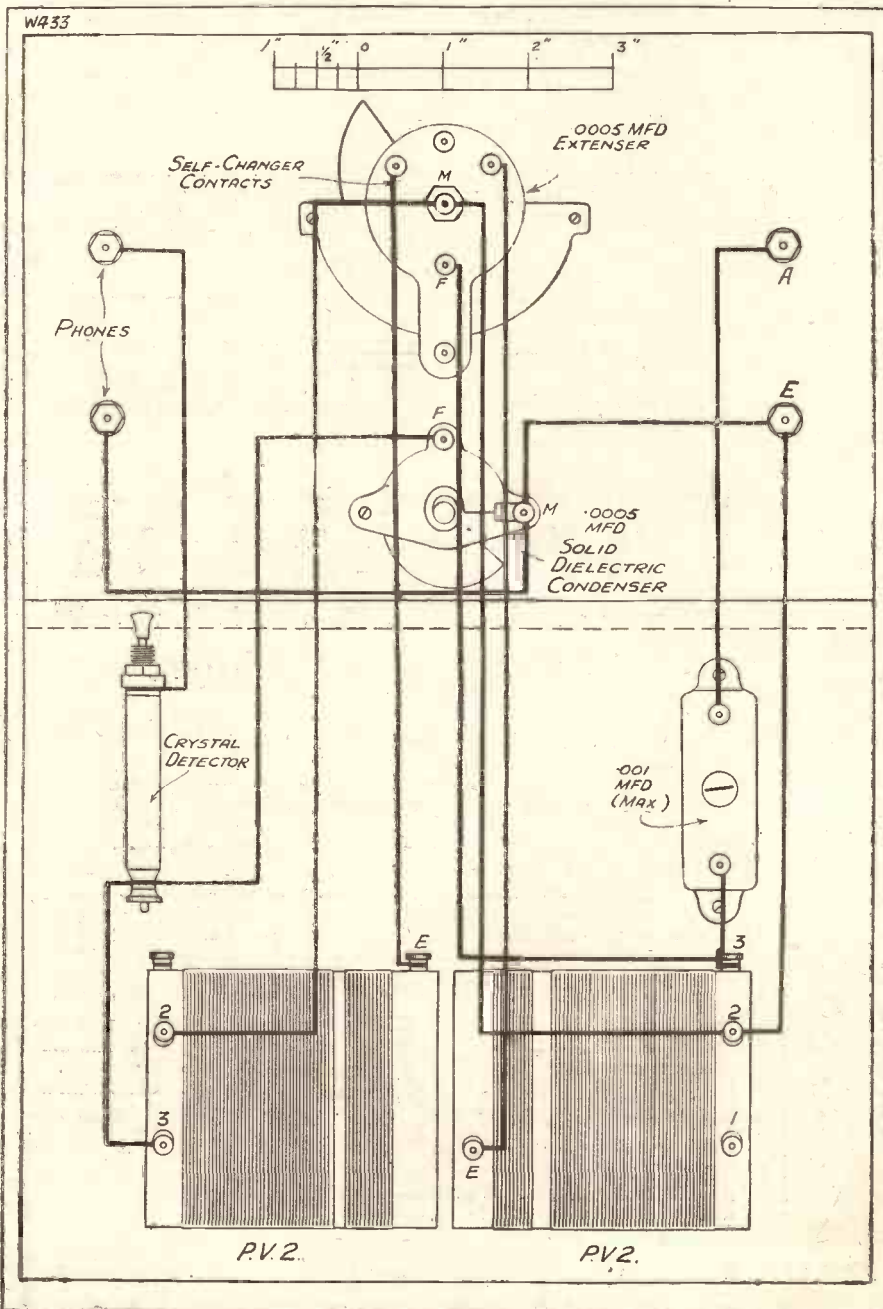
If you would rather buy your coils you can do so, but you will have to get two P.V.2's and alter the windings slightly. For the closed circuit coil remove 10 turns, starting from the end marked 3. Then, for the aerial coil you take the remaining P.V.2 and remove 25 turns, also from the end marked 3.

The reason why it is necessary to have a smaller aerial coil is because in this circuit you have the extra loading of the aerial to contend with, therefore you need fewer

turns. These P.V.2 coils were the ones actually used in the original model, and gave very satisfactory results.

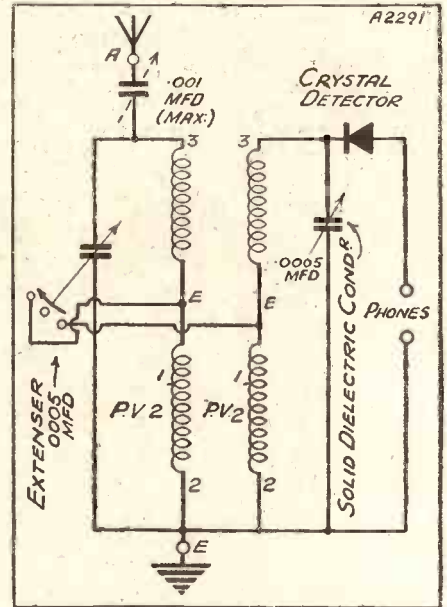
There is only one thing to remember, and that is if you buy the coils make certain that you get the type having a single layer winding the whole way. Most makes

"A BAKER'S DOZEN"—THAT'S ALL THE WIRES THERE ARE!



Thirteen wires—but as we are not superstitious it does not really matter! The listener who owns a little set like this one should consider himself very lucky, for it makes a useful standby if the main receiver should "konk out."

REALLY SELECTIVE



If you follow out this circuit carefully, you will see that the only connection between the aerial and closed circuits is the inductive coupling of the coils. This is the reason why the set is so selective.

COMPONENTS.

- 1 Panel, 10 in. x 7 in. (Permeol, or Peto-Scott, Goltone).
 - 1 Cabinet, with 8 in. deep baseboard (Camco, or Langmore, Pickett).
 - 1 0.0005-mfd. Extenser (Formo, or Cydon, Wavemaster).
 - 1 0.0005-mfd. Brookmans Condenser (Ready Radio, or Telsen).
 - 1 0.01-mfd. Compression Type Condenser (Formo, or Sovereign, Telsen, Lewcos, R.I.).
 - 2 P.V.2 coils (see text). (Ready Radio and Wearite, or R.I.)
 - 1 Permanent Crystal Detector (R.I.).
 - 4 Terminals (Ealex, or Belling & Lee, Clix, Igranic).
- Wire (Glazite, or Lacoline), screws, etc.

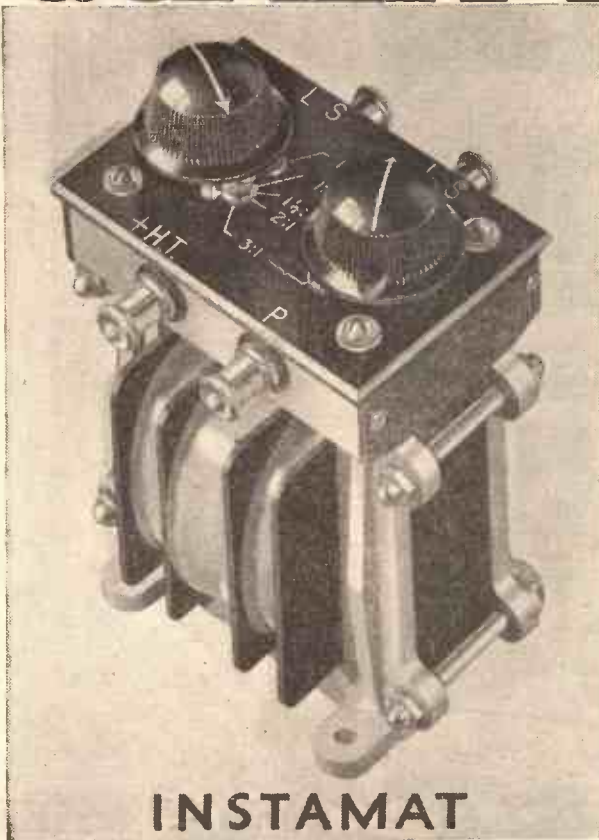
employ a hank or pile winding for the smaller coil; whereas this is quite correct for the purpose for which the coils were originally designed, it would hardly do for this small crystal set.

One reason is that in a receiver of this type it is essential to have highly efficient coils and the single-layer winding is easily the best. Another and most important reason against using any other pattern is that you would probably have difficulty in removing the required number of turns without letting most of the coil come unwound—a truly heartbreaking business, as I know from experience!

There is another point which I should like to mention, and that is with reference to the small compression condenser in series with the aerial. This condenser has the effect of reducing the capacity of the aerial, and will enable you to vary the degree of selectivity considerably.

QUALITY DEPENDS

on your OUTPUT STAGE



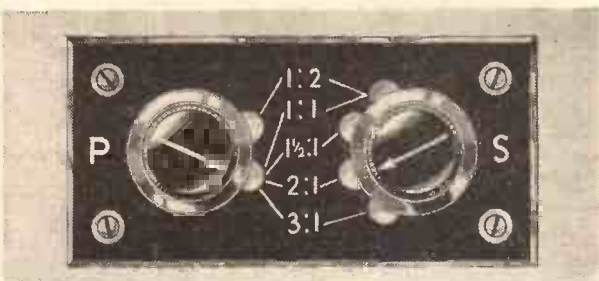
INSTAMAT

Your output stage must be right. You can have the best set and the best speaker that money can buy, but, unless they are accurately matched, quality must suffer.

Any radio expert will tell you that an output circuit is essential in a receiver capable of giving good quality and volume. It not only isolates the loud speaker from the set, thereby protecting the windings and guarding the user against shock, but also prevents the voltage to the output valve being reduced. But the output transformer must be correctly designed. It must have very low D.C. resistance and yet be able to carry a heavy current without core saturation and—it must be of the correct ratio.

The most positive means of obtaining the correct ratio is to try a number of different ones, switching rapidly from one to another until the actual reproduction from the loud speakers proves definitely that you are obtaining the perfect ratio.

That is just what the INSTAMAT enables you to do. It is an output transformer of the most perfect design, fitted with an ingenious switching arrangement with which you can vary the ratio whilst you are actually listening. No need to switch off the set or disconnect wires—just turn the switch knobs and hear the tone change. It is the only output transformer capable of giving you perfect quality by the turn of a switch.



**INSTANT MATCHING SWITCHING
ON THE INSTAMAT**

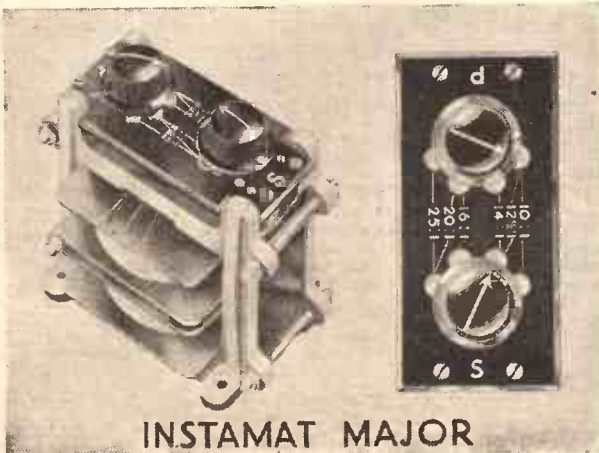
INSTAMAT OUTPUT TRANSFORMER

STANDARD

MAJOR

Connect between last valve and loud speaker. For all types except moving-coil speakers. Gives instant matching by the choice of five different ratios, all clearly marked. Extremely low D.C. Resistance, very heavy current carrying capacity and particularly generous core. **27/6**
Price

FOR LOW RESISTANCE MOVING-COIL SPEAKERS
Six ratios—10 to 1 up to 25 to 1. Heavy gauge windings and particularly large core: Current carrying capacity up to 150 milliamperes, without core saturation. Primary D.C. Resistance only 40 ohms; secondary 2 ohms. Weight 4 lbs. **37/6**
Price



INSTAMAT MAJOR

Ready Radio Ltd

To Ready Radio Ltd., 150, Borough High St., London Bridge, S.E. 1.
I lease send me details of the "INSTAMAT."

Name

Address



MADE IN ENGLAND
Sold by all Wireless Dealers.

Osram "FOUR"

NEW MUSIC MAGNET

The OSRAM "FOUR" NEW MUSIC MAGNET is the best circuit with the best valves and the best components

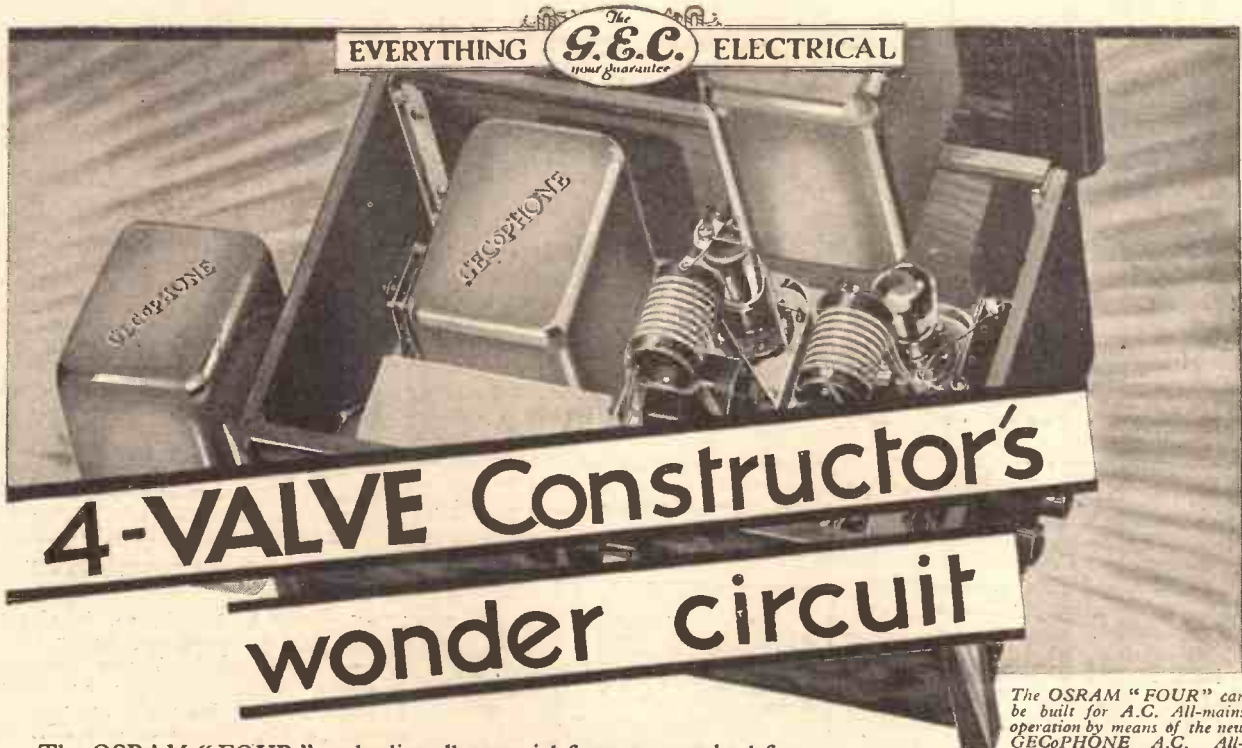
Made entirely in England

Previous models of the OSRAM MUSIC MAGNET kit sets have earned a world-wide reputation for outstanding radio performance, range, selectivity and quality of reproduction. This new model surpasses its predecessor in performance while exterior appearance has been completely changed by the provision of a magnificent walnut cabinet of modern design.

The commencement of the new wireless season is heralded by the sensational introduction of a new type of Music Magnet—the OSRAM "FOUR." This startling development introduces an entirely new and improved conception of home-assembled circuits. In appearance, in performance it represents high-class, super-efficient radio. At the remarkably low price of £10.15.0 the OSRAM "FOUR" introduces, as well, a standard of value never before attained. The Kit is manufactured at the Coventry Works of The General Electric Co. Ltd., with GECOPHONE Components and OSRAM VALVES—your guarantee of lasting reliability and satisfaction.

START THE SEASON WELL with a set that can give you radio performance without limit. Learn all about this Radio Sensation by sending for POST FREE Constructor's Instruction Chart. Fill in coupon on the opposite page. The clear instructions given in this chart will enable you to build the OSRAM "FOUR" without the possibility of mistake. It is crammed full of useful hints and tips, with a rapid guide for getting practically all Home and Continental Stations. Send for a copy TO-DAY.

SUPREMACY IN RADIO



EVERYTHING **The G.E.C.** ELECTRICAL
your guarantee

4-VALVE Constructor's wonder circuit

The OSRAM "FOUR" embodies all essential features required for modern broadcasting conditions and which are incorporated in the highest-class manufactured sets. Results—GREAT SELECTIVITY which enables you to get any station you want, GREAT POWER when the full output of the set is required, GREAT PURITY at any strength. These are the results you want. Read the nine special features below.

You will find absolutely no difficulty in assembling the OSRAM "FOUR." Wherever you live you can be sure of the utmost of radio enjoyment with this latest radio marvel.

The OSRAM "FOUR" Constructor's Instruction Chart, sent POST FREE for coupon below, tells you all you want to know. Post this off at once, and study it at your leisure.

SPECIAL FEATURES THAT WILL CONVINCe YOU

- 1 The two Screen Grid high frequency stages give extreme selectivity and sensitivity with an unrivalled range.
- 2 Enormous amplification with perfect stability is given by the complete shielding of H.F. Circuits.
- 3 Equal efficiency guaranteed on both wavelength bands.
- 4 Change of wavelength is effected by an external switch and the set need not therefore be opened.
- 5 Maximum ease in tuning with single knob controlling triple gang condenser.
- 6 Assembly is the essence of simplicity.
- 7 Volume control is provided not only to act as such, but to procure extreme selectivity.
- 8 Two terminals provided for connection to Gramophone Pickup.
- 9 Attractive Walnut Constructor's Cabinet of modern design with front panel to match.

HIRE PURCHASE. You can either buy your OSRAM "FOUR" for cash or on these attractive HIRE PURCHASE terms—25/- Deposit and 12 monthly payments of 17/-. Your dealer will give you full particulars.

The OSRAM "FOUR" can be built for A.C. All-mains operation by means of the new GECOPHONE A.C. All-Power Unit and Conversion parts. This Unit can also be used to convert last season's "Osram Music Magnet 4."

PRICE
£10.15.0
Including OSRAM VALVES
GECOPHONE COMPONENTS
& POLISHED HEAVY WALNUT
CONSTRUCTOR'S CABINET

POST FREE
Instruction Chart



POST THIS COUPON
Please send me particulars of the OSRAM "FOUR" NEW MUSIC MAGNET
Name _____ Address _____
The General Electric Co. Ltd.
Magnet House,
Kingsway,
London,
W.C.2
P.W.

G.E.C. RADIO

Cut out and paste on postcard, or enclose in unsealed envelope. Halfpenny postage in either case.

FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found-?



THE R.I. "PARAFEED" TRANSFORMER.

A NEW booklet in connection with this interesting component has been issued by Radio Instruments Ltd. There are some half a dozen or so circuit diagrams, and a quantity of useful information relative to the practical applications of this device.

NEW FORMO COMPONENTS.

There is a welcome addition to the Formo range of fixed condensers in the form of one of 6-mfd. capacity. For a condenser of such a value it is decidedly compact in construction. Moreover, its efficiency is fully up to that of its predecessors.

Regular readers will no doubt remember my report concerning the 2- and 4-mfd. Formo condensers. For the benefit of new readers I should point out that they are almost unique in that they reach a laboratory standard of efficiency. Indeed, it is remarkable how such low-power factors and high-insulation resistances have been achieved in mass-production articles.

You can gain a very good idea of the merits of a Formo fixed condenser from the following simple test: Momentarily join its terminals across the mains and thus charge it. Then carefully tuck it away on some high shelf or other safe place.

Three or four days later you will still be able to get a spark from that condenser!

The Formo Midget reaction condenser is a very neat little fellow, and at 2s. 9d.



On the left is the neat little Formo Midget reaction condenser, and in the centre the 6-mfd. Formo fixed condenser.

represents good value for money. Its design and construction are free from blemish, and the movement has just the right combination of smoothness and resistance. But constructors should note that this type is not a differential, and is no substitute for such. However, where an ordinary reaction type is specified, this Formo Midget can be fully recommended. Also, it has definite uses in selectivity and other units demanding small variables.

The arrival of the above Formo components coincided with the receipt of a further batch of Formo Extensers. These will, in due course, make their appearance in various sets; and as I recently gave in this page a detailed account of an earlier Formo Extenser it only remains to add that the latest specimens are in every respect up to the Formo standard, which is, you will recognise, a high one.



Owing to their rapidly expanding business, A. F. Bulgin & Co. have found it necessary to move into the above fine large factory.

TO BE REVIEWED.

Among the many interesting items which will be described in this page at the very earliest opportunity are: the new Orsam Four receiver, a Heyberd All-Electric Mains Unit, a Wates Electric Gramophone Motor and a Wates Potential Divider, a Ready Radio Output Transformer, a new Graham Farish Chassis Speaker, various Goltone components, an Atlas H.F. Choke and Pentode Output Choke, the new R.I. "Dux" L.F. Transformer, Fotos L.F. Transformer, a range of Atlas mains units, Formo P.V. Coils and a Formo Gang Condenser, Lotus Universal Switch and Lotus Gang Condenser, Utility Gang Condenser, Amplion Loud Speaker, Wavemaster Condensers, Sovereign Condenser, Volume Control and Potentiometer, Ferranti B.8. L.F. Choke, and various Bulgin items.

PERTRIX ACCUMULATORS.

Pertrix, Ltd., have published a new folder which is mainly devoted to Pertrix accumulators, although Pertrix H.T. batteries are also shown. It is a most colourful folder, and its design and layout reflect great credit on its producers. It cannot but enhance the already high reputation of the products it advertises.

A USEFUL FERRANTI COMPONENT.

Ferranti's have a fixed condenser on which there are three terminals, the centre one of which acts as a common point between two series capacities. Between this terminal and either of the

Manufacturers and traders are invited to submit radio apparatus of any kind for review purposes. All examinations and tests are carried out in the "P.W." Technical Department, with the strictest of impartiality, under the personal supervision of the Technical Editor.

We should like to point out that we prefer to receive production samples picked from stock, and that we cannot in any circumstances guarantee their return as it is our practice thoroughly to dissect much of the gear in the course of our investigations!

And readers should note that the subsequent reports appearing on this page are intended as guides to buyers, and are, therefore, framed up in a readily readable manner free from technicalities unnecessary for that immediate purpose.

other two is 1-mfd., so, in effect, it is really three condensers, for by using the two outer terminals you have a condenser of half a farad; by joining the two outer terminals together you get two mfd., while, alternatively, there is still the one mfd. before-mentioned.

You can, of course, use both the 1-mfd. halves separately, providing, as is quite often the case, there is a common point in the circuit to which the common terminal can be joined.

The main purpose for which the device was designed is to act as a centre-pointed capacity for joining across the mains in the well-known manner. I believe Ferranti's have a patent on this, but that you are automatically licensed when you buy their special condenser.

Multi-purpose components of this nature always appeal to me, particularly when the price is little greater than that for one of normal character. You see, even if the special features of such a device are not immediately needed, there is always the possibility in the future that they may come in extremely useful. There is one suggestion I would make, and that is that constructors would undoubtedly prefer to have the mounting part permanently fixed on this Ferranti condenser.



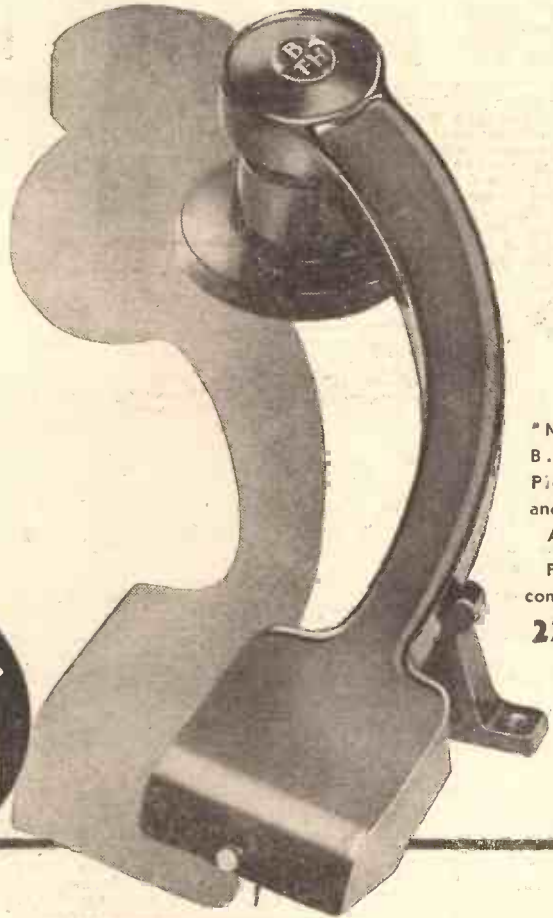
The "common" terminal is marked "minus."

NOW A
NEW
 MINOR
PICK-UP
 and **Tone Arm**



PRICE

27/6



"Minor" B.T.H. Pick-up and Tone Arm. Price complete **27/6**

A B.T.H. Pick-up and tone arm is the choice of leading radiogram experts—the choice of the enlightened home constructor—the pick-up that's chosen when a man "must have the best."

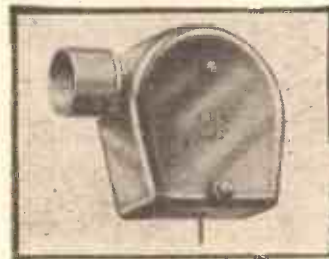
Now comes the B.T.H. "Minor" Pick-up and tone arm at a price which places first class reproduction within the reach of a wide public—the public which knew and appreciated the best but which couldn't afford to possess it.

The new "Minor" is an amazing success. Its brilliant performance on test records is a revelation. Bass, treble and middle register — all reproduced with amazing brilliance. The "Minor" is a product of the same technical experience and engineering skill that have made the "Senior" model the standard of excellence against which other makes are judged.

See one for yourself and ask for a demonstration at your local dealers.



"Senior" B.T.H. Pick-up and Tone Arm. Price **45/-**



"Senior" B.T.H. Pick-up only with adaptors. Price **27/6**



THE EDISON SWAN ELECTRIC CO. LTD.
Incorporating the Wiring Supplies, Lighting Engineering and Radio Business of the British Thomson-Houston Co. Ltd.
 Radio Division:
 155 Charing Cross Road, London, W.C.2
 Showrooms in all the Principal Towns

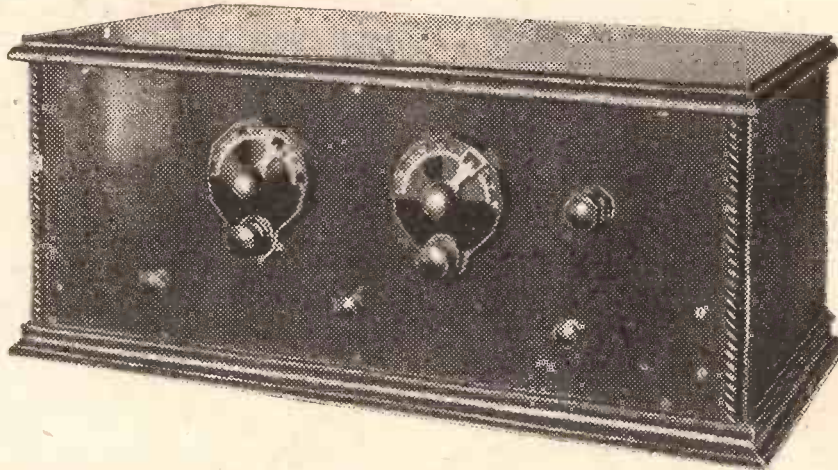
EDISWAN
RADIO PRODUCTS

NEW INVENTION for PERFECT RADIO

A new screen grid 3-valve set has just been specially designed to suit modern conditions and the development of regional stations. The Northampton Plating Co. have recently made extensive researches within three miles of Moorside Edge and Brookmans Park, and can undoubtedly claim to have obtained the most efficient means of overcoming the tremendous difficulty of obtaining selectivity. The New Screen Grid 3 was specially tested at Huddersfield within sight of the aerial, and the two local stations were easily separated by over thirty degrees, thus allowing for the reception of many stations—English and foreign—between these wave-lengths. This performance is far superior to that of any other set that has been tested in this locality. The results obtained are due to special devices incorporated in the design.

SPECIAL OFFER
OF BLUE PRINTS OF FAMOUS SETS

Two 6d. Blue Prints for Super Selective 2 and 3 for 3d. each. 1s. Blue Print of 4-valve Portable (which separates Brookmans Park Stations under the aerials) for 6d.



Read these Testimonials

"I write to say I have made up your 3-valve set. I am delighted with the results. I am about 8 miles from the Slaithwaite Station, and can separate the two programmes easily. I have only used your cheap parts. Please send me your 1931 catalogue."—G. O., Halifax. 7/7/31.

"Your Super Selective 3-valve set I made up is giving every satisfaction, and is an improvement on any receiver I have yet tried, both for quality and volume. The number of stations I can get is amazing:—High Wave: Warsaw, Motala, Eiffel Tower, Berlin, Radio Paris, and Daventry 5XX; Short Wave: Budapest, Vienna, Brussels No. 1, 5GB, Langenberg, Rome, Stockholm, Katowice, Frankfurt, Poulouer, Hamburg, Algiers, Muhlacker, Graz, Turin, Strasbourg, Brussels No. 2, Hellsberg, and many others which I cannot name. All these I obtained on an indoor aerial of about 40ft."—H. G., Nottingham. 9/5/31.

"It is now two years since I built your 'Super Three.' I might tell you I have tried many, including '—', which is classed very good on all waves by the late engineer to B.B.C., but I can say it is not a quarter as good as the 'Super Three.' The '—' Co. advertise their '—' to get about 30 stations, but you can go one better any time on them with your set. I logged 65 stations in two nights, from two thousand metres to two hundred metres, and that is quite a lot to say, but quite true. Your 'Super Three' is as good on short waves, I mean 80 metres downwards to 30 metres, this is how far I have tested with a six-turn coil and four-turn coil, home-made coils, out of connecting wire—Glazite. I haven't made the other coils yet to get a bit lower; anyway, here's one or two stations which I have logged: Dobritz, Germany, 67.65 metres; Prague, France, 58 metres; New York, W2XAL, 49.67 metres; Bound Brook, New Jersey, W3XAL, 49.18 metres; Pittsburgh on 48 metres; Madrid, 43; Paris, 32; Zeesen, 31; Eindhoven, Holland, 31. I can get Bound Brook, New York, about any night."—W. P. Hucknall. 10/4/31.

I have examined the above testimonials, and am satisfied that they are genuine communications.—(Advertiser, Daily Paper).

These include a specially patented Regional Unit which may be incorporated in any set to improve selectivity. There are also super screening methods and coils designed exclusively for the new set. This set can be used as a battery or all electric set, or for radiogramophone. It has been easily constructed by a novice at expense less than half that of other inferior sets. In order to give everyone the opportunity of testing out this new circuit, a full-size 6d. Blue Print will be supplied for 3d. from Northampton Plating Co.

SPECIAL OFFERS
7 Days' Approval to Test

Make your Set all electric by fitting the Northampton Plating Co. Super A.C. H.T. Eliminator with Trickle Charger. This Unit, value £6, will be sent to any address on payment of 70/- Cash or C.O.D. It is most silent in operation. STATE MAINS VOLTAGE AND CYCLES AND VOLTAGE OF ACCUMULATOR.

NORTHAMPTON PLATING CO. SUPER A.C. ELIMINATOR.

This A.C. Eliminator, value £3, will be sent to any address on payment of 42/- Cash or C.O.D. It is guaranteed to be most silent in operation, giving over 15 milliamperes and suitable for all 2 and 3-valve sets. State mains voltage and cycles.

These Units are sold with the guarantee that if they are not superior to other units on the market, and not giving complete satisfaction, your money will be instantly refunded if returned in good condition and undamaged. EASY PAYMENTS ARRANGED. TRADE INQUIRIES INVITED.

THE NEW REGIONAL UNIT.

This epoch-making invention (P. Patent 21319), as designed for use with the Northampton Plating Co. Screen Grid Three, has been found equally efficient in improving all types of sets. This unit is not a wave trap or rejector, and, unlike same, does not require adjustment for each wave-length. It has been designed to overcome the enormous interference caused by the New Regional Stations, and many foreign stations have been obtained with ease, using an old set that was useless without the new Regional unit.

SPECIAL OFFER.—7 days' approval to test. This Unit will be sent to any address on payment of 7s. 9d. Cash or C.O.D., with the guarantee that if it does not improve your set the money will be instantly refunded if returned undamaged.

SPECIAL WIRELESS AND CYCLE BARGAINS

Usual Price.	Sale Price.	Usual Price.	Sale Price.	Usual Price.	Sale Price.	Usual Price.	Sale Price.
10/- Latest Type Cabinet, 12 x 8	4/11	7/6 H.F. Choke ..	3/11	17/6 Dual Coil for M.M3	12/6	4/- Reaction Condenser	2/6
5/- Ebonite for same, 12 x 8	3/-	2/- H.F. Choke ..	1/6	Triotron Dull Emitter	..	5/- Diff. Reaction ..	2/6
5/11 Transformer ..	3/6	2/6 Daventry 5 G B Coil	1/3	Valve ..	4/11	2/- Loud Speaker Cord	11d.
4/6 .0005 Variable Condenser	2/11	10/6 6-Volt Amplion Valve	3/11	5/- Cycle Tube ..	2/6	2/- 'Phone Cord ..	11d.
2/6 4 Blue Prints of Famous Sets, 2, 3 and 4 Valve..	1/-	12/6 Cone Unit ..	4/11	6/6 Cycle Tube ..	1/3	6/- S.L.F. Condenser	2/11
1/- Anti-Mic. Valve Holder	6d.	12/6 Speaker Cabinets	7/11	6/6 Double-Reading Voltmeter	3/11	21/- D.C. Eliminator, 15 M.-amp.	17/6
2/3 Rheostat ..	9d.	2/- 12-in. Speaker Frets	11d.	15/- Titan Coil ..	9/11	£4 A.C. Eliminator, 20 Milli-amp.	59/-
2/- Indoor Aerial ..	9d.	3/- 15-in. Speaker Frets	1/11	17/6 Screen Grid Valve ..	9/11	£3 A.C. Eliminator, 15 Milli-amp.	42/-
5/- Earth Tube ..	1/6	2/- 12-in. Silk for Fret	6d.	Triotron Super Power Valve ..	6/6	17/6 Electric Iron (weight 5 lb.)	7/11
10/- Guaranteed 'Phones ..	4/11	7/6 Old Type Cossor Coils	3/11	9/- 60-Volt H.T. Battery ..	3/11	25/- Electric Heater ..	9/11
3/6 S.M. Dial ..	1/6	15/- Old Type Cabinets, 21 x 7	7/11	12/6 100-Volt H.T. Battery	6/11	30/- Cone Speaker ..	9/11
17/6 New Type Cossor Long Wave Coils (pair) ..	9/6	Ebonite for same ..	3/11	15/- 120-Volt H.T. Battery	8/11	'Phones Repaired ..	2/6
7/6 Volume Control..	3/11	12/6 Cabinet, 18 x 7 ..	6/11	5/6 2-Volt Accumulator ..	3/6		
		7/6 Aluminium Panel, 18 x 7	2/11	4/6 Neutralising Condenser	2/6		

New Cycles, Guaranteed, 59/11; with 3-speed, 79/11; with Dunlop Tyres, 10/- extra. Parts supplied for all sets at Reduced Prices. Send now to avoid disappointment. Cash with order or C.O.D. Special terms to those making sets. All goods guaranteed and exchanged if not satisfactory. Inquire for anything you want. Trade supplied. Send for our wonderful Bargain Price List P.W. Owing to the enormous number of inquiries and orders received, write clearly Name and Address in Block Letters to the firm that made Radio Popular. Letters must be fully stamped.



ARIEL'S MAIL

The very popular member of our staff who writes "Notes and News" each week tells us about some of the interesting letters he receives and how radio is often assumed to be a mere sideline among his accomplishments.

WHENEVER those technical chaps get a letter which does not deal with straightforward condenser, coil, or circuit-stuff they send it to the Editor, marked "Query: Ariel." I am, in fact, "The Human Dump." On this very afternoon, just as I was calculating on a nice sleepy finish to a dull day, they shot three pounds fifteen ounces of "Query: Ariel" on to my desk.

A New Department!

"Notes and News" is my especial job and I take a pride in it, but I am blown if I will turn it into an "Answers to Correspondents" column. Therefore, I have presented the Editor with an ultimatum. "An extra typist or an extra page." Typists, so it would appear, are as scarce as fine gold, or radium. So I have collared the extra page—as I should prefer! Now to catch up with my nimble-witted, enthusiastic correspondents!

First of all, and just to clear the ground, let me assert, hand on heart, to many inquirers, several of whom are (ah! I know it!) ladies, that I am indeed one person ("not Lancelot or another"); just "an ordinary guy," eleven rooms, h. and c. and a long way from station.

"Ariel" at Home.

Two kids, complete with bikes and homework. Fair complexion and slightly thin on top. Fond of elephants and would assist with young children—if same dumb. Would milk cow and arrange flowers in spare time. Church of E. Blows a pretty froth. Good third hand at whist or ludo. Cambridge. By the day or hour. Liable to sleep after Sunday dinner and to wake up after three cocktails. Educ.: Eton, Harrow, Haileybury, Shrewsbury, and Winchester; whence left for Charterhouse. Got lost and wound up at Borstal. Expelled for aspirating my hatches, and cast upon the world. (Talkies!) Clubs: "Slate," "Darts" and "Christmas." Occup.: Continual and grossly unremunerative.

Now for the *billets doux*. First of all, here is our mysterious friend Slogswither (or perhaps it is Slapwaddle) of Snoutbury (or maybe it is Southbilge), York. He is still pouring out his sorrows, in which are intermingled the B.B.C., the P.M.G.—and that ridiculous iron bedstead. With his pertinacity he ought to go far. Well, in order to end this one-sided correspondence I offer him five bob for the bedstead if he will only stop writing about it. Slugwortle, I pause for a reply!

Telling the Tale.

Next, I select an epistle which is written in green ink on pink paper. 'Dear "Ariel," at last I have plucked up courage to write.

SHIPLOADS OF IT!



Owing to "P.W.'s" world-wide circulation, "Ariel" gets correspondence from everywhere! Collected from ports in all parts of the world, it converges in one overwhelming heap on the middle of his table!

What I want to write about is a funny thing that happened last night at 9.33 p.m. (G.M.T.), my wife had just finished telling me about a Mrs. Magle. . . . Ha! are you sure that she has finished? I know these feminine stories.

My own Aunt Mehitabel has a famous one about a veal-and-ham pie which she

constructed in 1893. It has run through eleven long instalments and so far as I can see is nowhere near the *éclaircissement*. Last Christmas she brought it to the point where ". . . and just as I had got the crust nicely rolled out, who should knock—no! he rang—but the Reverend Mr. Greenbutt. . . ." But to return to the green ink!

No End to It!

". . . Mrs. Magle. I was listening to Oslo and when Mrs. Magle's stepson said 'And that's what she did to the dustman,' a voice said, 'and that is all for to-night.' Now at that very moment my wife was called away because our kitchen fire smokes and the next door people get it in their bedroom. I think that it a strange quincidents hoping you are interested." I showed this letter to the Hon. Arabella Martin, who remarked, "How too ghastly toxic." Full marks!

I shut my eyes and pick another letter. It is from T. B. (Stow). He wants to know the difference between a volt and an ampere; his ironmonger alleges that a volt is only an amp. when the valves are alight, whereas his local radio dealer swears that a volt is an ampere at rest. "Why do amperes rest?" asks T. B. "It is all very puzzling." My dear T. B., it's dead easy. A volt is only a volt when the valves are alight, and an amp. is an amp. for a' that. In a word, no volts no amps, and vice versa, if any. Ask us another. (*Gee! what a life!*)

The Last Straw!

J. S. (Luton), says that he has made every set described by "P.W." since 1925 and has been able to get nothing but one time signal from 2 LO (1927) and half a talk on "Medieval Guilds" from Mid. Reg. Should he try a super-het? No! Buy a box of bricks! "P.S. My ariel is touching a gasometer. Should I re-design it?" No! Write to the P.M.G. and ask

(Continued on next page.)

"ARIEL'S" MAIL

(Continued from previous page.)

him to forbid gasometers! Let me know what he replies. (Yes, please do! Ed.)

Short-Waves from Goldfish!

H. W. (Oxted). "I am a Boy Scout in the truest sense of the word, and wish to be a short-wave radio expert. Can you tell me how to begin? I have taken 'P.W.' since Nov, 1930, and have three goldfish." Dear lad! the recipe is as follows: Take one goldfish. Call it Lucy. Double it. Call the other Muriel. Procure a platinum aquarium—the "B.O.P." will tell you how to make and use a platinum aquarium. Having induced Lucy to take up a stance at end A, and Muriel at end B (A and B each marked with a cross), insert one ant's-egg midway between A and B. When Muriel sees egg she will signal with her tail, which will cause a wave. Lucy will stop gaping and slew around with her starboard engines, see the egg and waggle her tail, thus causing another wave. We now have two waves. You can take your pick; both are short. N.B. I bank on Lucy's.

Hullo! This one doesn't seem to be quite in my line. And yet. . . Well, here goes! "My boy friend, met him Thursday at a drive, a wist-drive, won a box of chock, and left them to me in his Will, he said, being named William, in the engineering, he is not forman but hoping to. He has a cask in one eye, not bad though bad enough and seems steady but Mrs. Zooper, a friend at the larndry says casks are unlucky if in left eyes, though his is right. Do you advise me to accept attentions from him? Or should I turn him down. Hoping you will answer." Looks like a stray from one of our hen papers. I should accept the cask like a shot!

Two to One!

Three gems from gents with bee-filled bonnets; all scurrilous. Two pretend to deduce from my Notes that I am a sycophantic parasite of the "ated Kepitalist." My aunt! I do my eleven hours a day for democracy, never wear a pot hat or a boiled shirt, and in my time have lent my pen—and my brain—to the service of a certain trade union. The third—I clean my pipe with it. The writer of it will not understand the honour which thereby I do him! Ah, me! What a trade is penshoving!

However, there are compensations, such as this note from somewhere in Africa. "Dear Sir Arrol, I make to Almighty hope you get this, because if not H.M.S. Postal goes astrayed, and stamp wasted again. I read your volume poplar wireless and poetrys of mission Wordswork Shalkspere

and all such. So if posstals go asstray like all we sheeps, stamp wasted again. Oh almighty. Please to answer. Yours litle freind, —" Evidently my friend has had bad luck with the mails and the loss of valuable stamps rankles, bless his woolly head. I shall send him a picture postcard of Stratford-on-Avon—where Shalkspere was born! He will then probably qualify for chief on the strength of it!

Half a pound of "Query: Ariel" consists of letters from fellows who swear by sets which they made in 1924-8. They refuse to go a-dialling after strange gods! Some of them quote names of sets and parts which I have almost forgotten; some indicate that their souls are satisfied with crystals or "bright emitters," which consume 2½ amps. each, while the rest chuckle over private designs of their own. Peace be with them! They also ran!

Secret of the Pyramids!

I observe in, and extract from the remaining pile a missive, written on cardboard, apparently with a poker. Its contents are for my private information, but I waive that pettifogging formality in the public interest. Its writer has discovered the

MIKE IN A CHICKEN COOP



Broadcasts of the nightingale's beautiful song are always popular, and those given this year have proved extremely successful. This is quite likely due to an increased knowledge of "tricks of the trade," one of which is illustrated here—namely, hiding the microphone in a chicken coop to which the birds have become accustomed.

secret of the Pyramids of Egypt! That's a great relief! Sometimes those pyramids have worried me badly, and I am glad that they are about to be shown up.

I Prefer "Radio."

But as I read on, I find that the disclosure is something to do with the Israelites and something to do with right-angled triangles. In the corner there is a fine specimen of a

triangle (A B C), but to my sorrow there is no diagram of an Israelite. I thought that there was a catch somewhere! Passed to the trigonometry department!

Alternative Programmes.

Sorting the rest of the "Ariel" heap, I segregate four cordial invitations. One is to spend my holidays at a Cheshire "pub"—that's a stout merchant! I'll lay he and I could swop a few good tales! Another is to stop making a fool of myself. Ta! The third is to buy a case of grape-fruit, and the fourth is an invitation to send half a guinea for my horoscope. Didn't know I had such a thing; anyhow, he can keep it, and send me in return his recipe for nerve tonic. I thought that I was fair to mid dling brazen, but this horoscopist has nerves like a public hangman!

I go out to lunch feeling that "Query: Ariel" is the coward's way, but a bite and a bracer accompany me back with a devil-may-care mood on me. I need it, for in the interim the mail has arrived!

"My son's wife . . ." ("Oh, sweeter woman ne'er drew breath, than my son's wife Elizabeth") Great stuff! Ah, well, what does this old hush want? ". . . wife is just about reached the end of her tether." The naughty gal! "My son turns night into day over this radio of his, getting up of a cold morning to fiddle-faddle with Shenektyday and Bandong—the idea! And him so subject to the lumbager for all she sews this thermerlene woll inside his next-to's. I'd give him a mustard plarster! My lord now announces as he pro-poses—huh!—pro-poses—lardida and all me eye and Betty Martin—pro-poses to sleep in his workshop or else bring his radio set to bed with him and she can take her pick! So there's a home nearly gone West, and I'd like to know whether you poplar wirey young gentlemen are proud of it?"

That's a bit of all right, that is, blaming it on to us. I'd better send her Honeypot No. 1. She'll frame it. Thunder! A postscript! Well—by the Great Goat's Bedtime Narrative! If she doesn't add that she will be in London to see her married daughter shortly, and would like a nice young fellow to show her Prince Albert at Madame Tussaud's!

Up from the Country.

Here's another pink 'un. I love these bright original colours! It is a letter from Mr. Brick—no! elsewhere it is spelt "Buck." Mr. Buck or Brick—and the fine sturdiness of the latter appeals to my sense of—er—all that sturdy yeoman bunk—old Bricky relates that, although turnips are sassy and back'uds this year, and pullets are not as they were wont to be, nor are cows the true blue, as they were in Virgil's day, nevertheless he had a gentleman in from Norwich to rig up a radio receiver and last night the jolly old rafters rang to the shouts and laughter of the B.B.C. vaudeville. Brick or Buck was much took up with a gal what sang something that goes dah dee dee dee deedah day and begs humbly to present herewith a recipe for the manufacture of cowslip wine!

Oh, broadcasting! What have you let "Ariel" in for, but "for" being a rotten word to end on, and "on" being a preposition, and prepositions being forbidden at the ends of sentences, I will stop writing and go home, lest I go loony! Bye-bye, chicks!

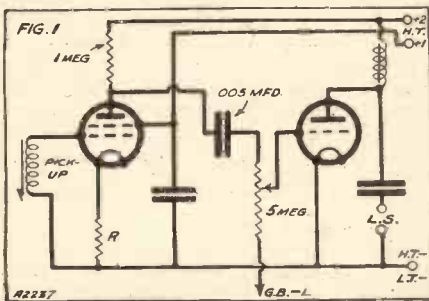
SOME QUEER S.G. FAULTS

SO many new uses for the screened-grid valve are now being found that one comes across some queer troubles with them when engaged in experimental work.

I was recently carrying out some experiments with this type of valve for L.F. amplification.

I was particularly interested in the use of the S.G. valve as the first valve in a pick-up amplifier and was trying to use it as a straightforward R.C.-coupled valve to feed a large output valve. The circuit is shown in Fig. 1, and is the usual one with suitable values for the high impedance of the S.G. valve.

AS AN L.F. AMPLIFIER



When using an S.G. valve for L.F. amplification after a pick-up it was found that terrible distortion resulted. This proved to be due to interaction between the grid and anode circuits of the S.G. valve.

As you will see, the volume was controlled on the grid leak which biased the grid of the output valve, as for certain reasons I did not wish to put a volume control directly across the pick-up.

Full Volume Unobtainable.

On connecting up the amplifier to test it out I found that terrible distortion and practically no amplification was obtained. With the volume control near its zero setting the quality was all right, but as soon as it was rotated more than about a third the way round the volume did not increase any further; if anything, it decreased, and distortion began to come in.

Owing to the colossal amplification obtainable from S.G. valves, they are very sensitive to small changes in circuit arrangement. This article deals with some interesting faults with which the writer had to contend when carrying out some experiments with this type of valve.

By C. P. ALLINSON, A.M.I.E.E.

Now you will see from the circuit that I was using a 1 meg. leak for the coupling resistance, a value that you would use yourself since the impedance of the S.G. valve is so high, especially with the negative bias given by R, which is connected in the negative lead of the valve, while the grid-leak potentiometer had a value of 5 meg-ohms.

Working Like a Dynatron.

I played about with the circuit for a long time and could discover little or nothing, and I was beginning to think I had better place it among my unsolved mysteries. Before doing so I drew the circuit out on paper and had a look at it, and while thinking it over I remembered a fairly recent article I had read describing a new use for the S.G. valve as a dynatron oscillator. I remembered, further, that the conditions for this were that the grid circuit should have a negligible impedance compared with the anode circuit, and that for H.F. work the grid was shorted straight to filament.

Now in my circuit the impedance of the pick-up was negligible compared with the 1 meg. leak in the anode circuit (its D.C. resistance was barely 1,000 ohms), and probably the valve was oscillating at some inaudible frequency—hence the lack of mag. and the horrible distortion.

A quick check-over revealed the accuracy of my guess, and a cure for the trouble was duly found.

On another occasion I had an H.F. amplifier which gave symptoms of parasitic oscillations incurable by usual methods, and which, curiously enough, appeared to have their frequency controlled by the volume control.

The circuit I was using was as in Fig. 2.

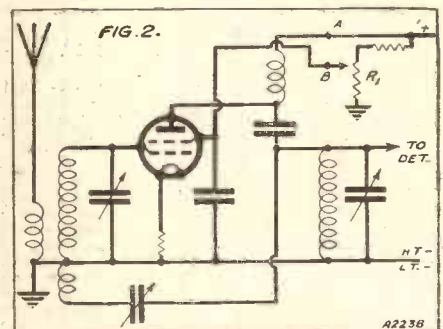
The H.T. was derived from a mains unit, and a potentiometer, R₁, was used to give a pre-detector volume control.

With this control at a low value the local station came in excellently, but as soon as a distant station was searched for and the volume control turned up, there was a click after a certain point was reached and the H.F. valve began to generate oscillations of some unknown frequency. A few beat notes would be obtained which would vary in pitch as R₁ was adjusted.

A Simple Remedy.

Luckily the cure for this was simple; a rapid check showed that I had reversed the H.T. connections for anode and screening grid, i.e., leads A and B in Fig. 2 were reversed, and on putting them in their correct position the amplifier functioned perfectly, and gave no further trouble.

A GOOD HOWLER!



This circuit gave signs of unexpected oscillation, the cause of which was traced to reversed S.G. and anode H.T. tappings!

On another occasion I was experimenting with an S.G., H.F. amplifier, using a tapped-down method of stabilising as shown in Fig. 3. Here, as you will see, stability was obtained by tapping grid and anode down their respective tuned circuits. This was necessary, since very efficient inductances were used, and without these taps the H.F. amplifier was definitely unstable.

I found that when I got down to about the London National transmission the

(Continued on next page.)

SOME QUEER S.G. FAULTS

(Continued from previous page.)

H.F. stage went into oscillation, but yet did not heterodyne the London carrier. From this it was obvious that the oscillation was not at the frequency of the tuned circuit; in other words, it was a parasitic oscillation.

On checking the wave-length of these oscillations I found it to be at about 170 metres, and an examination of the circuit showed that I happened to have the anode and grid taps at exactly the same distance from the bottom of their respective tuned circuits. On moving one tap up and the other down the trouble was cured.

Other causes of instability with S.G. valves are loudspeaker leads which are carried behind the set so as to run near the grid-circuit of the screened-grid valve. In big sets I have sometimes found it necessary

to use an output filter circuit as shown in Fig. 4.

This consists of a couple of H.F. chokes (ZZ) and a couple of condensers (CC) connected as shown. One choke is in each loudspeaker lead, while the two condensers, which are from .0005 to .001 mfd. each, are connected across in series, the centre point being earthed.

An aerial lead carried anywhere near the anode of the S.G. valve will also give rise to trouble, and in one set I had to run the aerial lead through metal tubing so as to stop instability that was resulting owing to coupling between it and the anode circuit of the S.G. valve. The metal tube was, of course, earthed. The set was an all-mains transportable, and the aerial lead came in at the top of the set so as to avoid drilling holes in the cabinet.

Order of Switch Connections.

I once had a lot of trouble with a portable receiver I made which had an S.G. stage in it. The wave-change switching was all carried out on one switch, and I finally found, after a lot of cures for instability had been tried, to no avail, that the order of the leads on the switch was the controlling factor.

If detector grid and S.G. grid leads were next to each other a little instability resulted. If detector anode and S.G. grid leads were adjacent, oscillation was uncontrollable. By separating the two grid-leads by the L.T. contacts of the switch, which thus gave a certain degree of screening as well as separating them by a greater distance, the trouble was overcome and the set operated satisfactorily.

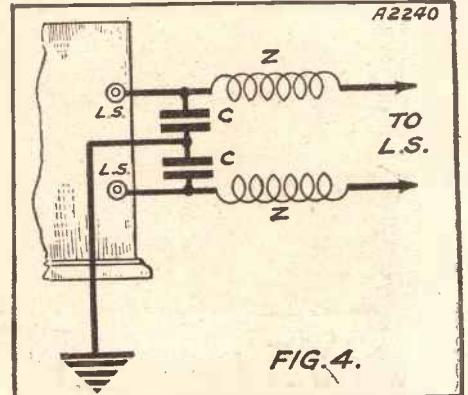
A.C. screened-grid valves, owing to their high efficiency, are rather more tricky to deal with than battery valves, and precautions such as those outlined in the preceding

paragraphs have to be carried out pretty thoroughly.

These valves have an additional source where trouble may originate. They are often somewhat critical as regards grid bias. Too much grid bias is perhaps a little better than too little, providing it is not a lot too much.

When using automatic bias it is well worth while using a variable resistance

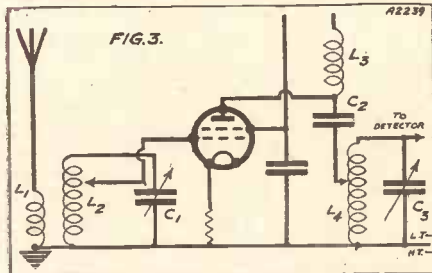
THAT "HOWLING" SPEAKER



It sometimes happens that when the loudspeaker leads are brought near to the receiver, howling sets in. This can often be cured by inserting H.F. chokes and condensers in the loudspeaker leads as illustrated above.

first, so as to find the right value under actual operating conditions for each valve, for variations exist between valve and valve—it would be surprising if they didn't, in view of the high mag. and steep slope that these valves possess—and such variations introduce variations of the conditions under which the valve will give the best performance.

TRYING TO BE A SUPER-HET



When this arrangement was tried out on the lower broadcast band it burst into uncontrollable oscillation, on a wave-length about 100 metres below that to which the set was tuned!

LETTERS FROM LISTENERS

Some interesting correspondence from "P.W." readers.

THE DOUBLE TRAPPER DOES IT.

The Editor, POPULAR WIRELESS.

Sir,—I am writing this letter to tell you that I have built the "Double Trapper," the circuit of which appeared in your paper, and that I am very pleased with it. I live within six miles of the new North Regional station, and my set is a "Straight Three," Det. 2 L.F. Before building the "Double Trapper" the North Regional programme spread all over the dial, and the North National did the same. Now the spread of both programmes is only 4 or 5 degrees, in fact, when both programmes have been working together I have tuned in Rome on 441 m. without any interference by the North Regional on 479.2 m. I also tuned-in Heilsberg on 276.5 m. without interference by the North National on 301.5 m., Midland Regional, Toulouse, Hamburg, Mühlacker, and London Regional have all been received clear of interference. I am looking forward to having a better time this winter than I had expected, thanks to your "Double-Trapper."

Wishing your paper the best luck.

I remain, yours,

(Mr.) N. HODGSON.

Halifax, Yorks.

USING THE VALVE AS COIL HOLDER!

The Editor, POPULAR WIRELESS.

Dear Sir,—I have been a reader of "P.W." for many years, and have made up dozens of sets and spent much time on the gadgets appearing so frequently, but I don't remember ever seeing the following space-saving idea, especially in portables.

Taking the detector valve of my "Magic" Three, I wound the aerial and reaction coils on same. The former goes round the base and just about fits it on a Mullard, and the latter is wound above it on the bulb, both in the same direction. The valve is plugged in and the connections made.

Of course, the whole thing becomes permanent, but for those who don't trouble to go over to the long waves this is no detriment. The idea is being worked on two other sets apart from my own, and reports are that—well, they have become permanent.

Enclosed is a sample of the wire used for both coils, as I don't know the gauge of it.

Perhaps some of your readers would care to try this out, it is something new to them. Wishing success to "P.W."

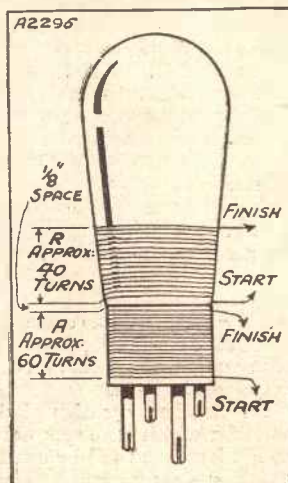
I remain, yours truly,

ARTHUR BROADHURST.

Kirkdale, Liverpool.

[Ed. Note.—The wire used by our correspondent was No. 34 D.S.C.]

A NOVEL IDEA



One "P.W." reader conceived the idea of winding his coils round the lower part of a valve. Read what he says about the results he got.

IS SOLDERING ESSENTIAL?

The Editor, POPULAR WIRELESS.

DEAR SIR,—Early this year a friend gave me the wiring diagram of the "Magic" Three—I did not know much of the construction of valve sets at that time, having only tried my hand at various crystal sets, so you can imagine my joy when the "Magic" Three was a success from the start—and I didn't even blow a valve!

My friend himself is surprised at the result, as I get about 45 stations on the medium waves at loud-speaker strength—and the set is not even soldered yet!

I am a woman, and to make a good soldered connection seems to be beyond the ability of the average woman. I remember some years ago, when I had made a crystal set which gave excellent results till I commenced to solder it, when I could not get a sound out of it! Of course, now I am afraid to solder the "Magic" Three. So far I have managed with the above-mentioned results, by pressing into the joints ordinary silver paper such as is wrapped round chocolate, and afterwards binding it tightly with adhesive tape, to prevent crumbling of the silver paper or crackling noises. It seems quite a success, and I am wondering whether you advise me to get someone to solder the connections properly, or leave it as it is?

Since I made your "Regional Eraser" (P.W. June 20th) a few days ago, the volume of all stations is slightly increased, while a few others have been added to it, though at present only faintly.

I must tell you that the "Regional Eraser" is a perfect little marvel, cutting out every interfering station (except the London Regional when I want Mühlacker). But I hope to manage that little difficulty also by and by. Your paper "P.W." is not only very interesting, but I have also learned ever such a lot from you and your readers' hints.

Yours faithfully,

London, W.C.1.

LEONIE A. J. PAUL

[We congratulate our lady reader on her success and would assure her that far from soldering being essential we do not, as a rule, advise it. Providing good pressure is maintained between the clamped conductors she need not give them a second thought!—TECH, ED.]

AN ENTIRELY NEW RANGE



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These new valves can be used in any existing pentode receiver without any circuit alteration whatsoever; in ordinary receivers only one extra connection is necessary. Three types of Multi-grid Valves have been introduced: PP230 (2 volt), PP415, and PP430 (4 volt). PP230 will very materially increase the output of the small receiver, although the anode current consumption will in most cases be below that of the ordinary power valve. PP415 and PP430 will be found extremely efficient for the output stage of A.C. Receivers. All Tungram Multi-grid Valves can be supplied with a 5-pin base, or 4-pin base with side terminal.

For characteristic curves and other technical information write to Dept. ST3
 Prices: Multi-grid Valves Type PP230, 16/-; PP415, 16/-; PP430, 19/-. Other types from 5/6 to 19/-. Tungram Barium Valves are manufactured under one or more of the following Patent Nos.: 289,762, 289,763, 311,705, and 313,151.

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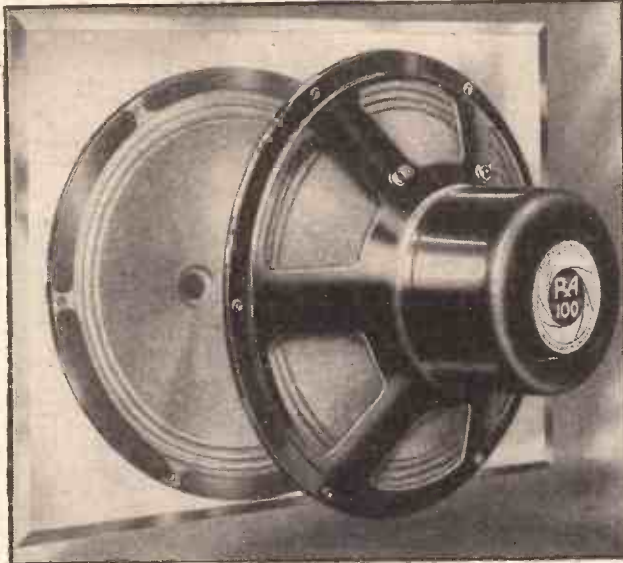
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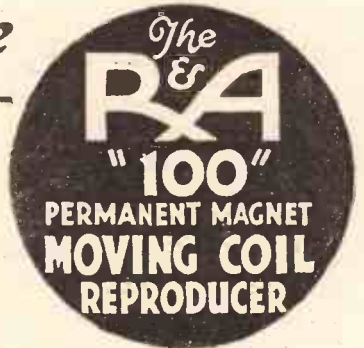


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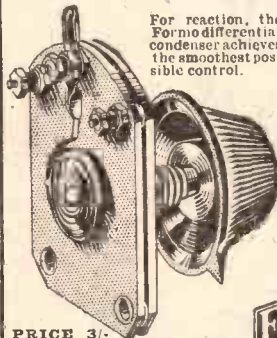
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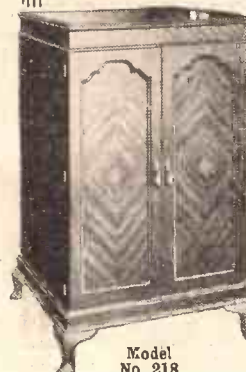
See also page 895.



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Model No. 218

MY MICROPHONE SONGS

PETER DAWSON, the eminent baritone, has some interesting things to say about microphone work in this interview with HAROLD A. ALBERT.



WHEN I heard Peter Dawson give one of his all too infrequent broadcasts in a relay from the Palladium, I enjoyed it immensely. This man, I realised, had an air.

"How Did You Like That?"

You may remember him yourself. His magnificent singing, his quiet "How did you like that one?" at the end of an item, his "And here's another that is quite good" as prelude to the next. It was intimate.

It made you feel that the man in the loudspeaker was very real indeed. When the relay ended, his inimitable style probably made enthusiasts rush to their radiograms and put on the P.D. records.

I rushed to my telephone. And—to cut a long story short—within a very few minutes, found myself ensconced on a couch in Peter Dawson's dressing-room, popping the question about radio and gramophone work.

Behind the Mike.

Like most singers, Peter Dawson is a huge man. He has a resemblance to the village blacksmith. He is big in the chest and big in the arm. "This confidential patter of yours," I asked. "Was it intended for listeners or the public who had paid to come in?"

"Listeners," said Peter Dawson.

Then, rather dramatically: "The millions behind the 'mike.' I've become so accustomed to studio work that it seems my natural atmosphere. Away from the studio, I feel just a little lost. Though, of course, the atmosphere of a theatre is very much the same. I might almost be alone.

"I cannot see ten yards before me; I just sing to a well of blackness. Only the exit lights, or the occasional lighting of a cigarette disturb me. Oh, yes, I notice them all. Even a man blowing his nose

in the gallery. They slightly irritate one. That is the joy of studio work. There are absolutely no interruptions.

"You might say I am 'microphone conscious'—always aware of the 'mike.' I flatter myself I understand it. I ought to at any rate, having made about two thousand gramophone titles, and a great number of these being by electrical recording. There is quite an art about the business.

"Choosing the songs is always important.

MORE THAN A QUARTER OF A CENTURY AGO



Here is Peter Dawson (left) with the identical gramophone that played the first Peter Dawson record over twenty-five years ago.

I always consider mine carefully. Not so much the music, but the words. They count for a great deal. They help to carry a song along. Like the words of a story in the newspaper. Perhaps that is why I like to sing songs that have a dramatic lyric.

"Then there is the microphone. You have to keep away from it for the powerful notes, and to draw nearer for the soft ones. In the gramophone studio, I always walk backwards and forwards. One cannot do this so obviously in the theatre, but I always try it to a slight extent.

"The 'mike' gives such unlimited freedom. Shall I ever forget the first time I faced it? I was amazed. I put my shoulders back and thought, 'Goodness, I can do whatever I like. No having to keep near the 'horn.' This feels fine!' But I soon discovered that what I gained on the roundabouts was lost on the coconuts.

"The microphone is a very keen critic. It detects one's faults. The old recording apparatus covered a multitude of sins. Not so the 'mike.' It picks out all the flaws—and somehow seems to amplify every one.

How It's Done.

"Singing to it necessitates great care. It is so fatally easy to 'blast,' to sing just a little bit too powerfully, and the effect is deadly to the record. Records have often to be remade for this very reason. The 'blast' does not always show at first, so the master disc is played over and over.

"At the gramophone factory they have an automatic machine to play the record two hundred times. At the end of all this, if there is the slightest flaw the disc is scrapped and remade. So if radiogram enthusiasts find that a record does not

sound good, it may be due to their sets.

"Or it may be due to me! I find that I am never perfect. My own records never please me. Something that could have been sung better here, and something that I ought not to have done there.

"I enjoy hearing records over the wireless. Indeed, I often think these mechanical broadcasts are better than transmissions of the actual performances. No scratch, and all the mush cut out by the Control Room. And what better compère could one have than Christopher Stone?"



CAPT. P. P. ECKERSLEY late of the B. B. C.

is contributing a weekly review of the latest developments in wireless to *The Daily Mail* every Wednesday. World-famous as one of the pioneers of broadcasting, both in connection with the Marconi Company and the B.B.C., his expert knowledge and unique experience are at your service.

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RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 888.)

a most striking manner, frequently varying from full loudspeaker strength to inaudibility and back to full loudspeaker strength in a few minutes.

(b) The P.V.1 and the P.V.2 coils CAN be used without the Selector coil, but the latter is usually recommended for reception of any stations other than powerful local ones.

THE "CLEAR-CUT" CONE.

D. S. P. (Sutton, Surrey).—"I am a bit puzzled about your 'Clear-Cut' cones. I have made up one or two, but on trial I find a notable lack of bass, and also I find practically no difference in tone whether the cone is put in a cabinet with quite a large baffle (2 ft. 6 in. or 3 ft. square), or operated without any cabinet at all.

"From the information which I have gleaned from Captain Eckersley's page and also from Technical Notes of your issue dated July 18th, 1931, I should imagine that the baffle, to be of much use, it should actually be attached to the cone.

"Further, if the cone is fixed to a fairly large baffle by linen or rubber or some such material, surely a resonating effect will be obtained, I mean the baffle will tend to vibrate well at the lower frequencies and thus produce a better bass effect, as well as to increase the volume (since the vibrating surface is increased).

"Suppose the reed had fixed to it a series of cones of varying sizes (neglecting suspension details), and finally a large baffle, would response to all frequencies be enhanced?"

There certainly should not be "a lack of bass," but the "Clear-Cut" principle gives much more "top," or emphasises the high frequencies much more than some of the old-fashioned methods of suspension. Possibly your unit lacks bass.

The trouble with the earlier moving coils or other

speakers in which the cone was clamped at the edge was just the one you mention—they tended to resonate at low frequencies and so over-emphasised the bass. We found that by freeing the edge of the cone and using a small air gap as described, adequate bass and much more natural high-note response was obtained, with greater "brilliance" and better speech.

The trouble with the multi-cone arrangement you suggest is that it would tend to increase the mass of the cone, and thus make resonant effects more marked. The difficulty nowadays is not to get sufficient bass response, as you assume, but to prevent over-emphasis of the low notes.

CUTTING OUT BOTH THE "NORTHERNS."

L. K. (Rochdale).—"Since they put up Moorside, the local results have been first-class, but it is going to be hard on foreigners this winter. In my own case the National fills all the lower readings on the dial, and the Regional blots out all the upper ones, so I hardly get anybody else at all.

"I am told the best way of clearing the dial is to use one of the 'P.W.' Brookmans Rejector circuits. Can I wind my own coils for this?"

"I have two mica-middle .00075 condensers for tuning. Also a .001 fixed. Are any other parts required, and what are the connections?"

All you need in addition to odds and ends and a couple of terminals are the necessary small panel and base. 7 in. by 5 in. is a convenient panel size, and you can arrange the terminals on this or on a strip at the back of the instrument.

Mount the coils well away from each other, and with their centre-lines at right angles.

One consists of 75 turns, tapped at 50 and 60, and the other of 50 turns, tapped at 5, 10 and 15. Wire, 26 D.S.C. (The formers are 2½ in. diameter, 1½ in. long.)

The connections are as follow: One terminal (A1) to moving vanes of first .00075 and to one side of .001. Other side of .001 to beginning of 75-turn coil.

Fixed vanes of first .00075 to two flex leads, with clips, going to taps on respective coils.

The other terminal (A2) to moving vanes of the second .00075 and to the beginning of the 50-turn coil. The end of this coil goes to the fixed vanes of the second .00075, and this completes the connections.

A TAPPED COIL CRYSTAL SET.

J. R. W. (Gorton St.).—"I have got a 50-turn coil wound round and round a 3½-in. tube tapped every four turns. I want to make this into a selective crystal set using a .0005 condenser to tune it, and should be glad if you could tell me what the connections would be in words."

All you need beside the main coil, the .0005 condenser and the crystal detector itself will be terminals for aerial and earth, a pair of telephones, and a .0003 or .0002 fixed condenser, with a short length of flexible wire to which is attached one of the ordinary crocodile clips. Stand the coil away by itself if you want the set to be selective, as this may not work

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Have you ever thought how difficult it is for a newsagent to order just the right number of copies of any particular paper each week? You can make his task much easier if you place a regular order with him. You will not only help him to order correctly and avoid waste, but will make sure of getting your copy regularly each week.

properly if the condenser is pushed down inside it, or if it is almost touching the condenser frame.

The connections will be as follows: Aerial terminal to one side of the crystal detector and to the flex lead, on the other end of which is the clip that goes to the different tappings on the coil. The remaining side of the crystal detector goes to one of the telephone terminals and one side of the fixed condenser.

The other side of this condenser is taken to the other telephone terminal and also to the earth terminal, to the moving vanes of the .0005 variable condenser, and to one end of the main tuning coil. The other end of the main tuning coil is then joined to the fixed vanes of the variable tuning condenser.

This completes the connections. You simply

(Continued on page 892.)



Pro. Pat.

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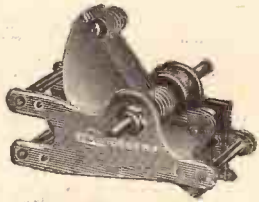
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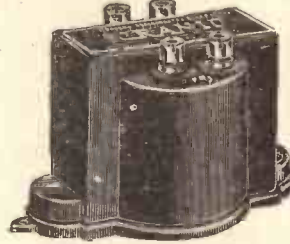
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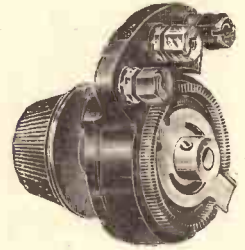
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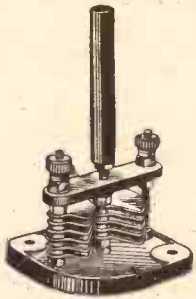
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RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 890.)

adjust the tapping clip to various points on the coil until the necessary selectivity and strength are obtainable.

RADIO DIRECTION FINDING.

"BURMA" (London, S.W.3).—"Can you give me any news of the 'new navigational wireless station' which I hear is to be erected near Rangoon? Is this for broadcasting as well as for directional aid?"

It will have nothing to do with broadcasting, but will be on the lines of the experimental rotating

at maximum in the plane of the loop, and at minimum or zero at right angles to that plane. It is thus totally different from ordinary broadcasting.

For the calculation of bearings, two distinctive signals—a "north signal" and an "east signal"—are transmitted at regular intervals as the loop aerial rotates, the periods between them being occupied by a steady dash. The normal method of observation at the wireless receiving station is to start a stopwatch at the moment the north signal ends, after which the time taken for the zero signal to be reached will indicate the bearing of the observer from the beacon.

The Rangoon station will be similar to the one just built by the Air Ministry at Farnborough, which is of the most recent design, and incorporates a number of new improvements.

It will operate on the wave-length of 1050 metres (285 kilocycles) with a maximum power of 2 kilowatts.

The system of operation will be to transmit a series of signals commencing at 15, 20, 35 and 50

by testing with a hydrometer. It pays, too, as apart from its longer life I find I get respect at the service station. And if I say: 'It was only half-charged last time' they do it over again, without a word!

"But I have never seen any explanation of what is inside the little 'beads' in the hydrometer tube to make them sink or float according to bad condition or good. What are they made of, and how do they act?"

The action of the hydrometer depends on the change in the liquid (electrolyte) in the cell and not on any change in the glass beads. They are

(Continued on page 894.)

"P.W." PANEL NO. 36.—EFFECTIVE HEIGHT OF THE AERIAL.

The effective height of an aerial is not its mean distance from the ground, as is often thought, but its distance above large earthed surfaces.

Thus an aerial erected ten feet over the roof of a high city building might have an effective height of only ten feet—its distance from the street being of less importance.

Trees and buildings should thus be avoided if possible when the site for the aerial is chosen.

beacon stations which have been erected at Orfordness, Gosport and Farnborough. These, after having been submitted to rigorous and exhaustive tests by the Air Ministry, the Radio Research Board, and other authorities, have been the subject of very favourable reports.

The first station of this type to be built as a commercial contract is to be erected by the Marconi Company at Rangoon, as a guide to shipping using the busy channel to and from the port.

A special feature of the rotating beacon system is that it requires only an ordinary wireless receiver and a stop watch to enable a ship or aircraft to take bearings, and it is therefore likely that the system will prove of considerable value in augmenting still further the application of wireless to navigation, especially in connection with the smaller classes of ships.

The system makes use of a vertical closed loop aerial rotating at a uniform speed of one revolution in 60 seconds. The radiation from such a loop is

minutes past each hour, the first minute of each transmission being utilised for signalling the identification letters of the station, V U R.

A SIMPLIFIED "P.V." THREE.

J. N. W. (Penarth).—"When did 'P.W.' give the directions for a simplified 'P.V.' Three using spaghettis, and would following valves be suitable—1 2-volt power, 1 H.L., and 1 L.F. (two-volts)?"

The valves named are all suitable for the "P.V." Three, which was described in "P.W." No. 477 (July 25th issue).

THE HYDROMETER INDICATORS.

T.S. (Portsmouth).—"Following 'P.W.'s' advice I keep my accumulator in good condition

TECHNICAL TWISTERS

No. 78.—AERIAL WIRE

CAN YOU FILL IN THE MISSING WORDS?

High-conductivity wire such as copper is essential for best results, as is always undesirable.

An aerial wire of several is usually much to be preferred to one of the single type. 7/22 is usually considered the best.

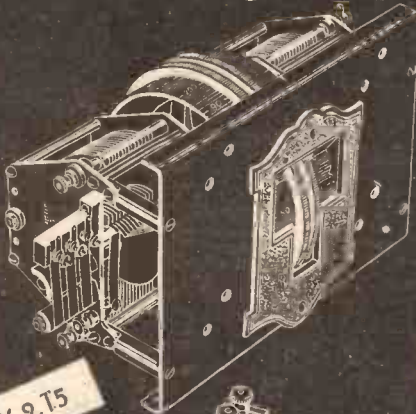
Don't cut the aerial wire unless it is impossible to lead it straight through to the set. It is better to use one continuous length for aerial and

Last week's missing words (in order) were: Capacity. Polarity. Thin.

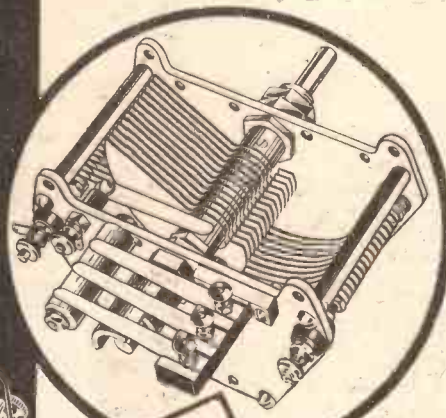
EXTENSER 4

Types—Single, Slow Motion, Double Drum and Straight Through-Gang Slow Motion

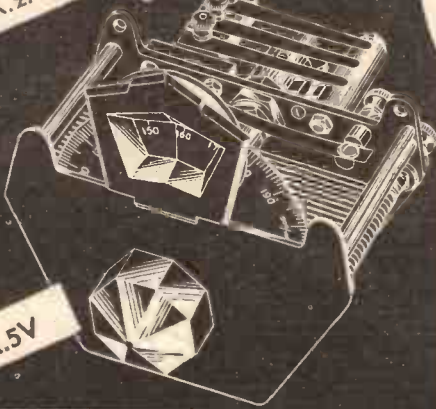
-8 MODELS



EX.2.T5



CYLDON EX.5



EX.5V

- EX.5 Single Extenser as illustrated (4" Bakelite 360° Dial 1/6 extra) 12/6
- EX.5V Slow Motion Extenser with Escutcheon and knob as illustrated 16/6
- EX.1T5 Single Drum Drive Extenser with Drum, Chassis and Bakelite Escutcheon 18/6
- EX.2T5 2 - Gang Extenser controlled by Double Drum. Chassis mounted 39/6
- EX.3T5 Triple Ganged Extenser. Double Drum Control. Chassis mounted 55/-
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- EX.G3 3 Through-gang Extenser—Slow Motion Control. Completely assembled as above 58/-
- EX.G3PIC. 3 Through-gang Extenser with insulated commutator. For VARLEY Square Peak Coil 52/-
- EX.G4 4 Through-gang Extenser. Completely assembled. Slow Motion 80/-

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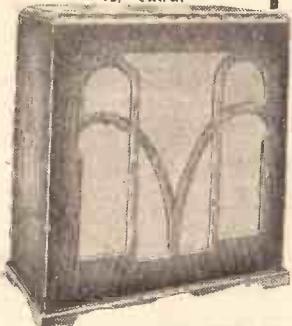
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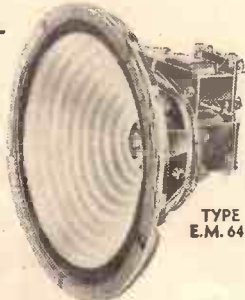


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RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 892.)

merely coloured glass, suitably weighted so that one is heavier and one is lighter than both the others.

When the accumulator is newly charged its electrolyte is "denser" (heavier) than when it has been used, the action of the L.T. current supplied being to "weaken" the strength of the acid solution.

When fully discharged the cell's acid (electrolyte) is not nearly so strong as when newly charged. Consequently a correctly-weighted bead would float at the beginning of the discharge, but as the process advanced and the strength of the acid was reduced it would tend to sink.

The "strength" of the acid is correctly called its "specific gravity," and as you see it is the changes

in this, and not in the glass beads that enable the hydrometer to indicate the condition of the accumulator.

FITTING A GRAMOPHONE PICK-UP.

L. G. (Coleshill, Warwicks.)—"The rewiring for the gramophone is not clear to me as I have not done much wireless yet. But I think I ought to be able to use my jack and plug for this.

"The jack is one of those which connects to both sides of the plug when this is pushed in. When the plug is taken out the top spring of the jack goes back onto a third 'leaf.' Would that kind do for joining the pick-up and bias to the detector, which has usual grid leak (to a potentiometer) and grid condenser?"

Yes, the jack and plug are quite suitable for the purpose you have in mind.

Join the plug to the pick-up itself, and then note which contact on the jack is *always* in use, whether plug is in or out. Call this contact "No. 1." The contact which touches this when the plug is out can be called "No. 2," and the remaining contact "No. 3."

Now join up as follows: Disconnect the grid terminal of the valve holder from leak and condenser, and join it instead to "No. 1."

Join "No. 2" to the grid leak and the grid condenser. Finally join "No. 3" to a flex lead with black plug, to go into a 1½-volt grid-bias battery. The "plus" of this battery should be joined to the set's negative L.T., or any point connected to this.

If you check over the connections you will see that when the plug is "out" grid goes to grid leak and condenser, as before; but when the plug is "in" the grid is disconnected from leak and condenser and goes, instead, through plug and pick-up to the negative bias.

Two points are worthy of further mention. Firstly, avoid long leads, or you may get all sorts of humming or instability cropping up. For this reason it is best to use a small grid-bias cell placed close to the valve.

Secondly, it is not every pick-up and set that requires grid biasing when the gramophone is plugged into the detector stage, so it might be worth trying to do without grid bias altogether at first. To test which the battery can be omitted and the two leads joined together instead of to it, at first.

SELECTIVITY CONTROL.

J. E. L. (W. Hartlepool).—"What is the 'Selectivity control' marked on the 'P.W.' 'Comet' Three Blue Print? I have got all the parts except this, but don't understand the marking near this ('001) if it is a resistance."

We don't know where you got the idea that this "selectivity control" is a resistance. It is nothing of the kind, being an ordinary semi-variable condenser, with a knob enabling the capacity to be varied from the minimum up to '001 mfd.

A GOOD "FIVE" WITH PUSH-PULL.

H. C. (Buckhurst Hill, Essex).—"Can you put me on to a good modern five-valve blue print, 2 H.F., Det. and 2 L.F., with push-pull power valves in last stage?"

There was a full description of a fine long-distance and quality set of this kind in "The Wireless Constructor" for September. No blue print was issued, but full constructional diagrams, etc., make its construction clearer than a blue print could.

"HULLO! WHAT'S WRONG WITH THE SET?"

Perhaps the switching doesn't work properly? Or some mysterious noise has appeared and is spoiling your radio reception?—or one of the batteries seems to run down much faster than formerly?

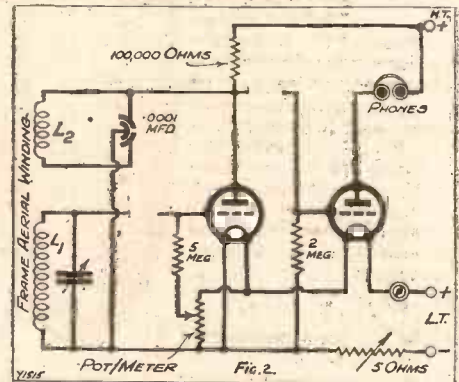
Whatever your radio problem may be, remember that the Technical Query Department is thoroughly equipped to assist our readers, and offers an unrivalled service.

Full details, including scale of charges, can be obtained direct from the Technical Query Dept., POPULAR WIRELESS, The Fleetway House, Farringdon Street, London, E.C.4.

A postcard will do. On receipt of this an Application Form will be sent to you post free immediately. This application will place you under no obligation whatever, but, having the form, you will know exactly what information we require to have before us in order to solve your problems.

LONDON READERS, PLEASE NOTE: Inquiries should NOT be made by phone or in person at Fleetway House or Tallis House.

MISSING LINKS, No. 16



Here is a two-valve circuit for use with a frame aerial, but two of the "components" have purposely been omitted. Can you fill them in correctly? (Look out for the answering diagram next week.)

Why pay full price for HALF a battery..

YOU only get half of what you pay for—with most batteries! That's because acid action eats away the zinc cell walls, making the battery useless long before its real energy is used up.

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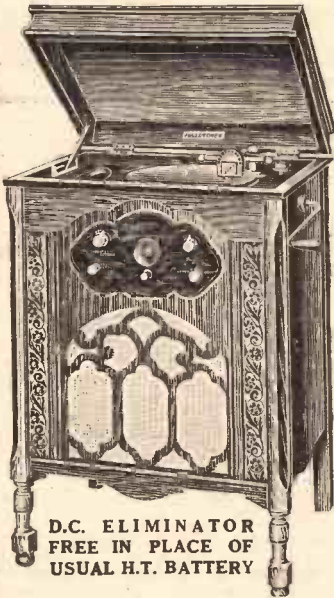
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Specification Model 203.—Exquisite Oak finished Cabinet, of modern design, 3 ft. high, complete with everything, 4-valve S.G. Circuit (B.V.A. valves), super-power battery, large accumulator, Daptacon pick-up, Cone speaker, powerful Motor, and Record Compartment, etc. Royalties paid. Delivered ready to play. Guaranteed for 12 months except valves.

Specification Model 202.—Handsome Oak finished Cabinet, 35 ins. high, complete with everything, 2-valve Circuit (B.V.A. valves), super-power Battery, large Accumulator, Daptacon Pick-up, Cone Speaker, powerful Motor, etc. Royalties paid. Delivered ready to play. Guaranteed for 12 months except valves.

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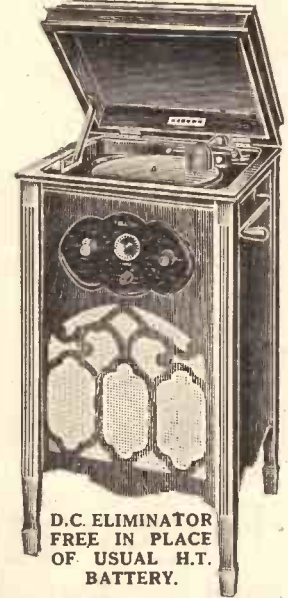
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EMPIRE STAND 201

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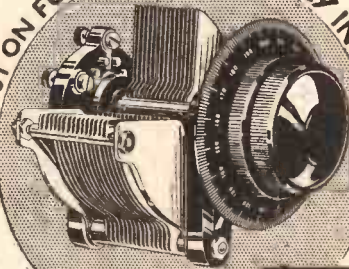
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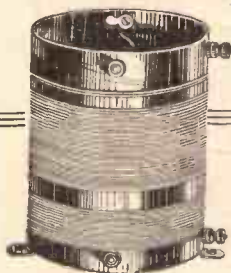
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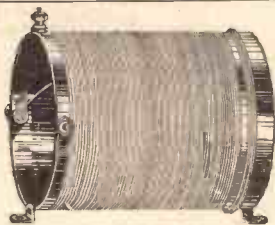
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FOR THE LISTENER

(Continued from page 856.)

old brass-hats who can talk for ever upon the tactics and the strategy of the Napoleonic Wars, but the men of vision who are ahead of their time and are surveying the new ground and laying the new foundations. It is no use to be as "safe as houses" when the houses in which we have lived for generations are toppling all round us.

Harold Nicholson Again.

I am glad to see Harold Nicolson back again in the main programmes. What the "New Spirit in Literature" may be, I don't know. I suspect that it may be a catchy title which means nothing in itself; but if it gives Mr. Nicolson the freedom of the microphone, that is all that matters to me.

He may talk on the "New Spirit in Lead-mining" if he likes, so long as he lets himself go. I take it that he is not coming back to the microphone except on the understanding that he will be free to let himself go.

On the whole, and with due respect to the many-lettered gentlemen who are to perform a prelude to the Disarmament Conference, I think that the housewives and the expectant mothers get the best of it in the Morning Talks. I could almost wish I were a housewife.

It must be much more exciting to make "Old English Dishes" than to dish up these Notes for you every week. Darioles and Flummery—how one's mouth waters! And oatacakes! I was brought up on Derbyshire oatacake; and if anyone knows a better morsel than toasted oatacake with beef dripping and pepper and salt, let him now declare it.

A Point to Watch!

I perceive a danger, however. I have myself several times put my supper of macaroni and cheese into the gas-oven and, becoming engrossed in a piece of work on hand, have forgotten all about it until it has become black in the face and dry as a bone—an uneatable cinder.

And I fear that some housewife may be so taken up with a talk that she may forget her husband's lunch of liver and bacon until it is beyond help. I do not think that these Morning Talks should be made quite so interesting for these dear housewives.

Why not let Professor Plant talk to them on "How Wealth Has Increased," or Lord Eustace Percy on "Can Democracy Survive?" That would be safer. I fear that, after all, the B.B.C. may be living dangerously in unsuspected ways.

Edgar Wallace on Saturdays.

Mr. Edgar Wallace will tell stories on Saturdays. This should be a great "draw." It will not perhaps quite make up for the threatened absence of Mr. Allison and his running commentaries; but Mr. Wallace knows how to curdle the blood better than most men, and his prolific genius may be depended upon to provide us with stories, each better than the last, until television comes in. Then the difficulty will be to get his cigarette-holder full-size on to the television screen!

A winter without Mr. Allison will be a "winter of our discontent" indeed. If the black heart of the Football Association remains adamant, I hope some other job will be found for him.

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TECHNICAL NOTES

Some diverse and informative jottings about interesting aspects of radio reception.

By Dr. J. H. T. ROBERTS, F.Inst.P.

Characteristic Curves.

THE characteristic curve of a valve, as we were saying in these Notes the other week, should always be carefully studied before deciding to use a valve in any particular position. The grid swing is very important and it is no use choosing a valve which has a steep "slope," that is high amplification, if its grid swing is so limited that it is unable to handle the required power.

Unfortunately you will, as a rule, find that a valve with a steep slope has a relatively small grid swing and so it becomes a question in this, as in so many other matters, of compromising, choosing a valve which has a grid swing of the necessary amount, and at the same time as high an amplification as is possible.

The question of the grid swing is particularly important in the final stages of the receiver because, of course, the input into the valve is getting larger and so you may have to sacrifice a certain amount of "slope" or magnification. The signal input voltage variations have to fall between the zero point or origin and the point which comes under the curving part of the characteristic.

The "Straight Curve."

Perhaps I should remark, in passing, that although it seems a contradiction in terms, we are applying the word "curve" to the characteristic, although the "curve" may be, and is, in fact, at some parts, actually straight, so that we use the curious expressions, "the straight part of the curve," and "the curved part of the curve."

In actual practice it is not possible to use the full amount of grid swing between zero and the curving part of the characteristic, and it is usual to take off about half a volt.

I have not the space to go into this particular point at the moment, but it is because, if we allow too large a grid swing, we run into distortion.

If, then, you are comparing the characteristics of two valves which have approximately the same grid swing, but one gives a much better "slope" than the other, then clearly the former will give better amplification—assuming, of course, that its other characteristics are suited to the conditions in which you want to use it.

"Dynamic" Curves.

Before leaving the subject of valve characteristic curves, I should mention that these curves are what are known as "static" curves. They are obtained with definite applied voltages and definite currents and not under the same conditions, with rapidly varying A.C. voltages, as in actual use.

The curve of the behaviour of the valve under actual working conditions has sometimes been referred to as a "dynamic"

(Continued on next page.)

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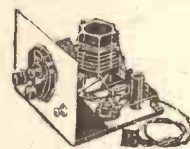
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TECHNICAL NOTES

(Continued from previous page.)

curve and there is a good deal of difference of opinion as to whether the static curve (which is naturally more easily obtained) fairly indicates the characteristics of the valve under working conditions.

The general opinion, however, is that the static curve is quite good as a general guide and that if the static curve is carefully studied and the results to be expected from that curve are compared with the results obtained in practice, the suitability of a valve for any particular conditions can be decided with all reasonable certainty. After a little practice you will soon learn to judge, by even a cursory examination of the characteristic curve of the valve, how it will behave in any particular set of conditions and how it will compare with other valves the curves of which you have before you.

How Much L.F.?

The tendency, nowadays, is not to use so many stages of low-frequency amplification. It is not so long back that two stages of L.F. amplification were quite common and even three stages were not altogether unknown in home receivers.

To-day, with the great improvements in H.F. amplification and in the amplification per stage in other parts of the circuit, one good stage of L.F. amplification is generally

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quite sufficient. Cutting down low-frequency amplification, or rather cutting down the number of stages of L.F. amplification, helps very greatly in maintaining quality, as it is much more on the L.F. side than on the H.F. side that distortion is apt to creep in.

With a detector valve having a magnification factor of 15 or more and a fairly low ratio transformer it is possible to supply the necessary input to the last valve even when this valve takes quite a high grid bias.

The great improvements in L.F. transformers and particularly in the higher ratios, have made it possible to get all the volume we ordinarily require with very little distortion and with a single stage of L.F.

Pentode Instability.

I have a letter from a reader who says that when he uses a pentode valve with his radio-gram set he always gets instability and motor-boating, and he wants to know how this can be avoided. Motor-boating, I should say, is not very marked, but quite sufficient to be a serious nuisance.

This kind of trouble is quite common and is generally due to instability arising from the high magnification which is used. A good plan is to use a choke output circuit, together with a choke condenser arrangement for anti-motor-boating, this being in the auxiliary electrode lead.

The anti-motor-boating device comprises an L.F. choke—which should be a good one—and a condenser, preferably not less than, say, 4 mfd., this latter being connected between the pentode side of the choke and earth; the choke should be in series with H.T. positive and the priming grid terminal on the pentode valve.

When the set is being used for radio it will probably be found that a small fixed condenser, say .0005 mfd., between the pentode plate and the filament will be an advantage, as this will prevent stray high frequency from getting through.

Balanced Armatures.

Amongst the various types of loud-speaker movements the balanced armature type—which often seems rather mysterious to beginners—is exceptional in that the reel or armature is arranged so that its movement does not seriously upset the inductance of the exciting coil.

In the simplest form of loud-speaker movement, in which an armature or iron diaphragm simply moves to and fro, towards and away from the magnetic poles, the approaching and receding of the armature naturally influences the inductance of the coil, this being greater when the armature is close and less when it is further away.

An action of this kind tends to set up partial rectification of the applied currents

and to a certain extent is apt to introduce distortion.

With the balanced-armature type, however, the armature moves between two poles so that when it is receding from one pole it is approaching the opposite pole.

In some cases the balanced armature is arranged to vibrate about the mid-point and there are two pairs of magnetic poles, one end of the armature vibrating between one pair of poles and the other end of the armature vibrating between the other pair of poles.

At any rate, in discussing the action we need only consider one end of the armature moving between one pair of poles. The effect of this arrangement is that the air gap between the poles remains constant.

Inductance Variations.

It is often stated that, by the balanced-armature arrangement, variations in the inductance of the coils are entirely obviated, but this is not strictly true; the very fact that the armature is caused to vibrate at all is in itself an indication that the changes are taking place.

If it were not possible for the lines of magnetic force to find an easier path by a movement of the armature, then there would be no reason why the magnetic forces should cause the armature to move at all. I want to point this out because it is one

(Continued on next page.)

TECHNICAL NOTES

(Continued from previous page.)

of those little fallacies which are so often repeated.

I do not say that the balanced armature type of loud-speaker movement is not without advantages; when properly designed it is often very efficient. But don't run away with the idea that this is due to the elimination of inductance variations; where the balanced armature has advantages they are due mainly to considerations of mechanical design. I have had under test for some time a new form of balanced armature speaker of my own design, which gives very remarkable results. I hope to describe this to you at an early date.

H.F. Amplification.

Although such a high level of H.F. amplification has now been made possible by the great improvements in screen-grid valves, there are two main factors which limit the amplification to a value less than that which would appear to be possible from purely theoretical considerations.

One of these factors is the residual capacity in the valve and the other is the inter-action between circuits. The internal capacity of the valve is a matter over which the user has no control, and its elimination or reduction lies entirely with the valve manufacturers who, of course, have devoted a great amount of attention to this point and have made important improvements in these valves during the past year or two.

De-coupling and Stray Coupling.

With regard to the action between circuits, it is obviously of little use to take great precautions in connection with de-coupling if the advantages gained in that way are to be set off by direct magnetic or capacity couplings between circuits owing to imperfect screening.

It is often thought that any set using H.F. amplification will be definitely improved by isolating its separate circuits in screened compartments, that is, by going in for the most complete possible screening. But I would remind you that this is not always the case, and if the high-frequency amplifier is already stable then any additional screening becomes unnecessary, whilst on the other hand it brings with it a reduction in sensitivity owing to a decrease in reaction effects.

You have to bear in mind that all screening tends to produce losses; in fact, it would be a fair statement of the case to say that it is often due to the losses in the screening that stability is secured. So that screening is a remedy to be applied with care and discrimination and is not without its own intrinsic drawbacks.

For this reason you do not want to apply any more screening than is necessary to secure stability and if you already have stability, either without screening or with a small screen, then there is no point in going in for additional isolation, except in certain cases.

Optimum Conditions.

The cases in which additional screening may be resorted to are where the optimum operating conditions of the H.F. valve or valves cannot be attained, owing to the onset of oscillation. In such a case as this

(Continued on next page.)



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TECHNICAL NOTES

(Continued from previous page.)

you have to consider whether the attainment of the optimum conditions, notwithstanding the price you have to pay (I am speaking of price electrically) is going to give you an over-all advantage. In most such cases I think you will find that it will.

Another case in which you have to consider effective screening is where you are re-designing the high-frequency part of your receiver and proposing to use circuits of very small damping.

Tricky Voltages.

Talking about pentode valves and the importance of having the valve working under the correct conditions, I often receive letters from readers who complain that their pentodes are not working properly, and it nearly always turns out that the trouble is due to the applied voltages being all wrong.

You want to remember that you cannot fiddle about with the pentode valve in the same way that you can with an ordinary power valve. For instance, altering the external connections whilst the valve is in operation may be harmless enough with an ordinary valve (though even here it is not to be recommended) but with a pentode it is quite possible to do a good deal of damage.

A pentode, as I have said before, is rather tricky, and with its high amplification and

MIRROR OF THE B.B.C.

(Continued from page 856.)

the observation of thunderstorms, until about the year 1895. Marconi, then only 21 years of age, succeeded with very primitive apparatus in achieving wireless communication over a distance of more than a mile.

That was in Italy, but shortly afterwards he came over to England, and after taking out his first patent, extended the range to twelve miles. The value of wireless at sea was proved in 1899, when the East Goodwin lightship was run down by a steamer, and sent out a radio message to the mainland, which resulted in all lives being saved.

Developments came very rapidly and wireless was used in the South African War. It is now thirty years since Marconi transmitted his first signals across the Atlantic. It is almost the duty of those who can to make a point of hearing him talk of his early hopes and fears on September 19th

Our Scientific Adviser.

Sir Oliver Lodge and General Smuts will both be heard in connection with the Centenary of the British Association for the advancement of Science, in connection with which there is also a preliminary talk by its secretary, Mr. Howarth.

Sir Oliver is to speak on Tuesday, September 15th, on the century of scientific progress, and General Smuts will be heard on Wednesday, September 23rd, when his Presidential address will be relayed

NEXT WEEK!

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its closely assembled electrodes you may easily run into trouble with excess voltages. Excess voltages—I mean inside the valve—can easily be produced by interfering with the external connections when the valve is "on."

Push-Pull.

Push pull amplification has a fascination for a good many amateurs, and one of its principal advantages is that the effects of the direct-current through the primary of the output transformer cancels out automatically. It is interesting to compare this with the case of a single-valve low-frequency amplifier, where a steady current passes through the primary winding in addition to the fluctuations corresponding to the signal voltages. With the push-pull system the direct-current component from the one valve is in opposition to that from the other and the two counterbalance.

Inductance Variations.

It is very desirable to keep out the effect of the direct-current component for various reasons.

According to the push-pull arrangement the high-tension supply goes to the centre tapping on the primary of the transformer and flows through the two halves in opposite directions, so eliminating the inductive effect upon the secondary.

from the Centenary Meeting. Both broadcasts will undoubtedly be of outstanding importance.

Who Started "Foundations"?

Few people are aware of the part that Mr. Filson Young, the well-known writer and journalist, has played in the development of certain sections of the programme department at Savoy Hill, with which he has been associated, somewhat behind the scenes, for six or seven years.

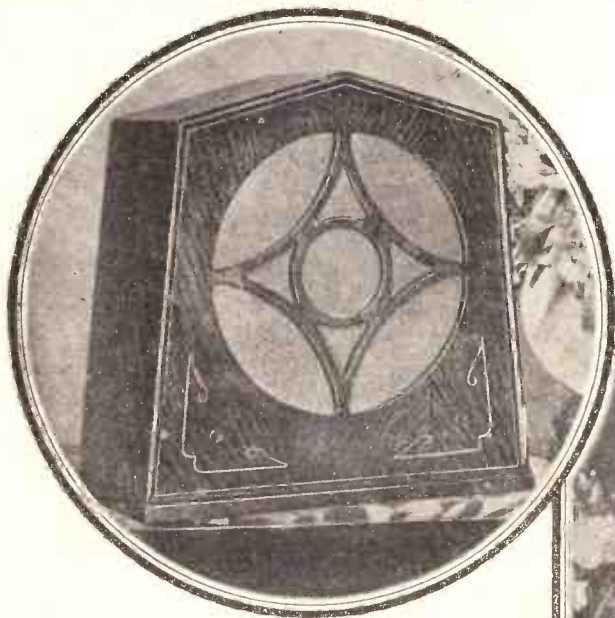
To him is responsible the daily "Foundations of Music" broadcasts, and also the weekly series of Bach Cantatas. Every year, in association with the Rev. Bernard Walke, of St. Hilary, in Cornwall, he arranges the Nativity Play, which is performed by villagers round about Christmas, and there are many other delightful bits of the programmes to which he has contributed, from time to time.

On Friday and Saturday, September 18th and 19th, respectively, he is putting on a programme entitled "The Road to the West," which will take the form of the spoken thoughts of a man motoring from London to Land's End, what he sees, what he thinks as a solitary traveller, during a journey that Mr. Filson Young has done many times.

Mr. Filson Young will himself speak the monologue in this experiment.

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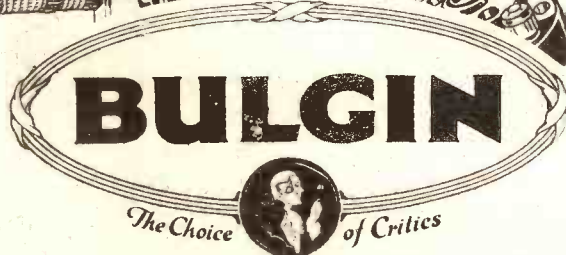
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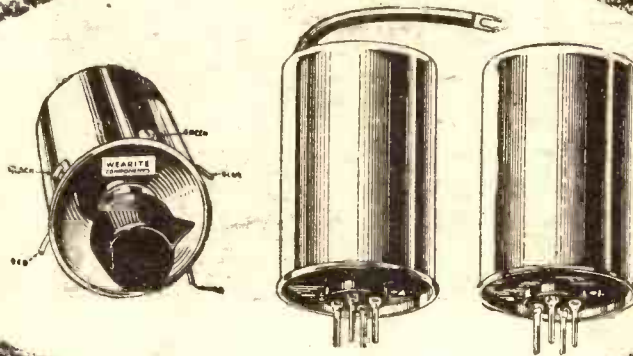
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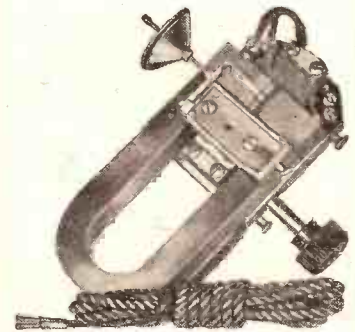
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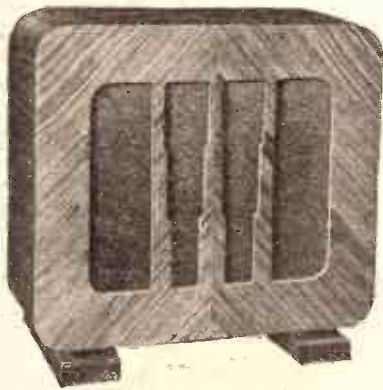
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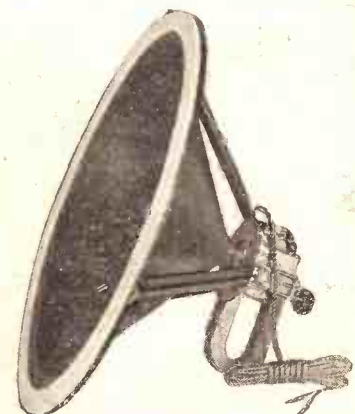
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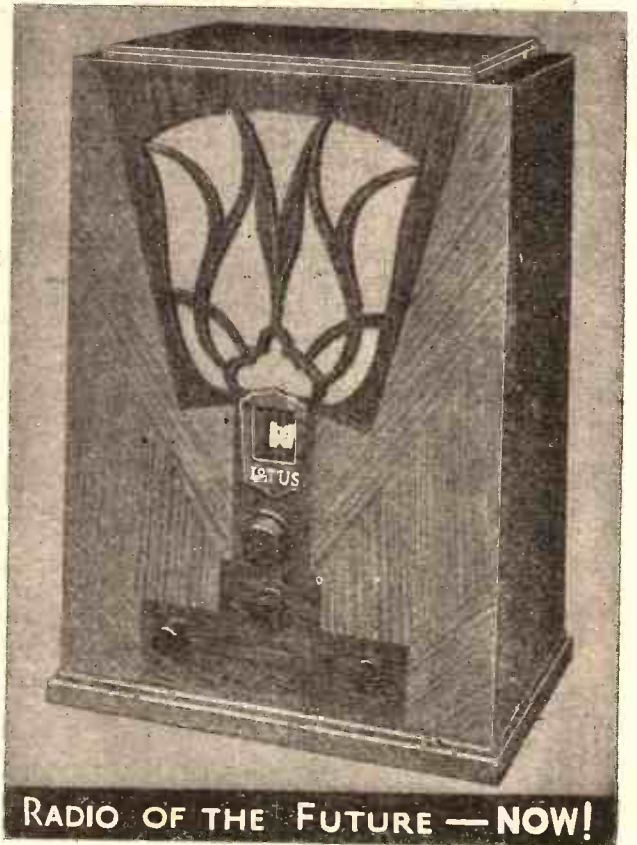
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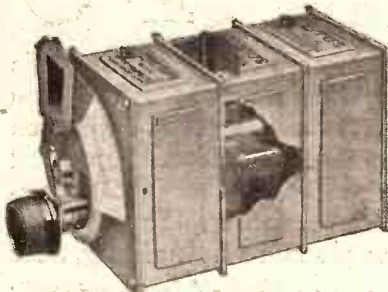


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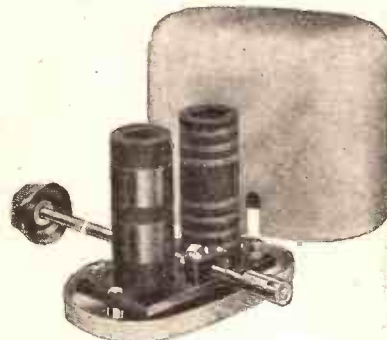
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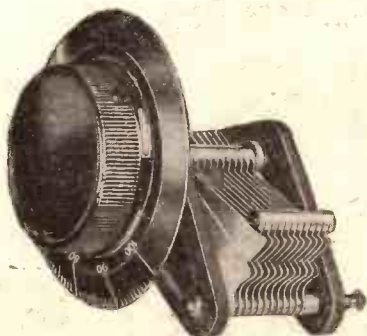
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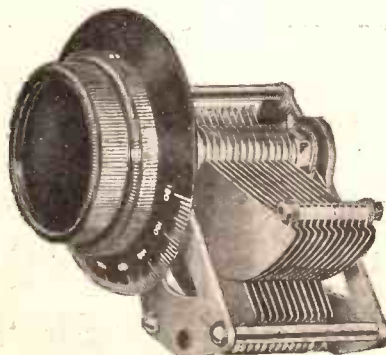
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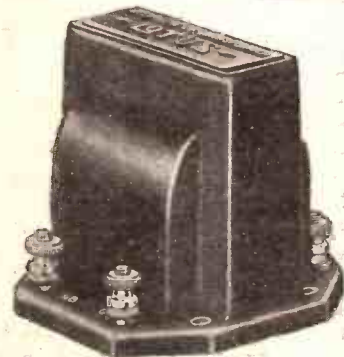
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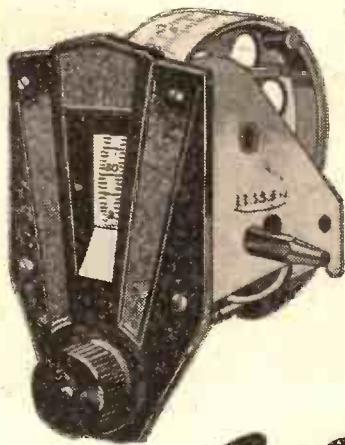
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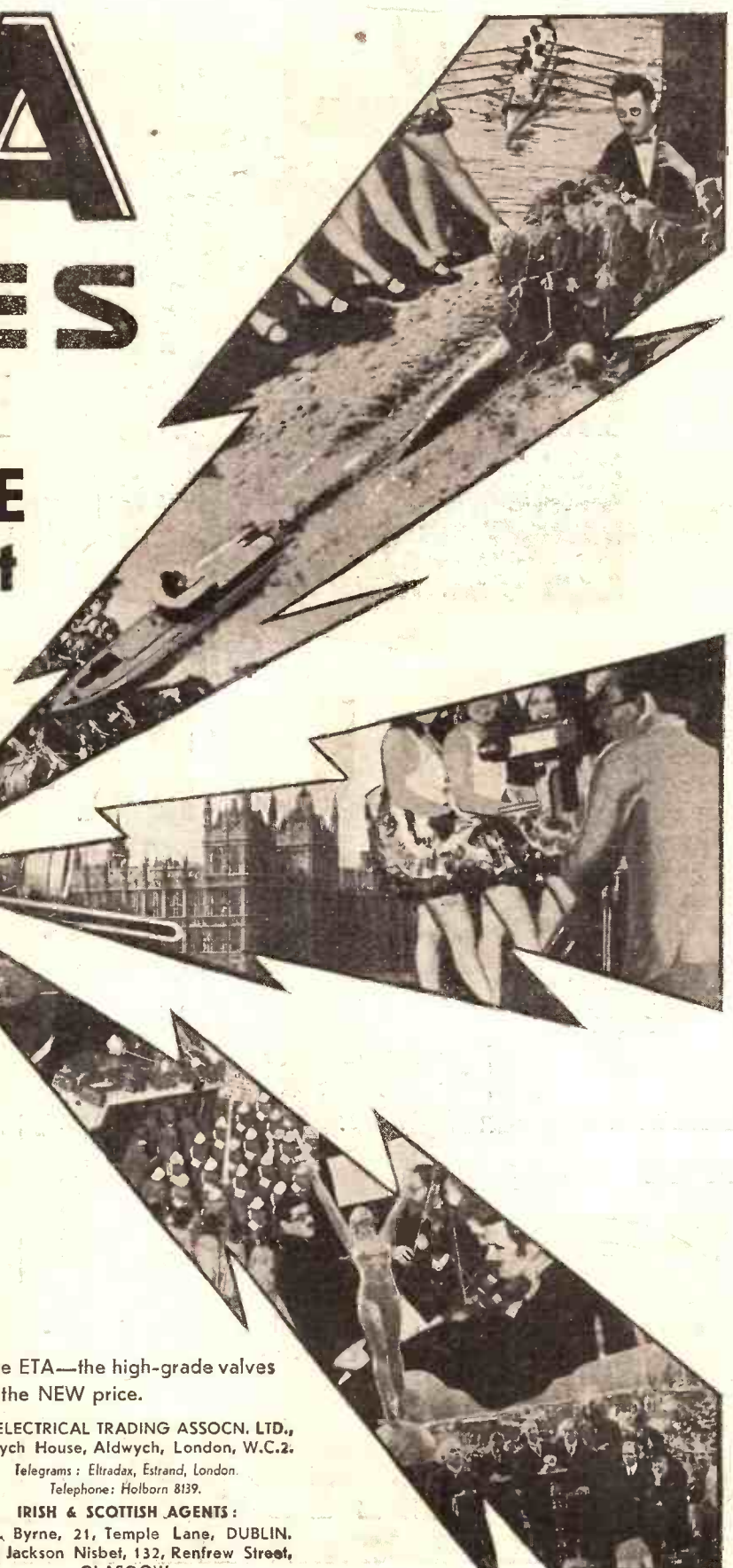
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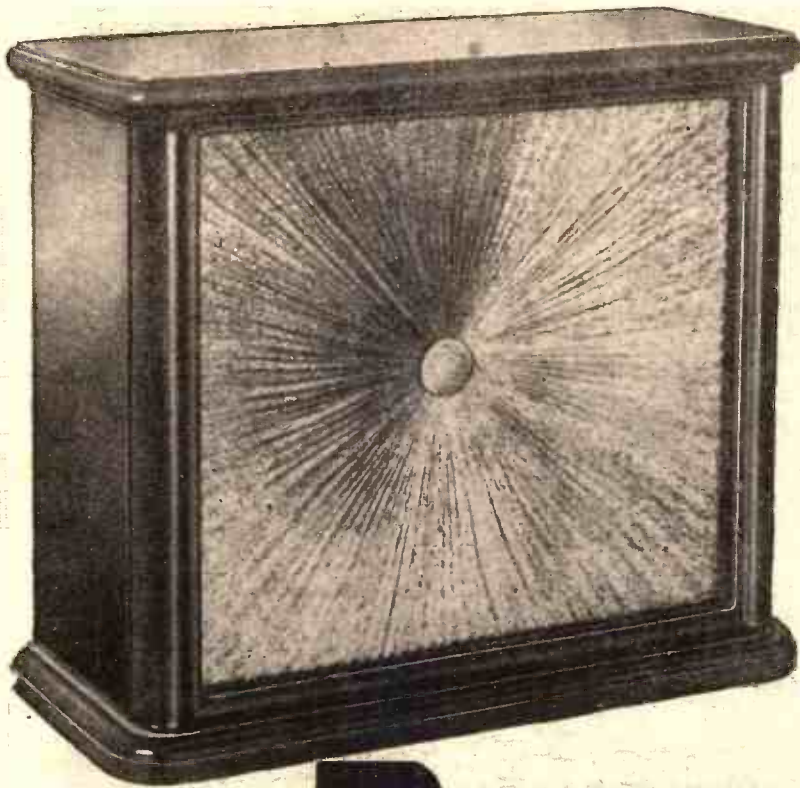
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"Oh! it's a Regentone Mains Unit."

"What does it do?"

"Practically everything, and I take my hat off to the Regentone people who make it. I bought it about 4 months ago—it only cost me a couple of pounds and since then I've forgotten that such things as batteries or accumulators existed. Every evening I just pull down the switch and there you are—listen to it, isn't it great?"

"Did you have much trouble fixing it up?"

"No, it didn't take me two minutes. It's just as easy as putting in batteries."

"There's a wireless shop on my way to the station—I must drop in and have a chat with them, or write to the Regentone people for one of their leaflets."

MASTERPIECES



Masterpieces of design, construction and performance. In the moving-iron class the R. & A. "Type 40" is supreme; in the moving-coil class the R. & A. "100" sets a standard. Designed for performance, and not produced to a price.

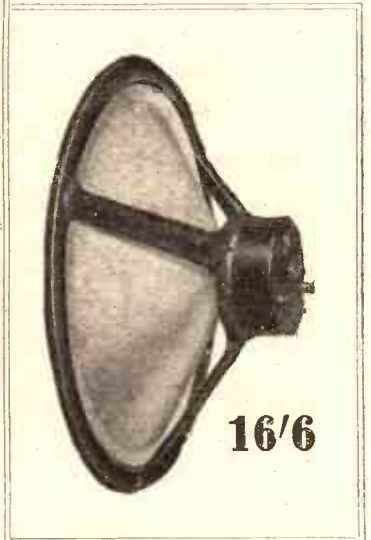
The R. & A. "100" Permanent Magnet Moving-Coil Reproducer is the supreme achievement in M.C. Speaker design. Sensitivity is equal to mains energised types and the quality of reproduction challenges comparison with the most costly speakers. Speech coil resistance 8.5 ohms, requiring a suitable output transformer.

At the Radio Exhibition, Olympia, both R. & A. '100' and R. & A. 'Type 40' are exhibited on the stands of the leading distributors.

The R. & A. "Type 40" is acknowledged by critics and public as "in a class by itself." Purity and volume throughout the whole audible range, without the slightest "chatter" in the heaviest passages or loss in the most delicate pianissimo notes. Speech amazingly life-like. Its performance constitutes the nearest approach to moving-coil reproduction it is possible to achieve.

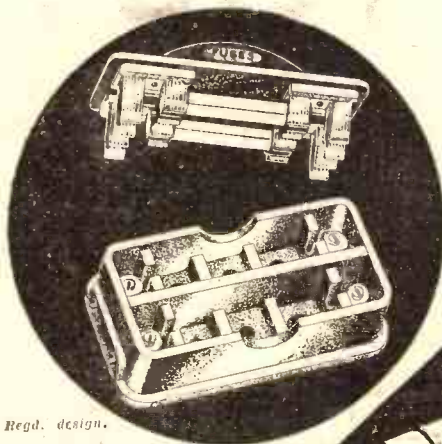


45/-



16/6

YOUR DEALER WILL DEMONSTRATE. WRITE US FOR FULL PARTICULARS.
REPRODUCERS & AMPLIFIERS LTD., FREDERICK STREET, WOLVERHAMPTON



Regd. design.

TWIN BASEBOARD FUSEHOLDER, with two 1 amp. fuses for mains leads (illustrated above) .. 3/6
WANDERFUSE, combined wander plug and fuse, with 60 m. a. fuse. 1/6
FLEXIBLE LEAD FUSE-HOLDER, short type, with 1/2-amp. fuse .. 1/- (Longer type with mains fuse, 1/-).
BASEBOARD HOLDER, with 1/2-amp. fuse. The best method of mounting a fuse inside a set or mains unit .. 1/3

STAND No. 13.
NATIONAL
RADIO
EXHIBITION

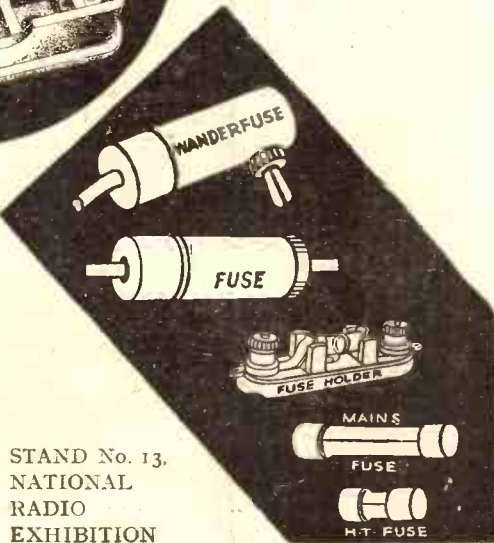
A COMPLETE RANGE OF FUSES for EVERY REQUIREMENT

TECHNICAL REASONS

A fuse in a mains lead is a totally different proposition from a fuse in a H.T. or G.B. lead. In the mains lead it is unsound to use a lower rating than 1 amp, because the mere switching on and off of current creates a surge which might easily blow a fuse of lower rating. Further, in a mains lead fuses should always be more than 1 in. long to make arcing impossible. In H.T. and G.B. leads and rectifier circuits, on the other hand, it is unnecessary for fuses to go beyond 1/2 amp, even with multi-valve sets. Nor need they be longer than 1/2 in., even with a powerful H.T. supply. H.T. fuses should be kept as short as possible, for the fine high-resistance wire is liable to act as a coupling between the circuits and to set up "motor-boating" if too long.

That is why Belling-Lee now make their fuses in two lengths: H.T. ratings, 60 m/a., 150 m/a., and 1/2 amp, 1/2 in. long; mains ratings, 1, 2, and 2 amp, 1 1/4 in. long.

Spare fuses of all ratings are sold at 6d. each.

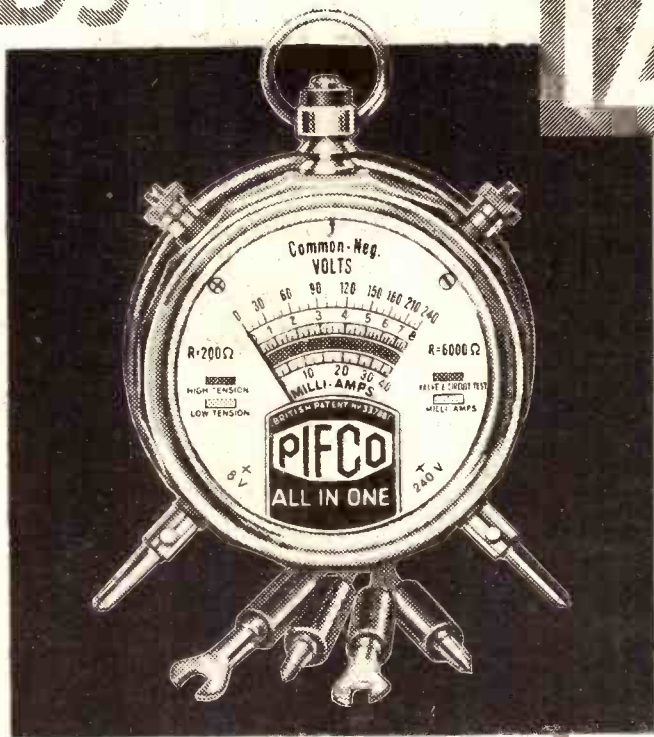


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FOR EVERY RADIO CONNECTION

Advt. of Belling & Lee, Ltd., Queensway, Ponders End, Mdx.

THOUSANDS
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ENTHUSIASTS
USE THIS
AMAZING
LITTLE
RADIOMETER

126



DO YOU!



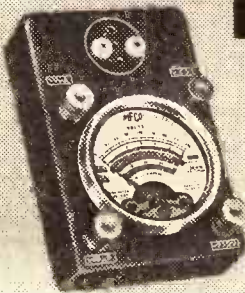
The SHERLOCK
HOLMES of
RADIO

It will enable you to carry out the most comprehensive tests without having to call in expert technical advice. The "All-In-One" Radiometer is the constant standby of radio enthusiasts all over the country. With its aid the swift and certain testing of Valves, Circuits, Batteries, Components becomes absolutely simplicity. No need to be puzzled about a fault when you've an "All-In-One" Radiometer. This little instrument will instantly diagnose the trouble.

The "All-In-One" Radiometer is offered in two types. The Standard Model at 126 for Battery Operated Sets only—and the De Luxe Model at £22-, the Super High Resistance pattern, which is also suitable for Electric Receivers and Mains Units. Ask to see them at your radio dealer TO-DAY.

The NEW DE-LUXE
HIGH RESISTANCE MODEL

£22/0



PIFCO
ALL IN ONE
RADIOMETER

Obtainable at all Stores and good-class Radio Dealers. Booklet free from Patentees: Pifco, Ltd., High Street, Manchester.

FREE TWO INVALUABLE BOOKS FOR EVERY WIRELESS ENTHUSIAST



The efficiency of your receiver depends upon valve efficiency. The Mullard 1932 valve production policy was decided only after a very careful study of the conditions governing the potential development of the whole radio industry. Every Mullard valve bears a definite relationship to the needs of radio owners, radio manufacturers, and broadcasting conditions.



Mullard

THE MASTER VALVE

VISIT STAND No. 18—
THE MULLARD STAND AT OLYMPIA

Obtainable from your own Radio dealer or direct from the Mullard Wireless Service Co., 111, Charing Cross Road, London, W.C.2.

The new RADIO WONDER

SPECIFICATION	CLARKE'S ATLAS
I Variable Tapping	0/100 V.
I " "	0/120 V.
I " "	150 V.
I Fixed " "	25 m.A.
Output at 150 V.	2, 4 & 6 V.
L.T. Trickle Charger	0.5 A.
Charging Rate	1/2, 3, 9, 16 V.
4 Grid Bias Tappings	12 months
Guarantee	£6-10-0
Price	10/- down
Yours for	



£6-10

ALL-MAINS UNIT A.C. 290

**COMPARE THESE
UNIQUE FEATURES
FOR YOURSELF**

You can't beat "Atlas"

4 OTHER NEW "ATLAS" UNITS.



MODELS No.
A.2 and A.K.22

"ATLAS" Model A. 2. H.T. Unit for 1, 2 & 3 Valve Sets. 3 Tappings 60/80 V., 90/100 V., and 120/150 V., respectively. Output 12 m/A. Price 52/6 cash or 10/- deposit and 6 monthly payments of 8/- each. "ATLAS" Model A.K. 22. All-Mains Unit, has similar tappings but incorporates a L.T. Trickle Charger for 2-Volt Accumulators at 3A. Price 77/6 cash or 10/- deposit and 9 monthly payments of 8/6 each.



MODELS No.
A.C.244 and A.K.260

"ATLAS" Model A.C. 244. H.T. Unit. 3 Tappings 60/80 V. (max. & min.), 50/90 V. (max., med. & min.), 120/150 V., respectively. Output 20 m/A at 120 V. Price 59/6 cash or 10/- deposit and 8 monthly payments of 7/- each. "ATLAS" Model A.K. 260. All-Mains Unit, has similar tappings but incorporates a L.T. Trickle Charger for 2, 4 & 6-Volt Accumulators at 3A. Price 90/- cash or 10/- deposit and 9 monthly payments of 10/- each.

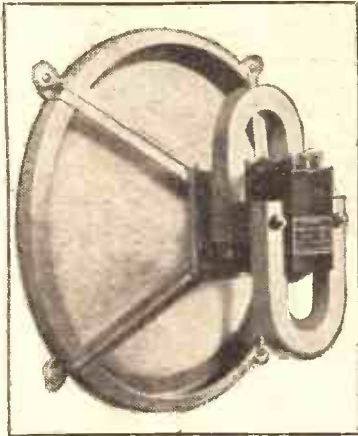
Last year the "ATLAS" All-Mains Unit A.C. 188 was voted the finest Mains Unit at Olympia. Since then it has remained unbeaten. Now comes an even finer unit. One that only "ATLAS" ingenuity and experience could produce. "ATLAS" Model A.C. 290 includes 4 Grid-Bias Tappings which are entirely independent of the H.T. Voltage supply, and incorporates the Westinghouse Rectifier. Moreover, an exclusive "ATLAS" L.T. Safety Switching arrangement isolates the receiver when Trickle Charging. The exceptionally easy H.P. Terms of 10/- deposit and 9 monthly payments of 15/- each make this wonderful "ATLAS" Mains Unit the finest value of the year. See it at Olympia, Stand No. 33, or ask your dealer for a demonstration.

"CLARKE'S ATLAS" MAINS UNITS

**H. CLARKE & CO. (M/CR) LTD.,
Atlas Works, Old Trafford, Manchester.
LONDON OFFICE: BUSH HOUSE, W.C.2. ☉**

THE SPLENDID REPRODUCTION OF THE
FERRANTI
 INDUCTOR SPEAKER

must be heard to be believed!



Until the advent of the Ferranti Inductor Speaker, moving-coil speakers held the field almost exclusively among listeners who put quality first in Radio reproduction. Now, however, the Ferranti Inductor Speaker gives a faithfulness of reproduction which is surpassed only by the best Moving Coils.

PRICES: CHASSIS ONLY. £3:10:0
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HEAR IT AT
 STAND No. **45**
 AT THE OLYMPIA EXHIBITION



FERRANTI Ltd, Head Office and Works: HOLLINWOOD, LANCASHIRE.

LONDON: BUSH HOUSE, ALDWYCH, W.C.2.

At last! A panel
 guaranteed **NEVER**
 TO DISCOLOUR

PERMCOL
The Perfect Ebonite Panel

Specified by the leading technical journals and recognised as the only Ebonite Panel that will never discolour. Neither chips nor splinters. Easy to cut and drill. Splendid insulation. Low in price.

Such is PERMCOL, the Panel with the mirror-like surface. Black or Mahogany. Ask your Dealer, or direct, cash or C.O.D. **BRITISH MADE.**

PERMCOL MIRROR-POLISH 3/16th" PANELS.

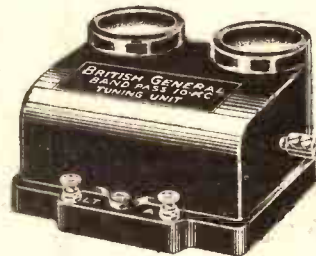
Size	Black-Polished	Mahogany Finish
7" x 14"	3/6	4/3
7" x 18"	4/6	5/6
7" x 21"	5/3	6/4
8" x 16"	4/7	5/6

Stand No. 182

OLYMPIA RADIO EXHIBITION

BRITISH HARD RUBBER CO. LTD. (Dept. B.)
 PONDERS END, MIDDLESEX.

for **INCREDIBLE!**
AMAZING!
 selectivity



NEVER BEFORE
ACHIEVED without
 loss of sidebands

A new development in Tuning Units which is unique in its scope. It overcomes the difficulty which is experienced in achieving separation of near stations without destroying the effective range of the Set. This new Band Pass Unit gives the separation of 10 kilocycles as laid down by the International Radio Convention and yet covers the entire waveband between 230 and 550, and from 800 to 2,000 metres on one dial.

PRICE **14/6** Including non-inductive coupling condenser.
 BRITISH GENERAL MANUFACTURING CO., LTD.
 Brockley Works, London, S.E.4.

BRITISH GENERAL
BAND PASS 10Kc.
TUNING UNIT

SEE US ON
 STAND
30
 RADIO
 EXHIBITION



**"SAY 99" ... and see
the wobbly valve!**

Giant sprung valves, gently swaying to and fro
look out for them on Stand 99 at Olympia.

You need not examine them, they stand for the Benjamin system of supporting valves in sprung holders, so as to damp out shocks and protect sensitive filaments from premature loss of emission.

Just let these wobbly valve holders remind you that these same Benjamin valveholders have sold literally in millions, that they are today, as at any time in the past five years, outstandingly the most popular valveholders made, that they are the only valveholders used by those who know the wisdom of protecting their valves from shock or jar.

The name is Benjamin, and the Stand number is 99.

STAND
99
OLYMPIA



BENJAMIN

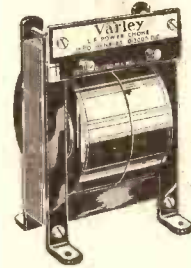
**SEE
THEM
AT
THE**



NICHOL 11
The latest addition to the range of Varley Chokes. Inductance (no D.C.) 20 henries. With 50 m.a. D.C. 14 henries. D.C. Resistance 450 ohms. List No. DP23. 10/6.



JUNIOR MULTI-CELLULAR H.F. CHOKE
Chokes efficiently on both wavebands, either in detector or H.F. stages. Inductance 120,000 microhenries. List No. BP2. Price 3/6.



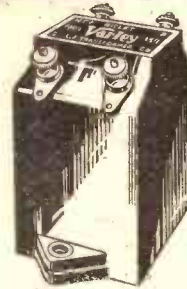
EP30 L.F. POWER CHOKE
Inductance 15 henries (no D.C.), 10 henries (300 m.a.). D.C. resistance 100 ohms. 45/-.
EP31 CENTRE TAPPED L.F. CHOKE. Max. current 120 m.a. 27/6.

GREAT NEW RANGE OF



COMBINED PICK-UP AND TONE-ARM

Compensated bass output. Ball bearings. Suits all turntables between 10 in. and 12 in. Pick-up enclosed in dustproof black bakelite case. Arm in bronze finish. List No. CPI38. Price 42/- complete.



NIGLET L.F. TRANSFORMER
Primary inductance 45 henries with no D.C. Ratio 3 1/2 to 1. The primary will carry a steady D.C. current up to 3 m.a. No blocking condensers necessary. List No. DP11. Price 7/6

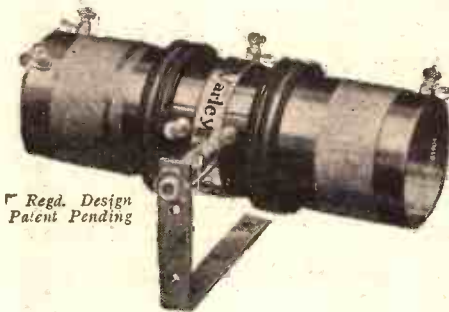


MULTI-VOLT MAINS TRANSFORMERS. For valve and metal rectifiers. Complete range of outputs. Prices from 32/6.

"SQUARE

(REGISTERED

TENFOLD INCREASE IN SELECTIVITY : : MATCHED COILS ENSURE PERFECT GANGING

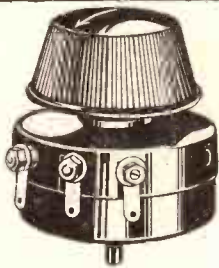


Regd. Design Patent Pending

VARLEY "SQUARE PEAK" COIL. An aerial band-pass coil giving a constant square-topped peak and separation of substantially 9 kc. over the whole of both wavebands. New Model BP7 without switch for "Extensers" or remote control switching. Complete with mounting bracket. 15/-.
(Type BP5 with wave-change switch, same price.)



H.F. INTERVALVE COIL, for use with the "Square Peak" Coil. Completely screened. Its inductance inside the screen is exactly matched to that of the "Square Peak" coil to ensure perfect ganging. New model BP8 without switch for "Extensers" or remote control switching. Price 8/6.
(Type BP6, complete with wave-change switch, same price.)



VOLUME CONTROL
Adaptable for ganging. Two or more may be ganged together and controlled by a single knob. Exceedingly compact. Values: 25,000, 50,000, and 250,000 ohms. 6/6 each.
GANGING EQUIPMENT, to gang 2 controls. 1/- per set.

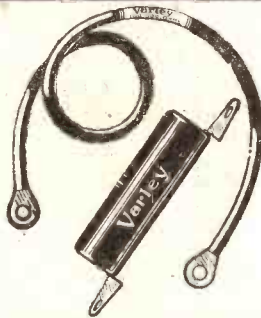


POPULAR RESISTANCE
Spiral Wire-wound. Values from 5,000 to 300,000 ohms. Prices (without Universal holders): 1/6 to 4/- each.
UNIVERSAL HOLDER Price 1/6.

COMPONENTS



THERMAL DELAY SWITCH
Specially designed for use with Osram G.U.1 rectifier. Allows filament to be run for desired time before automatically switching on the anode current. Heater circuit 4 volts and is connected across the G.U.1 filament. Price 12/6.



"SPAGHETTI" RESISTANCE
22 values. 100 to 100,000 ohms. 6d. to 1/6.
"TAG" RESISTANCE
Same values. Wire wound. Compact. Price 1/- to 2/-.

SEE THEM AT THE "SQUARE PEAK" STAND

The new range of Varley components. Recommended by the leading technical journals in the strongest terms. Carefully designed in every detail and made with the most scrupulous care. The standard of quality and workmanship VARLEY'S standard... yet selling at these amazingly low prices!

Time is always short at exhibitions, so make a bee-line for the "Square Peak" Stand. Whatever you do be sure to see these new Varley components, the "Square Peak" coils, and the amazing new "Square Peak" Mains Receivers and Radiograms.

PEAK

TRADE MARK)

Write for the New Varley Catalogue

Varley

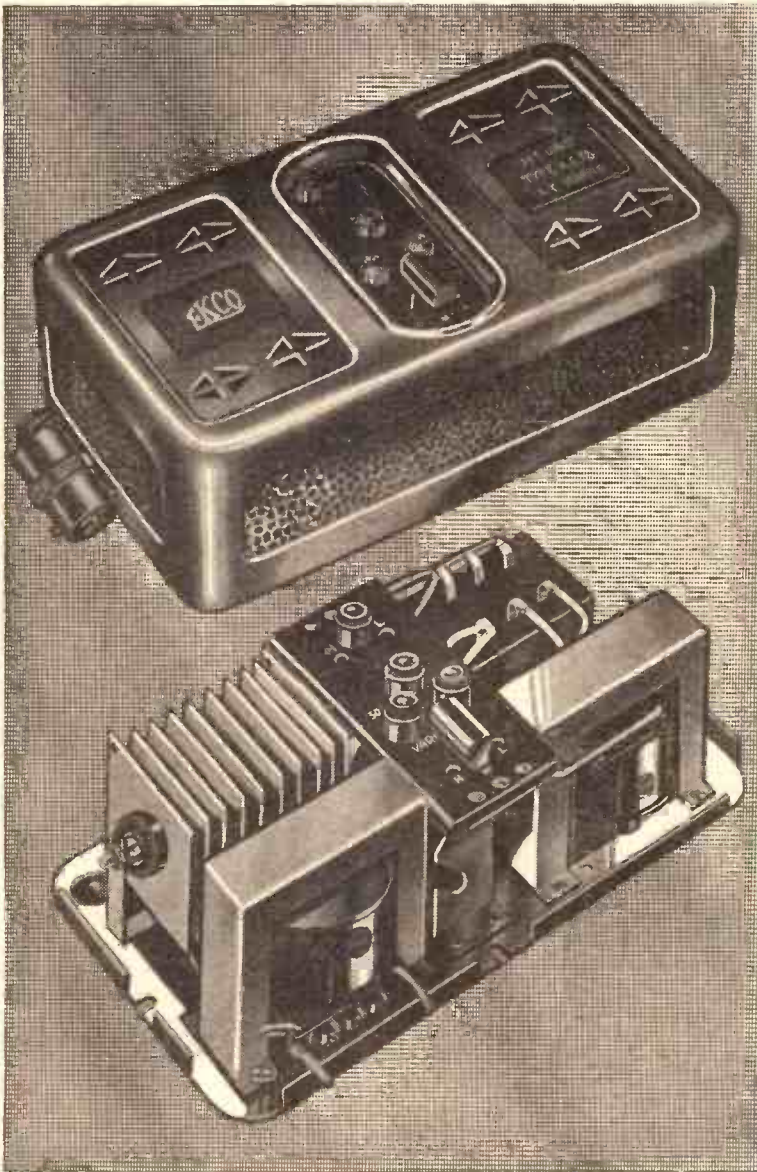
STAND

No 58

EMPIRE HALL
NATIONAL RADIO
EXHIBITION

New Ekco Power Units . . .

a triumph over all previous standards



EKCO—leading specialists in All-Electric Radio—introduce their unique range of 1931-32 Power Units . . . surpassing all previous achievements. Wonderfully compact . . . triumphs of efficiency . . . housed in beautifully designed bronze-metal cabinets . . . embodying unique features . . . combining highest efficiency with greatest simplicity.

Immediately adjustable for different output voltages by a method which eliminates all variable resistances and their attendant defects. Adjustable to every type of receiver and valve. All the controls compactly arranged, readily accessible, clearly marked. Cleverly recessed, too, so that they do not protrude above the surface of the cabinet. Measuring 9 ins. by 5 ins. by 3½ ins. . . . ideal for portable sets . . . and for all other receivers. Banish all battery worries, renewals and expenses for ever . . . and give you better radio . . . permanently . . . for only a few pence a month.

EKCO NEW H.T. UNITS

(For A.C. Mains).

Model A.C.12 for 1 to 3 valve sets (12 m/a output) £2 15 0
 Model A.C.18 for 1 to 5 valve sets (18 m/a output) £3 7 6
 Model A.C.25 for multi-valve sets (25 m/a output) £3 17 6
 Model D.C. 15/25 (for D.C. Mains) (15 or 25 m/a output) £1 19 6

EKCO NEW COMBINED H.T. AND L.T. CHARGER UNITS

(For A.C. Mains. Supply H.T. and also keep your accumulator constantly charged.)

Model K.12 for 1 to 3 valve sets (12 m/a output) . . . £3 19 6
 Model K.18 for 1 to 5 valve sets (18 m/a output) . . . £4 12 6
 Model K.25 for multi-valve sets (25 m/a output) £5 7 6
 All obtainable on EASY PAYMENT TERMS from as little as 3/8 per month!

Worth knowing more about! Post coupon now for full details.

To E. K. Cole, Ltd. (Dept. A.12), EKCO Works, Southend-on-Sea.

Please send me full descriptions of EKCO Power Units with which I can finish with batteries for ever and obtain permanently perfect radio at a cost of only a few pence a month.

Name.....

Address.....

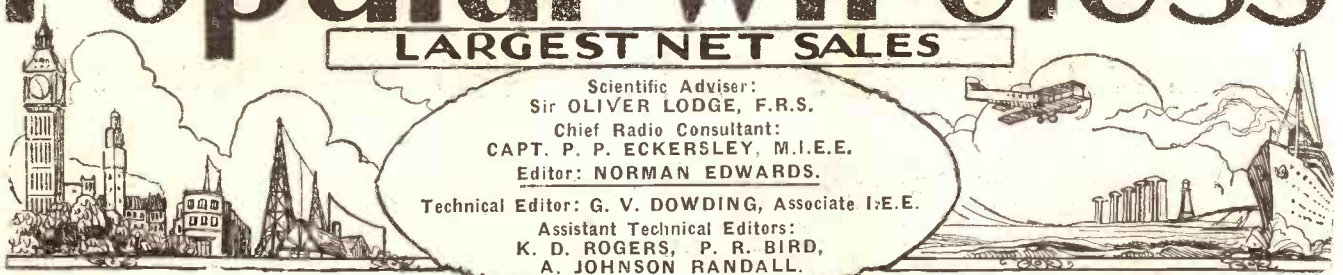
(If you require details of Easy Payment Terms put a cross here.....)



Woburn

Popular Wireless

LARGEST NET SALES



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**THE KICK-OFF
 LIVELY LUNATICS
 THE 7-M. SCARE
 WHAT ABOUT TAFFY?**

RADIO NOTES & NEWS

**A. J. ALAN
 SCOTLAND AGAIN
 CESKY BROD NOW!
 PROGRESS OF "P.W."**

The Kick-Off.
NOW, then! Line up, there! Line up!
 For when the whistle blows at eleven o'clock on Friday morning, September 18th, the great Radio Exhibition at Olympia opens its doors, and—we're off!

"The best Radio Show we've ever arranged," is what the organisers are saying. And if all I hear about it is true, it is certainly going to be a wonderful eighteen-penn'orth. For one thing, it will be much bigger than ever before, as they've had to take in three floors of the Empire Hall to hold it all this year.

"P.W.'s" Stand is No. 67.

THE "P.W." stand is No. 67, and members of the Technical Staff will be there every day to meet readers (that's you) and talk over radio problems.

There are lots of rumours going round about this year's Show, and apparently the new components are going to be an eye-ful in themselves. But one really solid fact which emerges pleases me more than anything else, and that is that, generally speaking, prices are lower. So what with more stations and higher power, this 1931-32 is going to be the best radio season we've seen.

The Lively Lunatics.

LISTENERS in the Argentine had the surprise of their lives the other night when they heard a broadcast by four real lunatics. Mad as hatters!
 It was not impromptu, or anything like that, but was done in due form in a broad-

cast from an asylum. The madmen began by crooning a tango, and everything went smoothly until one of the mentally-deficient performers had an unrehearsed quarrel with the announcer. But they managed to smooth him down, and, in spite of that unexpected hitch, it is

transmits every evening from 6 to 9.30 p.m. B.S.T. and most afternoons from noon to 1 p.m. (also B.S.T.).

D. B., who lives only fifteen miles away from the station, and so receives the ground ray, tells me the transmission is remarkably good.

WHERE IS HER WANDERING BOY TO-NIGHT?



The house with a radio set is never really lonesome, even if your dog does go to sleep! And if—like Louise Fazenda, the talkie star—you have a self-contained set on wheels, it will accompany you from room to room.

The 7-Metre Scare.
WHAT'S all this worry about 7 metres?

Just because the B.B.C. is carrying out some interesting tests on these ultra-short waves, A. D., of Beccles, and a number of other nervous souls, have gone all panicky, and have written to ask me if their sets will have to be altered? Of course not!

At present, the scheme is simply experimental; very interesting, it's true, but not likely to affect ordinary programme distribution for years and years. And even if it does, it will be only in the big cities; for these 7-metre waves seem to be stay-at-homes which have a service area of only half-a-dozen miles or so around the radiating aerial.

What's This About Taffy?

REPORTS in the Press and

letters from Wales reveal a movement, almost verging on a revolution, for the attainment of a Welsh National Station. I hear that some Welsh folk are prepared to immolate themselves in prison, be conscientious objectors, passive resisters, and what not, in the holy cause.

I don't believe that the majority of dwellers in Wales care a tinker's naughty
 (Continued on next page.)

expected that another "mad hour" will be arranged shortly.

Johannesburg's Short-Waver.

NOT long ago somebody hurled at my head several questions about the Johannesburg short-wave station. Now comes a very pally letter from D. B. of that city, with the information that the wave-length is 49.4 metres. The station

NEWS—VIEWS—AND INTERVIEWS (Continued)

word about a Welsh national station; all they want is a good programme, and although I do not believe in fostering this movement against the Union, I do not for the life of me see why they shouldn't have it.

The Mysterious "A. J. Alan."

W. M. F. (Aberdeen)—a beautiful city and a fine place for a seaside holiday—suggests that "A. J." may be attached to the Post Office, and that the next time I have to wait for a stamp while the lady finishes powdering her nose I should threaten to report her to "A. J." No, he's not Post Office, I feel convinced! They don't talk like that there, even in the Secretary's office. The P.O. is the Ugly Duckling of the Civil Service—they work hard, there, too. If "A. J." isn't west of the "Cock" tavern I shall be greatly mistaken.



Scotland Again!

HISTORY, I believe, credits Scotland with the very first suggestion that electric currents could be used for quick communications. That was back in 1753, and they're still full of good ideas up there on that side of the Tweed.

For instance, V. H. B., of Edinburgh, writes to me to throw more light on this Morse buzzer-practice business, and he puts forward two well-tried and easily-applied methods:

(a) Wind a few turns of insulated wire round one of the buzzer coils and connect ends of the wires to the 'phones only.

(b) Lay over or under the buzzer a 150 or 200 plug-in coil, and connect to the 'phones.

According to V. H. B., it works well even with low-resistance 'phones, so I pass on the tip with pleasure.

"Portable Grammys."

WHEN one comes to think, or even goes to ponder, one has to admit a marked paucity of imagination on the part of English makers of portable gramophones, which instruments, shut up in their cases, are indistinguishable from portable typewriters. The Germans are showing more poetry in this matter and are making round cases.

After all, the theme-song (so to speak) of a grammy is round; the round records go round and round on a round turn-table. Other new ideas introduced and shown at the Berlin Exhibition are a winding key which acts as a carrying handle and a locking device, and a winding crank fitted with a sleeve which starts the turn-table and regulates the speed!

Wake up, England!



"Who Frew Dat Brick?"

NATURALLY, I don't hold with shop-lifting, and all that sort of thing; but I notice, without astonishment, that smash-and-grabbers simply will not leave radio sets alone.

It's partly the manufacturers' fault, I think. They make these sets look so attractive, and they stick them in shop windows and shine coloured lights on them until some covetous soul can bear it no longer—"And lo! the Brick is on the Wing."

I suppose the desperate idea in the mind of Mr. Bill Sykes is that "it may end in quod—or in a Super-Quad"!

Studio Atmosphere.

THEY say that the new studio in Broadcasting House from which services and bible readings are to be broadcast is to be built like a small chapel. The

SHORT WAVES.

With reference to the complaint that the B.B.C. do not give sufficient all-Welsh programmes, one explanation is that they fear that the Welsh language would be mistaken for atmospherics.—"Punch."

A PERMANENT JOB.

Listener: "Something's wrong with this; can you fix it for me?"
Repair Man: "Sorry, but that's a fixed condenser."

"There's one thing to be said for these wireless lessons," said Tommy. "You can put your tongue out at the teacher."

A scientist says that radio waves which reach the moon from the earth are thrown back to earth again. And considering some of the programmes being broadcast, nobody should be surprised at the moon's action.—"Sunday Dispatch."

decorations are to be ecclesiastical, and a dummy altar is fitted there.

I hope this idea of realism will not get overdone—we do not want the announcers getting colds in their heads because they must go out on the roof every time they read the weather reports.

Have You Heard Cesky Brod?

LISTENERS to the North Regional Programmes are getting a little apprehensive as to Cesky Brod, Europe's latest big noise.

In case you do not recognise the name I ought perhaps to explain that Cesky Brod is the site of the new Prague transmitter, which has been testing on a wave of 487 metres, using a power of 60 k.w.

It is only just a tick above the North Regional wave-length, and looks like sitting on that transmission in much the same way as Mühlacker sits on the London Regional.

"With Regrets."

WHEN I congratulated Mr. O'Heffernan on walking off with all the honours in the International Relay Competition the other week, I little thought that my playful "surprise and regret" would be taken seriously. But it was. Dead Seriously!

From Bermondsey I have received a long and impassioned letter all about inter-

national friendship, which it is supposed my remarks in our August 29th issue are likely to endanger. I suggest that the writer had better read my paragraph again. So far as I remember, no one else has ever accused me of being unfriendly to amateur radio, and there are thousands of "P.W." pals all over the civilised globe who take the exactly opposite view!

U.S.A. Goes "Shop-Made?"

A CHERISHED American correspondent and friend who I have never seen save by photography, and upon whose word I rely, tells me that in the U.S.A. the radio set constructor is definitely off the map, and that it is practically impossible to buy parts for construction, except in the junk shops.

He attributes this to the low price of American commercial sets, but I myself put it down to a change of heart, because the hard-boiled British home-constructor as a rule spends more per annum on his hobby than would be needed to buy a Yankee set. The fun of the thing is poking the parts into different circuits and distance-getting is a subsidiary interest to that of trying out new hook-ups.



The Progress of "P.W."

OUR regular readers will excuse me for one paragraph while I say a word to the new chums.

If you haven't been buying a wireless paper during the (so-called) summer, you missed the significant news that POPULAR WIRELESS net sales keep going up and UP! And then some!

All records went west last June when the astonished auditor proved that "P.W.'s" average net sales were about 130,000 a week—a figure that no rival can bear to contemplate.

And that's why this is such a whacking good threepenn'orth. "P.W." progresses.

The Cultured Owl.

A SCOTTISH body has written to the Press alleging that at Broomhill Cross there lives an owl that nightly hoots in perfect Morse Code. First the owl hoots a dot and a dash (the letter A), and then he—or do I misjudge her—or she, hoots three dots and a dash (the letter V).

That's nothing! I have a cuckoo around here who sends dot dash at intervals, a duck who sends a series of dashes, and a woodpecker who emits a stream of dots. And then, what about our parrot, who transmits in telephony: "silly ass, silly ass; take a pill, take a pill"?



ARIEL.



THE RADIO EXHIBITION

"CLICK, clack; click, clack; click, clack!" For hours on end, from 11 a.m. to 10 p.m., the numerous turnstiles at Olympia will voice their monotonous song as they take in the one-and-sixpences during the next week. For the Radio Exhibition is here again.

Once more thousands upon thousands of keen enthusiasts from the ranks of Britain's wireless home constructors and listeners will jostle one another as they seethe through the narrow openings with their erratically moving paddles. Through, and into a fairyland of science.

Better and Better.

This is the ninth annual Radio Exhibition and, like its predecessors, will be a record-breaking one. Every year "the Show" has eclipsed all previous efforts, and this year more space than ever is occupied by this gigantic display.

More than two hundred firms are represented by tastefully decorated stands, where the latest and best of their goods will be on view—ready to be appraised aurally, too.

Not that the visitor will be greeted by squeals and squawks from an army of radio sets as soon as he enters the building. No, the Radio Manufacturers' Association, who are responsible for the Exhibition, have forbidden the demonstration of sets and gramophones except in specially built soundproof demonstration rooms.

But "the Show" will not be dumb by any means, for all the manufacturers of loudspeakers—and they number no small percentage of the whole—will be able to "demonstrate" their speakers from a common source of music.

Hear the New Speaker First!

And so the visitor will be treated to a varied rendering of the same tune or tunes as he walks up and down the avenues of stands, or climbs to the first floor or gallery in search of further revelations.

How is it done? Quite simply. The B.B.C. has arranged, among other things, a giant amplifier which will S.B. to all stands, as it were, gramophone or radio-received programmes for dissemination by the very varied loudspeakers on show in the various parts of the Exhibition.

Consequently, though not a strictly fair comparative test, the visitor in search of a

Until the end of next week, from September 18th to September 26th, the National Radio Exhibition at Olympia will be in full swing. In this article a non-technical description of the show, now prepared for the visitor, is given.
By K. D. ROGERS.

loudspeaker will be able to compare, say, a twelve-guinea "Super-Blooper Vox" Audio reproducer, relaying Jack Payne's terpsichorean efforts, with the quite different rendering of the same piece of music by Blank's ten-bob bleater. Exaggerated

examples, maybe, but they serve to illustrate a point.

These tests are never really conclusive, and for that reason demonstration rooms are provided upstairs, where the same speakers can be heard in their more natural surroundings. After all, with such a communal "broadcast," the old saying, trvestied is true, "One speaker's meat is another's poison."

The Musical Arrangements.

This music, which will liven the whole show, is not to be from bands situated in the Exhibition buildings, but from actual radio-reception of broadcasts and the reproduction of H.M.V. and Columbia gramophone records.

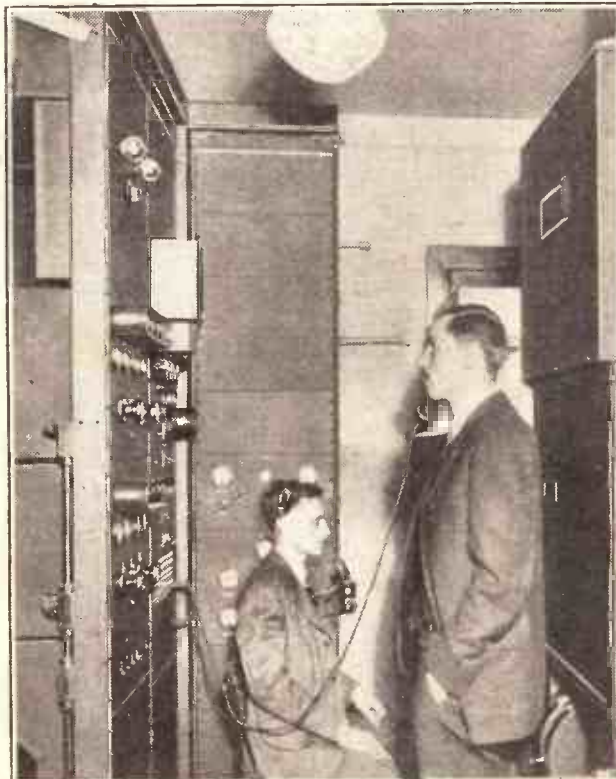
This may sound a bit impersonal and mechanical, but at a radio show it is surely right. The reproduction of radio and gramophone music is an electro-mechanical business, and so the R.M.A. have rightly decided to keep to the spirit of the thing and restrict all the music to the "canned" or "etherised" sort.

Last year over 155,000 people visited Olympia during the eight days the Radio Exhibition was open, and this year, between September 18th and 26th (inclusive), it is expected to beat that.

More Space.

For very much more room has been allotted to the show this year, and it will occupy the National Hall and Gallery, and the Empire Hall, with its first floor. Above this, the second floor will be reserved for dancing, the three sessions
(Continued on next page.)

SHALL WE SEE IT?



Will it ever be possible to stay at home and see the Exhibition? There will be a television display by the Baird Co. at Olympia this year, and this picture shows engineers engaged in a recent ambitious television experiment in New York.

THE RADIO EXHIBITION

(Continued from previous page.)

per day being arranged as on previous occasions. The music for this is being supplied by records and broadcasting, via a second B.B.C. amplifier and set of loud-speakers.

The actual exhibits it is not the purpose of this article to describe, though the special sets for the entertainment of cattle and poultry are of peculiar interest.

It is said that experiments have shown that if the cowshed and the poultry yard are provided with loudspeakers and suitable music, especially jazz, is broadcast, there is a marked increase in the milk and egg output of the denizens of the respective places.

Be that as it may, we are informed that suitable radio receivers for such purposes are being marketed, and that examples will be on show at Olympia.

What You Will See.

The B.B.C.'s own exhibit takes up a fair space and is of a somewhat novel character. We will not give the show away, because in a demonstration of this type part of the enjoyment comes from a sense of surprise, and so we will satisfy your curiosity only to the extent of saying that it concerns "The Distribution of Radio."

The Gramophone Co., too, are showing big things, not in Olympia itself—they could not get enough space—but opposite, where a garage has been hired and turned, at considerable expense, into a Hall of Music. Complete with soundproof rooms, and artistically decorated, this H.M.V. demonstration hall is well worth a visit.

Inside Olympia itself the usual blue-and-gold colour scheme (that of POPULAR WIRELESS, by the way) will hold sway. The main decorative theme of all the stands, therefore, will be the same, but interior ornamentation is left to the artistic tastes of the stand-owners themselves.

Mullards, of course, as usual, can be relied upon to have an attractive display. "Will

WRONG NUMBER?



An automatic loudspeaking telephone recently on show in London.

it be as good as two years ago?" you ask. We cannot give any secrets away; you must come along and see for yourselves. Whatever it is it will be worth having a look at.

But the feasts for the eye, and the ear, are not the only kind of foods supplied by the Exhibition authorities. The inner man is very well catered for.

Plenty of restaurants of various degrees of culinary possibilities are provided. You can get just a sandwich snack, with iced drinks (for it will be fairly warm at Olympia), or you can go along to one of the larger restaurants and have a full-course lunch or dinner.

Liquid refreshment, too, will not be lacking, and it would surprise you if you knew the thousands of gallons of good "nut brown" that is ready, labelled "Radio," as it were, for consumption during the show.

Plenty of Grub!

Mountains of sandwiches and tons of buns will "go west" during those eight days, while if all the straws for the ice cream sodas were placed end to end they would reach from— But what's the use of going on like this? Let's put it bluntly—there will be loads of grub for all!

As a matter of fact, the catering is one of the strong points of Olympia; there is always plenty of accommodation, and this year, with the exhibition spread out more than ever, an increased number of restaurants will be available.

But, in conclusion, just a few words about getting there. Olympia seems to be such a hole-and-corner place to get at, doesn't it? But it's not so bad as it seems; in fact, by train and bus you can get there very quickly from practically any part of London.

Getting There.

The District Railway (feeding stations such as London Bridge, Cannon Street, Charing Cross, Victoria, etc.) will take you within a penny bus ride of the show, by a ticket to High Street, Kensington, or Baron's Court.

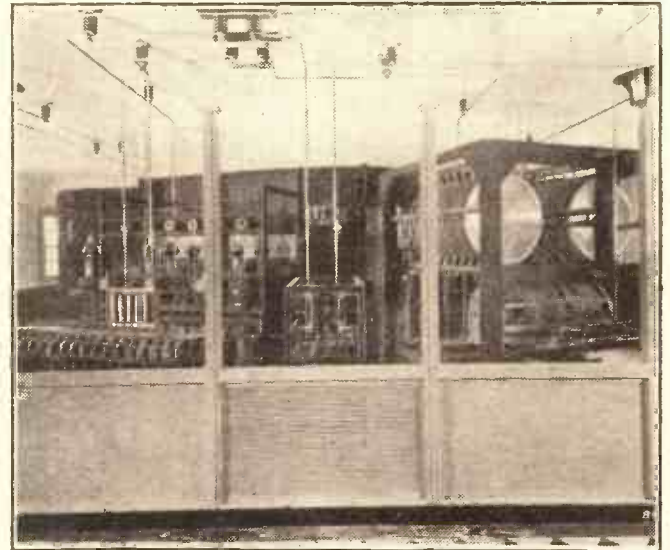
While from northern London, Paddington, King's Cross, Euston, St. Pancras, Liverpool Street, you can book through to Olympia's own station, "Addison Road," via the Metropolitan.

Those buses that go past Olympia will probably be labelled "To and from Olympia," but if you are near any of the following routes you can take a bus almost, if

not quite, to the door. Here are the numbers: 9, 27, 28, 33, 49, 73, 92, 102, 127, 173, 233, 273 and 291.

So there you are. Everything is ready for the biggest Radio Show we have ever had. It's packed full of interest, in fact, it is the last word in exhibitions. On with the show!

KEEPING AN EYE ON IT!



The back of this transmitter (WEAF) is surrounded by glass, so that visitors to the station can see the works.

RADIO REMINDERS

Extenser Tuning—Testing Condensers.

When considering valves of similar characteristics remember that, generally speaking, the one with the highest mutual conductance is the best.

Buenos Aires is now working a telegraph service with Germany via the Nauen station.

When using Extenser dials all the medium-wave stations have two-figure dial-readings, and long-wave stations have three-figure readings.

One great advantage of extenser tuning is that you can calibrate all the stations received on one straight curve, commencing at the lowest-waver and ending at the longest.

FOR D.C. MAINS.

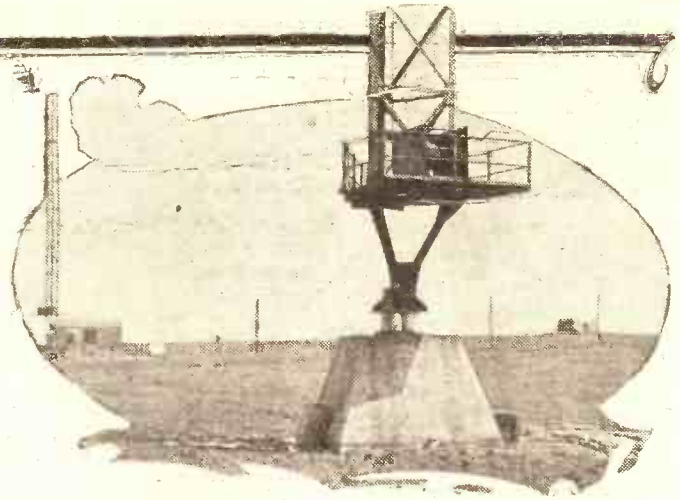
When a condenser intended to be used for ordinary D.C. supply is being tested, the test voltage should be at least twice the normal supply voltage.

For condensers to be used with alternating-current mains the test voltage should be at least three times the value of the alternating voltage across the condenser.

When dealing with H.F. amplification H.T. current is small, so there is no danger in pulling out the H.F. grid-bias plug and trying different tappings while the set is on.

With L.F. valves, and particularly with power valves, it is important always to switch off the set before adjusting the grid-bias plug-in its battery.

RAISE DAVENTRY'S POWER!



By CAPT. P. P. ECKERSLEY, M.I.E.E.

I RECENTLY wrote an article about what people are now calling the Newcastle experiment. It was proposed to synchronise Newcastle with the North Regional. I pointed out in my previous article (which was written before any results were forthcoming), that there were certain grave difficulties to be faced in connection with the experiment, but that perhaps the B.B.C. had made a closer study of the question than I had means to undertake, and that therefore my rather gloomy forebodings were less justified than they appeared to be according to rough calculation.

After a good deal of misunderstanding in and around the North-East region, the Chief Engineer decided to abandon his scheme, and the Regional Scheme remains substantially as I proposed it. There still remains, therefore, the problem of giving alternative programmes to Newcastle people who only possess quite cheap sets.

Here is the problem. According to my original calculations the North Regional gives a strength in Newcastle of from about 1 to 2 milli-volts per metre. Daventry 5 X X (giving the programme alternative to the North Regional—sometimes!) has a field of about 2.5 milli-volts per metre.

Four Times Greater!

Now in large towns such fields do not give a sufficient service, although, particularly in winter, such strengths are sufficient.

So Newcastle is not in the true service area of either Daventry or North Regional. So it has a station of its own radiating the National programme. Now, people in Newcastle, with cheap sets, get a perfectly good service of the National programme from their local station, but they do not get an alternative twin-wave service.

The local station, even on expensive sets, is difficult to cut out, and overwhelms the rather feeble North Regional. Daventry 5 X X is redundant, as it sends out the same programme as Newcastle.

There is one simple solution to all this, thus: Quadruple the power of Daventry,

 "P.W.'s" Chief Radio Consultant suggests that the power of 5 X X and the North Regional ought to be quadrupled in order to provide a good broadcasting service for the North.

quadruple the power of North Regional, shut down Newcastle, and there you are. Newcastle city would have 2 to 4 milli-volts of North Regional and over 5 milli-volts of 5 X X signal. Certainly, some few crystal sets would need "teeing up," but it would be perfectly justifiable to ask people, as they have been asked elsewhere, particularly in Birmingham, to make this effort for the benefit of the majority.

A Reasoned Suggestion.

But to quadruple the power of the North Regional National would in all circumstances be uneconomic. It would, in fact, "wipe out" too many, be terribly expensive to run, and the benefits conferred would be small compared with the cost of upkeep and construction.

It seemed, and still seems, to me, however, a perfectly sane idea to increase the power of Daventry fourfold. More of this later; for the moment let us assume it done. Then there is an adequate signal of National programmes, and the local station, as regards the National programme, can be shut down.

Now comes the question of the Regional programme. Now the Chief Engineer reasoned that if he could synchronise

Newcastle and North Regional he would have a service of alternatives in Newcastle, either 5 X X (National) or Newcastle (Regional). In my opinion, he would have been more justified if, before trying this idea, he had seen to it that the signal from 5 X X was adequate, so that those who could not, owing to synchronisation, get the North Regional and were used to it could get very good service from 5 X X.

But the scheme failed because in synchronising Newcastle and North Regional he denied a larger number of persons a North Regional programme and yet those used to receiving the National via Newcastle were denied their customary service.

In my opinion the right scheme is to increase the power of 5 X X fourfold (and so double the strength of signal), shut down Newcastle local, and assume that a very considerable number of persons will still be able to get a good service of an alternative from North Regional with its 1 to 2 milli-volts.

After all, North Regional now gives a field which, with a medium wave, is a good service for suburban listeners and very good for people away from tram routes, etc.

The Remedy for That.

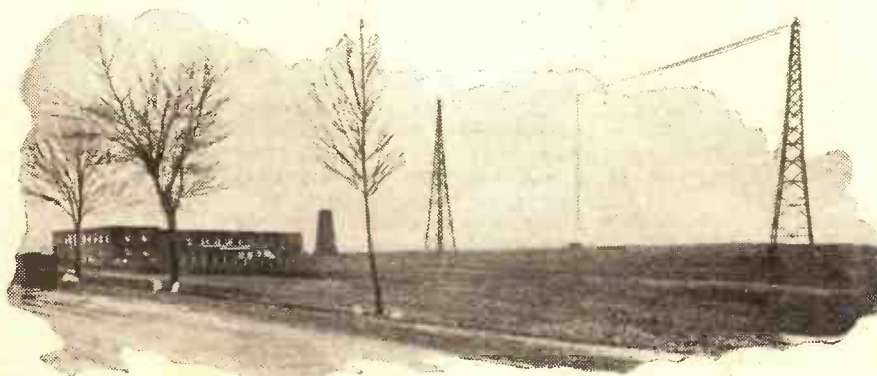
There would be outcry, however, from the poorer people of Newcastle if their local station were shut down. Here I have a remedy. A re-diffusion system is being started in Newcastle. The transmission service (Daventry 5 milli-volts per metre and North Region 1 to 2 milli-volts per metre) would be perfectly adequate for a properly sited and designed receiver maintained by skilled persons, so the poor persons' problem would be solved and Newcastle would be shut down.

And if the power of 5 X X were raised, people with valve sets and people not in the densely populated parts of the town could rely upon good service from North Regional.

Now as to the raising of the power of Daventry 5 X X. I proposed, just before I left, that this should be done then. It was

(Continued on page 99.)

A POWERFUL CONTINENTAL



A view of Heilsberg, a German broadcasting station having a power of 40 kw more than of Daventry 5 X X

THE MIRROR OF THE B.B.C.

A MYSTERIOUS SILENCE

JACK PAYNE: PRIME MINISTER!—TELEVISION—
WINSTON AND THE B.B.C.

ALTHOUGH something may be said between the time I write this and the time it appears in print, I still cannot understand why the B.B.C. maintained so oyster-like an attitude for at least a whole month after the appearance of the May Report which suggested that an additional £470,000 should be taken by the Treasury from licence revenue.

Despite the national economic emergency, listeners in general do look to the B.B.C. to do all in their power to protect the already truncated allowance from being further depleted. The basic question is whether the B.B.C. should work in the interests of listeners or as a tame subservient of a Treasury that holds it in supreme contempt.

It is not as if the national finances really depend on what is done with licence revenue. The sum total is a bagatelle. The point is rather, is the B.B.C. carrying out its obligation of honour to the listener?

My view is that if any further remittance at all is made to the Treasury beyond the £600,000 they already take, and there is no really big "kick" from Savoy Hill, then the B.B.C. is guilty of gross negligence, and the nature of its constitution must come under fresh review without delay.

Friends at Savoy Hill tell me that the strongest possible case has been put to responsible ministers, and that there is no occasion for public discussion. Well, all I can say now is that I hope the event will prove them right; but even so, I am frankly alarmed at the new attitude of ready, almost eager, submission to "officialdom."

This is not the B.B.C. we knew in the old days, when they flooded Parliament itself with such an attack on the Postmaster-General that he made haste to surrender.

Jack Payne: Prime Minister!

During the recent political crisis I received no less than twenty letters from various parts of the country and from representatives of widely different sections of society stating in effect that Jack Payne should be invited to lead a really non-party Government and save the country from impending disaster.

This is only another symptom of the extraordinary hold that successful broadcasting personalities gain over the public mind. The most striking example was Captain Peter Eckersley, whose personality is so much missed nowadays. The B.B.C. must do something about accommodating personality and individuality as well as mass efficiency.

Television.

I told you a fortnight ago that the "television drive" should be treated with reserve. I gather now that the B.B.C. has been considering whether to give television a slightly varied "show."

What I believe will happen will be a slight reduction in the hours of transmission, with a substitution of rather better but

shorter periods at times when listeners are more likely to "look-in." Also there will be facilities for occasional "stunts," such as the Derby, and perhaps also an extension of the transmissions to North Regional transmitters.

If, as I believe, something of this kind is done, it will be subject to the condition of much closer scrutiny and examination by B.B.C. engineers. In other words, Savoy Hill sleuths will be on the look-out for results.

Winston and the B.B.C.

I hear that Mr. Churchill is still waiting to receive the long-contemplated invitation to take part in the "World Dictator" series of talks which Mr. H. G. Wells will inaugurate soon. Since the skirmish about India, there has been some reluctance to invite Mr. Churchill to the mike.

I sincerely hope that this shyness will vanish. Mr. Wells is reported as having suggested Mr. Churchill, and if this is so, Mr. Wells is right.

I hear that Jack Hulbert who, with his wife, Cicely Courtneidge, and his brother Claude and Mrs. Claude (Enid Trevor), are making frequent appearances before the microphone, has written a new revue for broadcasting, called Jack Hulbert's Follies, which is to be presented on Thursday and Saturday, September 24th and 26th, respectively.

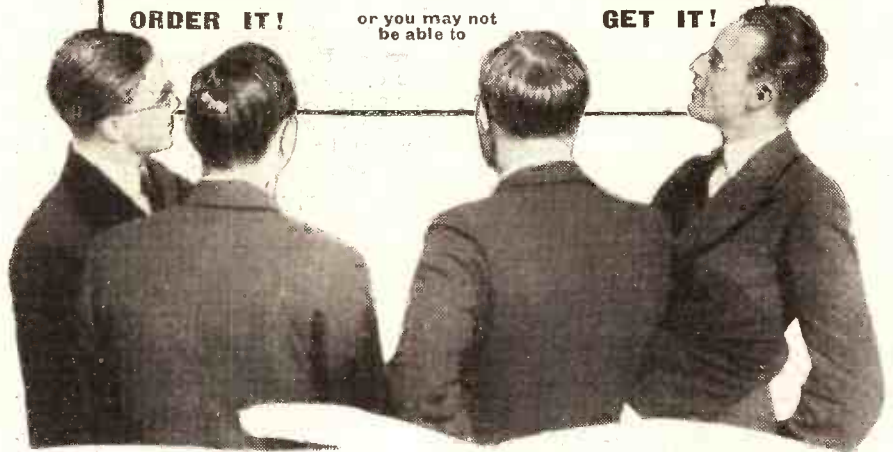
NEXT WEEK

The next issue of "P.W." will be
ANOTHER ENLARGED NUMBER
full of readable articles about the
new season's sets and circuits.

ORDER IT!

or you may not
be able to

GET IT!



FOR THE LISTENER

By "PHILEMON."

This week our contributor raises the question of Big Names—and he thinks we might be better off without them!

A GOOD deal of enthusiasm accompanied the announcement that Mr. Henry Ainley and Mr. George Grossmith were to appear in leading parts in two plays recently broadcast. I do not share this enthusiasm.

I think that it was an artistic mistake that these two extremely competent actors should appear in casts composed otherwise of ladies and gentlemen who are good in their own class, but who belong to a definitely inferior class of actor compared with these "stars." It was, in my view, another instance of the deplorable tendency of the B.B.C. to worship names.

I do not suggest that the B.B.C. is guilty of mere "stunting"; but it has frequently created the impression that it has been glad to secure a distinguished name for its programmes regardless of whether or no the

possessor of the name has any other excuse for appearing at the microphone.

In other circles, we say that "money talks"; in our programmes it would sometimes seem as if it were believed that the "big name talks"—as, indeed, it does, and not seldom very badly. Perhaps the fairest thing to say is that the B.B.C. sometimes gets "let in" by the Big Name, and is itself just as disappointed as its listeners.

How It Pans Out.

I am far from thinking that it is a mistake to present Mr. Ainley or Mr. Grossmith at the microphone. One of my most pleasant recollections is of hearing Mr. Ainley, in a programme of recitations.

And although I did not hear Mr. Grossmith's recent talks on "Hollywood," I

(Continued on page 99.)

"P.W.'s" SPECIAL EXHIBITION REVIEW



Go to Olympia if you can, it's a fine show! And take particular note of all the items that have been chosen for inclusion in this comprehensive review. You will then be able to tell those of your "stay-at-home" friends who take "P.W." that all they missed was the "atmosphere" and the walking about!

AMALGAMATED PRESS, LTD.

Our new "P.V." sets—"P.V. Plus" and "P.V. Star"—which are described in other pages in this issue, will be included in the "P.W." display, and we trust that a very large number of our readers will be able to get along and examine these sets at close quarters.

And two particularly interesting MODERN WIRELESS receivers are being shown. The one is an Extended "Super-Quad," the first super-heterodyne ever designed to employ Extenser tuning. Further, it uses only four valves, and yet is actually free from some of the disadvantages of super-hets of much more intricate characters!

Almost equally original in design, is the "Four-Band Three," a remarkable set which can, merely by the operation of a simple change-over switch, be transformed from a two-band short-wave set to a two-band broadcast set or vice versa. Four wave-bands, covering practically all the broadcast wavelengths in the other, are thus made immediately accessible.

THE WIRELESS CONSTRUCTOR is represented by a pair of receivers of an extremely outstanding nature. Nowhere in the rest of the whole

NOVEL VOLUME CONTROL



The Auto-Electric Devices volume control operates on a logarithmic principle, and has a special sectionalised resistance element.

great National Radio Exhibition will you see another instrument like the "I.E." for it is the only set of its kind ever designed, and is entirely new in conception.

It is the simplest conceivable piece of apparatus and yet, by the simple and single rotation of the one tuning dial, you roam through both the short waves and ordinary broadcast waves. For instance, with a flick of the finger you whip past your local station and run into Melbourne, Australia!

THE WIRELESS CONSTRUCTOR "Exhibition Four"—well, you will have to see that before you will be able to appreciate the novelty of its construction, for here we have a complete breakaway from the conventional.

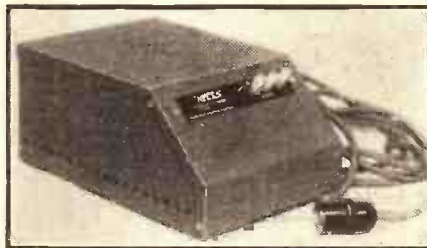
Our stand is, in fact, an exhibition in itself, and no radio enthusiast can afford to miss it. In addition, there will be technical experts on duty all the time to answer free and without any obligations on the part of the questioner whatever, any query regarding radio.

The trickier the problem that will be worrying you the happier will our experts be to give you advice, so do not hesitate to roll up in your hundreds and thousands in order to examine the above-mentioned apparatus and to ask questions about that or anything else. We shall be only too pleased to see you.

A.E.D., LTD.

Auto-Electric Devices, Ltd., have a new and very attractively priced A.E.D. gramophone pick-up and arm, in addition to the existing and well-known model, and the ingenious and very efficient A.E.D. volume control. There is also an attractive novelty in the form of an electric portable gramophone. This comprises a clockwork turntable motor, and a pick-up connected to a two-valve battery-driven

UNIQUE CASE DESIGN



You will note that the handily-sloping front is a special feature of "Atlas" mains units.

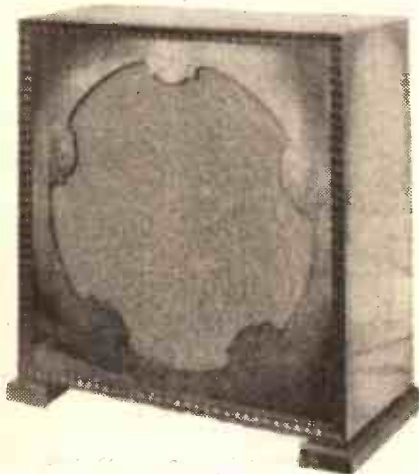
amplifier. There is a balanced armature loud speaker built into the lid of the outfit. (But don't forget to examine the senior A.E.D. pick-up—it is one of the two best pick-ups that have passed through our test-room.)

BELLING & LEE, LTD.

One of the special features of the Belling-Lee show is that they are exhibiting a new range of their popular and useful Belling-Lee Battery Cords. These are now available for practically any imaginable combination of L.T., H.T., and G.B. connections.

They are very attractive alternatives to the employment of separate wires for battery leads, and not only do they make for greater neatness, but they are also definitely safer to use.

A POPULAR MODEL



One of those well-known—and well-liked—Amplion cabinet cases which is being shown.

We like the name given to a new Belling-Lee plug, they call it the "Banana," and it has been produced in order to satisfy the demand for a plug of larger dimensions and larger contact surface than the standard wander plug.

It is of the same three-prong construction which has made Belling-Lee wander plugs famous, but it has a "banana" shape to give it an easy entry into the appropriate socket.

There are Belling-Lee fuses made with carrying capacities of 60, 120 milliamps and 5 amps. These are of small tubular construction. There are also additions to the terminal ranges that the constructor should particularly notice. Indeed, the Belling-Lee stand is peculiarly a constructor's display and one well worth lingering over.

BENJAMIN ELECTRIC, LTD.

Benjamin valve holders form the most important features on this stand, and even if the valve holder is a small object it is none the less important for that; and constructors who have the desire to get the best from their sets should pay particular attention to the efficient design and polished finish of the Benjamin anti-microphonic model.

MAKING YOUR OWN SPEAKER?



An item that speaks for itself.

But Benjamin are also including their particularly versatile and useful D.P. rotary switches, and portable set enthusiasts will no doubt examine with interest the Benjamin turntable for portable and transportable receivers. This article has collapsible legs, enabling it to be firmly bedded, even on the roughest ground outdoors while, for indoor use, the legs fold up and rubber cushions are automatically brought into service to prevent the surface of the table being scratched.

THE BRITISH EBONITE CO., LTD.

Here is to be seen what is probably the largest ebonite former in the world—a giant model of the "Beacol" low-loss former, a magnificent production for this class of work and an apt exhibit for one of our leading manufacturers of ebonite panels. Ebonite tubes and mouldings, and, by the way, many new sizes and types, numbering 26 in all, of the world-famous Beacol low-loss former itself, are being shown.

BRITISH HARD RUBBER CO., LTD.

A new development in the manufacture of ebonite is Permcol, a non-discolouring ebonite. Unlike ordinary ebonite this material is guaranteed to keep a permanent colour even under strong sunlight, although it also has exceptional insulating properties.

A number of beautiful specimens of engraved work, illustrating how the flat, velvet-like surface of Permcol ebonite permits the most delicate applica-

(Continued on next page.)

"P.W.'s" SPECIAL EXHIBITION REVIEW

(Continued from previous page.)

tions of this kind of work are to be seen. Ebonite coil formers, rods, tubes, switch blocks, and various other high-class ebonite products are included in the display.

A1 "CHOKING"



A specimen of special H.F. choke construction.

BRITISH BLUE SPOT, LTD.

Blue Spot have many new lines. First of all, and picking quite at random from an extremely pleasing range of apparatus, is the Blue Spot inductor type loud speaker, which is claimed to give very fine results. And then there is a permanent magnet Blue Spot

moving-coil loud speaker which will cause no little interest.

An entirely new type of Blue Spot product is a mains gadget for cutting out mains noises. It is a very compact little device and you simply plug it into your supply socket and your set is then connected instead to the gadget.

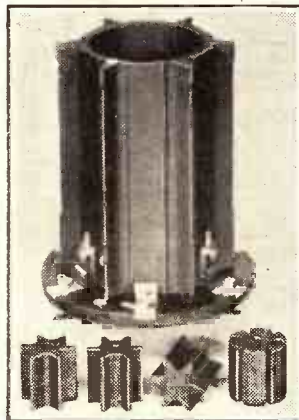
Another new Blue Spot line is a rejector wavetrap, designed to cover the medium wave-band and having three alternative couplings, for varying degrees of selectivity according to local requirements. And, of course, all the existing Blue Spot loud speakers and units and chassis are on view.

We believe that Blue Spot will also be showing at least one Blue Spot receiver, although at the time of writing we have no details regarding this beyond that it is a four-valve A.C. mains set of the console type.

BRITISH GENERAL MFG. CO., LTD.

There are numerous tuner units on the market, but we are able to say from experience that the British General is one of only about half a dozen that are really efficient.

FINE MOULDINGS



Examples of "Becol" workmanship.

The British General is a very fine unit indeed, also it is an article well worth examining for its interesting construction. It is fashioned from high-class mouldings, and reveals none of the "rawness" only too often met with in radio productions of this nature.

Whether or not you are interested in such a device, we should certainly advise you to examine the B.G. tuner as an article representative of the best British radio manufacturing practice.

BROWNIE WIRELESS CO. (G.B.), LTD.

The very well-known "Dominion" sets—the "Dominion" Three and the "Dominion" Console, and "Brownie" crystal sets and loud speakers are shown, but there are entirely new lines in addition.

For instance, there is the Baby Grand two-valve all-mains set, a cabinet receiver into which a cone loud speaker is built, that will be marketed at a most competitive price.

There is also a battery version of this two-valver, which should make many foreigners who contemplate entering the British market stop and think. The Baby Grands appear to us to be particularly attractive propositions.

A. F. BULGIN, LTD.

A veritable heaven for the constructor! One of the most attractive displays of novel and useful

gadgets in the whole of Olympia. We would draw particular attention to the new Bulgin thermostatic delayed action switch, and Bulgin Quickwye which is to be sold in 10-ft. coils, and which is a material that, as its name suggests, enables a set to be rapidly wired up.

There is also a series of moving-coil milliammeters and voltmeters, and a comprehensive range of tubular condensers and mains type resistances. And we must not forget to mention that Bulgin Differential Reaction Condensers make their appearance. In all, there are over twenty new Bulgin lines added to an already most comprehensive and popular list.

C. F. & H. BURTON.

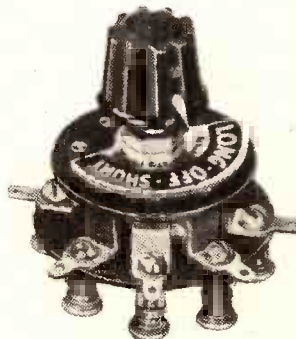
For the first time we have A.C. and D.C. mains units from Burtons, and these appear simultaneously with the new version of the well-known "Empire Three" receiver, in which a loud speaker is now embodied.

There are also "Empire" constructor kits, new variable condensers, both of normal and pre-set varieties, and a full range of components.

SYDNEY S. BIRD & SONS, LTD.

An extremely fine range of Extensers, including both dual and ganged assemblies. Constructors should take particular note of the triple gang, for this exemplifies in the clearest possible manner the precision of the design and construction of Cyldon apparatus.

DOES TWO JOBS



A Benjamin switch for wave-range and filament control.

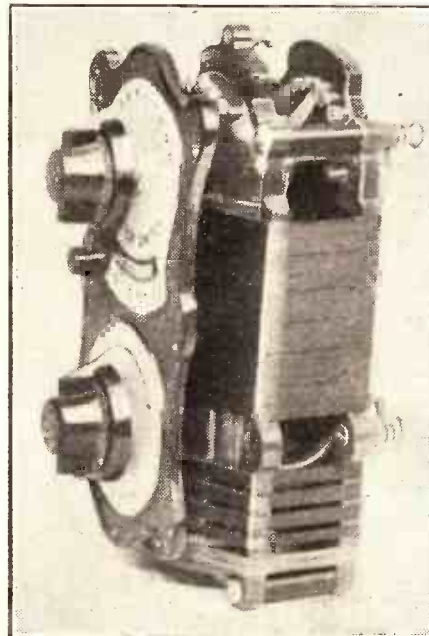
All three sections, each complete with its three-contact self-changer, are all operated by the one control, and yet the movement is as velvety as it could possibly be.

The Cyldon Extensers are also to be seen in company with some beautiful slow-motion controls. Sydney S. Bird & Sons have certainly made the most of the

new extenser principle, and have shown that there is no reason why, because the thing is new, it should not be as attractive in appearance as the luxe versions of a more ubiquitous article.

There are also on view some Cyldon variable condensers of conventional design or rather types, we should say, for Cyldon products, whatever their nature, all bear indelibly the "Cyldon" stamp of individuality.

ALL-WAVE TUNER



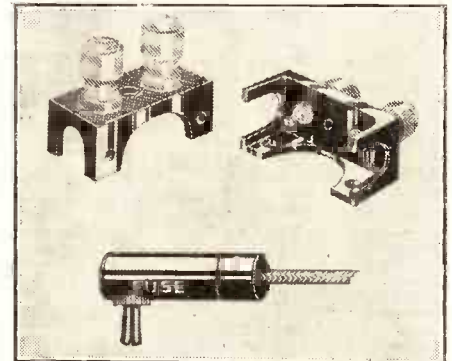
The British General tuner covers ordinary and long-waves, and embodies an ingenious selectivity control scheme.

CARRINGTON MFG. CO., LTD.

A very comprehensive range of cabinets for all purposes from the simple "American" types to large, handsomely polished radiogram cabinets.

The "Melodice" cabinet is prominently featured. This has been designed expressly for housing modern loud-speaker units. It is made of a special treated oak, and it is claimed that its construction definitely gives increased volume and tone to any speaker.

THAT FINISHING TOUCH



Two Belling-Lee items that help to round off a design—the Terminal Block and an H.T. Fuse.

It is certainly a very handsome object, and as it is attractively priced it should prove very popular.

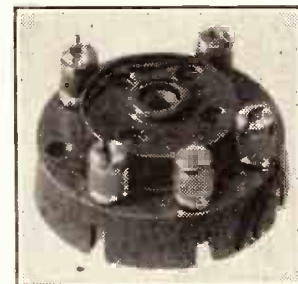
CHLORIDE ELECTRICAL STORAGE CO., LTD.

A very comprehensive range of batteries for all radio purposes. There is an improved design of the Exide Mass type battery for L.T. The mass type will hold its charge for very long periods of time without attention, and is thus peculiarly suitable for radio service.

There are many points in its design which make it an outstanding accessory, and the glass container has a moulded lid in which an identification label is embodied.

Our Empire's biggest accumulator makers are also featuring "Drydex" H.T. and G.B. batteries whose merits are now so universally recognised that it will be quite unnecessary for us to say any more about them than that they are displayed in a particularly forceful manner.

INDISPENSABLE!



Note the screw terminals on this Bulgin version of one of the constructor's most indispensable components.

CELESTION, LTD.

Three Celestion loud speakers which achieved such success during the past year are retained, and these are the models D.10, D.12, and Z.20.

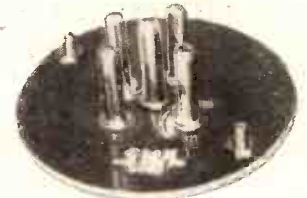
The new Celestion "M" unit figures in three new models of unusual attractiveness.

Constructors particularly will be intrigued by the M.12 chassis which is a complete Celestion speaker with reinforced diaphragm all ready for building into a cabinet or fitting to a baffle. It has tapped coils, so that it can be perfectly matched with any receiver.

The excellent Celestion moving-coil unit figures in two fine instruments which should carry the Celestion banner even further afield than ever this season. They incorporate step-down transformers which are tapped for output matching purposes.

The Celestion W.5 pick-up is featured. Regular readers of "P.W." will know that this pick-up is a high-class product, giving excellent results and

IT'S CLIX!



Leetro Linx's new panel-mounting valve holder.

(Continued on next page.)

"P.W.'s" SPECIAL EXHIBITION REVIEW

(Continued from previous page.)

incorporating many technical points of originality and usefulness.

The Celestion display is certainly one that should not be missed.

H. CLARKE & CO. (Mer.), LTD.

An entirely new H.T. unit for A.C. mains having fixed tappings suitable for the majority of medium-sized sets. A Westinghouse metal rectifier is used, and the device is available for a wide variety of mains.

There is a similar unit having a trickle charger; this charger is for 2-volt accumulators and charges at 3 amperes.

NON-INDUCTIVE



A Dubilier non-inductive fixed condenser of sound construction

An improved A.C. 244 is shown and this has an aggregate current output of 20 milliamperes from three tappings, two of which are of a variable nature.

Again, we have an entirely new Atlas all-mains unit, similar to the A.C. 244 but including an L.T. trickle charger for 2-, 4- or 6-volt accumulators.

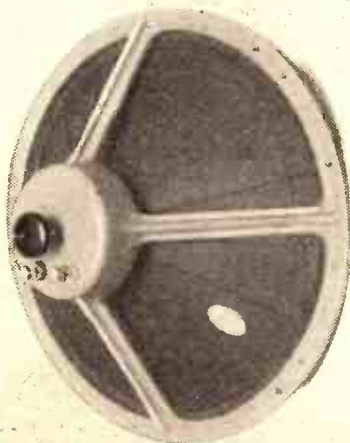
It is important to note that all these Atlas units are offered at most competitive prices, and visitors to Olympia who have ideas in regard to the acquisition of such instruments, should collect all the literature they can about the new Atlas lines.

E. K. COLE, LTD.

There will not be many visitors who will miss the new "Ekco" sets. These strike quite new notes in design, and their appearances alone are sufficiently original and tasteful to guarantee their success.

The "Ekco" four-valve Console and the

A CLASSIC CONE



A feature to note in Celestion loudspeakers is a patented reinforced cone.

"Ekco" four-valve Console are reasonably priced, and we are able to say that the results they give are "Ekco" at their very best.

There is an "Ekco" four-valve radiogram which can be obtained with an "Ekco" Radiocorder, built in so that you can make your own records when and as desired, with a minimum of trouble. You can, for instance, capture for repeating as many times as you like in the future, any item in the broadcast programme. "Ekco" also have some new mains units which are fine value-for-money propositions.

COLVERN, LTD.

Colvern, Ltd., are, of course, famous for their coils and here constructors will see components of this nature which figure in many outstanding receiver designs.

There is a new Colvern coil of the screened, dual-range variety having a wave-change switch on its base.

This last is arranged so that it can be operated from the front panel of the set. The windings of this coil are carried on ribbed ebonite formers, the long-wave sections being accommodated in slots.

A. C. COSSOR, LTD.

The new Empire "Melody Maker" will hardly pass unnoticed by anyone setting foot within Olympia. Messrs A. C. Cossor, Ltd., are making certain that this instrument receives the attention it deserves.

The design is quite new and a metallised S.G. valve is employed in conjunction with screened coils.

And it should be noted that there is an all-electric Cossor "Melody Maker," for those who have mains. It occurs to us that Cossors are so well known for their popular and widely used valves that some people will meet the Cossor loudspeakers with some surprise.

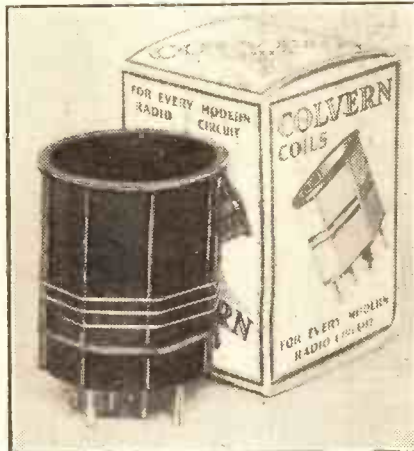
That they are high-grade instruments goes without saying, and we would remark that one of them costs only 25s. This is built into a dark oak cabinet and pairs very well with the Cossor "Empire Melody Maker."

DAYZITE, LTD.

Being wholesalers, Will Day, Ltd., are able to stage an exhibition within an exhibition, for they have a large selection of the best sets, components and accessories of all makes.

Of a more spectacular nature, they are showing their latest portable talking picture outfit which

COILS THAT COUNT



A Colvern short-wave coil for six-pin holders.

comprises certain novel features designed around their own patents.

DYSON & CO., LTD.

Here we have a strong showing of "Godwinex" mains devices for all sets and purposes. They range from neat little D.C. eliminators up to all-mains units for A.C.

And then there is an H.T. unit specially designed for portables, and a neat and efficient charger for 2- and 4-volt L.T. accumulators.

Mention must also be made of the "Godwinex" A.C. rectifiers, which are similar in design to the "Godwinex" mains units, but are intended for converting existing D.C.-H.T. units for A.C. working.

DONOTONE (REGISTERED) LOUD SPEAKERS LTD.

The Donotone people never fail to draw considerable crowds around their stand, for their loudspeakers are unique in design. A system of tuned gongs is employed in the Donotone loudspeaker, but these gongs are not for resonating and amplifying as many people think.

Their purpose is to absorb peaks and unwanted resonances, so that the response will be true throughout the whole frequency range. And we must say, judging by the several Donotone loudspeakers we have heard, that the principle appears to be completely effective.

DUBILIER CONDENSER CO., LTD.

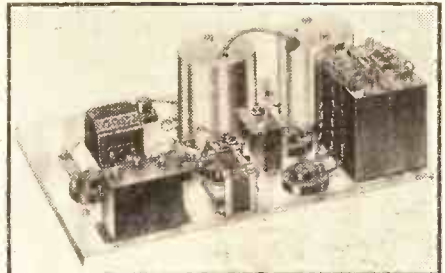
By far the greater proportion of this exhibit is devoted to various types of condensers. Of special interest is the new Dubilier non-inductive paper condenser which is particularly suitable for use with certain special band-pass circuits.

But it also has its applications in many other parts of sets, and is ideal for H.F. bypass purposes, inasmuch as it possesses an extremely low radio-frequency resistance.

It is tested at 500 volts D.C., and the price is low. Dubilier are showing a number of variable condensers, both of the air and solid dielectric type. In this latter is included a differential condenser which will already be well known to "P.W." readers.

If you have not met them before, it would be worth your while to pause for a few moments over the Dubilier electrolytic condensers, these being obtainable in capacities up to 2,000-mids. And yet they

A "MELODY MAKER"



The Cossor Empire Melody Maker for A.C. Mains.

are not very much larger than the smoothing condensers of ordinary construction!

Many new Dubilier resistances of the metallised types are making their appearance for the first time.

EASTICK & SONS, LTD.

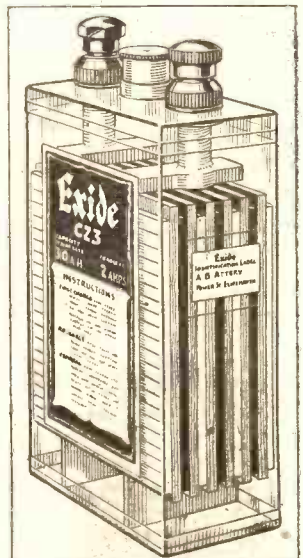
Here you will meet the Elex Short Wave Converter housed in a cabinet which is assembled in accordance with the "Byldurone" principle.

The Elex Frame Aerial, which has been specially constructed for use with super-hets, towers above the now familiar Elex earth bowl.

A number of "Byldurone" cabinets illustrate the elasticity of the idea. A "Byldurone" kit, by the way, comprises all the materials necessary for the building up of a handsome cabinet for which only the simplest possible tools are needed.

Terminals, testing rods, and a representative range of high-class components and accessories complete the Eastick contribution to Olympia.

SURE TO CELL!



One of the many Exide accumulators for L.T. purposes that are shown.

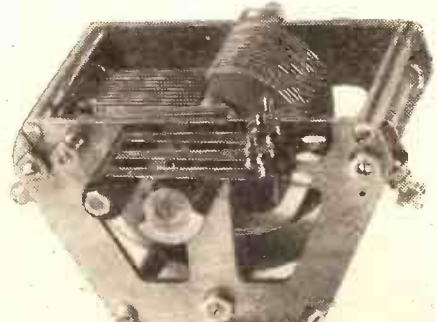
EDISON BELL, LTD.

A magnificent array of receivers, including two super-heterodynes and two radio-gramophones.

A new moving-coil loudspeaker chassis of the

(Continued on next page.)

DON'T MISS THIS!



The "Cyldon" Extenser is one of the newest and most important exhibits.

"P.W.'s" SPECIAL EXHIBITION REVIEW

(Continued from previous page.)

permanent magnet variety embodying an input transformer, and several complete cabinet constructions.

The Edison Bell pick-up is shown and constructors particularly will be interested in the spaghetti resistances and pre-set condensers.

EXIDE GO DRY!



An H.T. battery produced by the Empire's biggest accumulator makers.

EVER-READY CO. (GT. BRITAIN), LTD.

If yours is a battery driven set you will find plenty to interest you at this stand, and you may regard the Ever-Ready H.T. battery with even keener interest in view of the fact that most, if not all, the prices of these will be considerably reduced.

There is also a large number of accumulators, including unspillables for portables. These incorporate safety devices which make them absolutely unspillable and safe from acid spray whatever their position.

And those which are intended for suitcase models of portables in the free acid range, to which all the above refers, by the way, are so designed that their plates are constantly immersed whatever their position.

In addition to these "free acid" unspillables, there are also Ever-Ready Jelly-acid types.

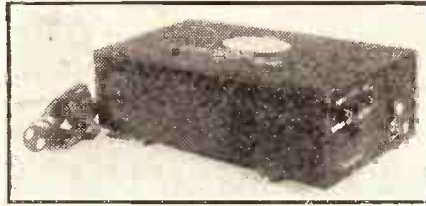
The Ever-Ready glass cell accumulators are provided with indicators which automatically indicate the condition of the cell. These indicators operate on the hydrometer principle and floats tell you to what extent, if any, the cell has run down.

FERRANTI, LTD.

It will be noted that Ferranti, Ltd., have kept well abreast of the times and have added several new items to their catalogue. For instance, there is a permanent magnet moving-coil loudspeaker to retail at a low price.

Then there is a Ferranti Inductor speaker which is said to give a most impressive performance. Although it is not certain at the time of writing, it is at least hoped that Ferranti will show their super-heterodyne receiver, which has only two controls and incorporates an Inductor speaker.

"ELECTRIC" SUCCESS



The popularity of Ferranti gear proves that the public knows how to buy with discrimination. Above is a Ferranti mains unit.

The other Ferranti sets include an Inductor Console, and a number of speakers and, of course, all their well-established radio components will be on view.

FORMO CO., LTD.

Here "P.W." readers will come across many old friends. For example, there are the Pop-Vox and P.J. coils which figure in so many of our designs. And if you can, take the opportunity of scrutinising a "Formo" extender and noting how smooth its action is.

IN FACT . . . EVER-READY!



Batteries which retain their original high quality despite extensive price reductions.

We have no doubt that many of you who have not yet met the Formo extender will be surprised at its compactness and its generally pleasing design and finish.

"Formo" also have some ganged condensers meriting special attention, particularly a triple type with illuminated dial which embodies an ingenious balancing control.

FULLER ACCUMULATOR CO. (1926), LTD.

A wide range of accumulators including an unspillable jelly-acid type. And it will be noticed that all

MELODIOUS "EKCO"



One of the new "Ekco" sets. This is the 3-valve Console, and is a very attractive design.

excepting the jelly acid pattern embody a new form of indicator for denoting the state of charge. The Sparta H.T. batteries are well in evidence, the new Sparta super range making its appearance for the first time.

GRAHAM AMPLION, LTD.

Keen interest will be centred on the new Amplion permanent magnet moving-coil loudspeakers which do seem to be excellent "value for money" propositions.

In the balanced armature range of Amplion loudspeakers there is a new cabinet model obtainable in oak and mahogany.

The Amplion portable sets are retained and there is a fine A.C. model of the transportable variety embodying a moving-coil loudspeaker.

GENERAL ELECTRIC CO. LTD.

You will, of course, see the "Osram Four" (The New Music Magnet), a kit set which can be built either for battery or A.C. mains operation. As this fine set is treated in our Tested and Found columns, it will not be necessary to give details of it here.

The Geophone Compact All-Electric Screened

A PAIR OF "SPARTAS"



They figure in many sets, these Sparta G.B. and H.T. batteries.

Grid Receiver for A.C. mains is an entirely new self-contained model built into a handsome inlaid walnut cabinet. The Geophone Inductor Dynamic speaker figures in this receiver, which strikes an attractive modern note both in appearance and in technical characteristics.

The Geophone Table Four, All-Electric Screened Grid Receiver for A.C. mains embodies a mains aerial device so that no outside aerial or frame need be used. There are two stages of screened grid H.F. amplification and a special power pentode output. This set is also available in a console type in which there is a Geophone Inductor Dynamic loudspeaker.

This outfit is housed in a walnut cabinet having inlaid decorations and is a fine piece of furniture. The Geophone all-electric radio gramophone is a magnificent instrument right up to the minute in every part of its design.

The G.E.C. are also showing a Geophone all-wave super-heterodyne which covers the short and medium wavelengths. It is a six-valver and has been constructed primarily for tropical conditions, although, of course, it is equally suitable for use in cooler planes.

There is a fine range of Geophone loudspeakers, including the Inductor Dynamic and Geophone moving-coil for A.C. and D.C. mains.

All types of Osram valves are exhibited on a separate stand, and "P.W." readers will not need reminding that the Osram range is most comprehensive. Thus there are indirectly-heated A.C. mains valves, D.C. mains valves, pentodes for battery and A.C. mains, new types of rectifiers for A.C. mains sets and mains units, etc., etc.

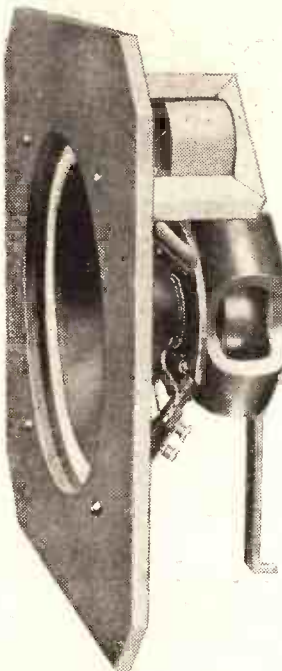
GRAHAM FARISH, LTD.

This enterprising firm makes the radio exhibition an opportunity to introduce a number of attractive new lines. First there is the "Litles" bakelite dielectric condenser which is similar in design to the condenser Graham Farish, Ltd., have always sold in quantity to set manufacturers.

It has been slightly modified to give an increase

(Continued on next page.)

CLEAR AS A BELL



The Edison-Bell permanent magnet moving-coil speaker.

principle and floats tell you to what extent, if any, the cell has run down.

A FINE FRAME



The "Elex" Frame Aerial is of the dual range variety.

"P.W.'s" SPECIAL EXHIBITION REVIEW

(Continued from previous page.)

in efficiency and an elimination of unnecessary parts. The "Litlos" is also available in differential form. Another Graham Farish line that will appeal to constructors is a spaghetti resistance made of the finest nickel chrome wire, of the largest size consistent with the various values. Further, Graham Farish, Ltd. now have an L.T. transformer that is to be offered at an extremely low figure and a competitively priced L.F. choke. Four-pin anti-microphonic valve holders, a push-pull switch with a bakelite moulding and terminals are included among other lines.

S. G. HEYBERD & CO., LTD.

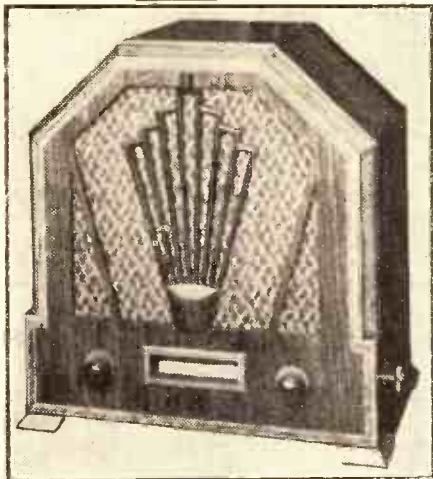
Coincident with the opening of the show at Olympia Heyberd's are making a fine gesture of confidence in their own productions by the announcement of a guarantee of three years against breakdown with all the units shown.

All radio enthusiasts should make a point of examining the Heyberd "all-electric" units, for these are indeed of notable construction, and incorporate many points of interest.

For instance, there are silver-embossed control switches. When these are operated the words "on" and "off" automatically appear in appropriate apertures where they can clearly be seen.

Built in metal cases having bakelite panels and pilot lamps, these Heyberd all-electrics employ Westing-

SENT FROM COVENTRY



A product of that vast G.E.C. factory at Coventry—the Geophone All-Electric S.G. set. It is particularly handsome though surprisingly low-priced.

house dry rectifiers. For the benefit of constructors, numerous kits are displayed, and the three years' guarantee applies also to these. The units are ready assembled in metal cases with bakelite panels and only require wiring up. Simplified point to point diagrams are supplied.

The D.C. mains unit kit is assembled in a metal case large enough to accommodate a transformer and rectifier if and when the mains are changed to A.C.

IGRANIC ELECTRIC CO., LTD.

Chief interest will no doubt be centred in the new Igranic moving-coil speaker which sells at only 45s., and the set of coils for super-het. receivers.

Several Igranic components appear in completely remodelled form, notably their L.F. choke and grid leaks. And, of course, there are those very well-known Igranic honeycomb coils, and the type "J." L.F. transformer on view.

JACKSON BROS., LTD.

"P.W." readers must not fail to visit the J.B. stand, for here they will see the J.B. extender, which is a very fine component indeed.

And then there is a ganged condenser specially designed for use with the Varley Band-pass Coil, and a range of five types of enclosed ganged condensers that represent British radio engineering at its very best.

There is a new drum dial for use with ganged condensers arranged for easy fixing to baseboards and, of course, all the other and older members of the well-known and popular "J.B." family.

JEWEL PEN CO., LTD.

Some constructors' items of the smaller, but none the less essential character, such as switches and

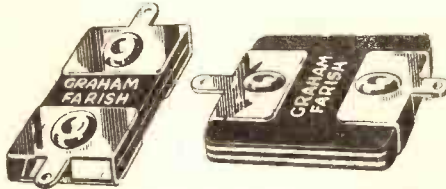
crystal detectors are far from being unknown to "P.W." readers.

For instance, there are the various R.D. switches of the two-point and three-point varieties and if, perchance, you have not met these before, it will be worth your while to inspect them.

R.D. is an abbreviation of "Red Diamond," the name by which these products are sold.

Other Red Diamond items include coil mounts and coil holders, terminal blocks, lead-in tubes, gram-

NEAT AND EFFICIENT



Just two samples of an attractive range of components to be seen in the Graham-Farish display.

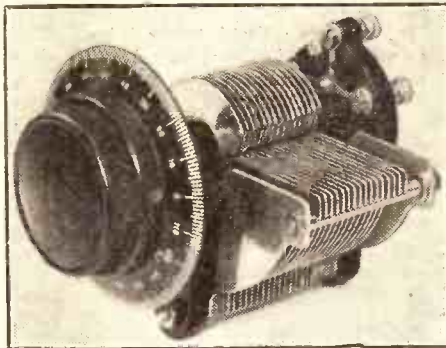
phone pick-up adaptors, loudspeaker attachments and flex connectors, and there are 'phonic connectors of three- and six-way types which will no doubt solve the problems of many amateurs.

LECTRO-LINX, LTD.

Among the new Clix products are to be found constructor kits comprising a special selection of Clix fittings for set builders. L.T. spade terminals, wander plugs, engraved sockets, etc., are included.

And Lectro-Linx have an almost bewildering display of new terminals, accumulator and anode connectors, etc., but although these items are many in

AN EXCELLENT EXTENSER



There are several distinctive points of design in the Formq Extenser which make it well worth very close inspection.

number it cannot be said that any one is superfluous.

One picks up each in turn, marvelling at the essential usefulness of it, and wondering why "nobody thought of a thing like that before!" The Lectro-Linx stand is certainly one over which constructors should revel.

LISSEN, LTD.

Lissen H.T. batteries are being drastically reduced in price and these are, of course, prominently dis-

A GUIDING LIGHT



The Heyberd all-electric mains unit has a pilot lamp and switches which automatically indicate their positions.

played. In addition, there are Lissen valves and components together with various sets, loud speakers,

etc., well worth the allocation of some time during your tour.

W. & T. LOCK, LTD.

The Beaufort radiogram cabinet, and cabinets for transportable sets, and loud-speaker cabinets in various finishes. There is one Lock receiver cabinet which is a decidedly novel and attractive breakaway in that it has tapering ends and an ebonite base. Certainly those constructors who are desirous of giving their sets both an original and a professional touch should not miss this stand.

LONDON ELECTRIC WIRE AND SMITHS, LTD.

More familiarly known by the abbreviation of "Lewcos," these people are featuring their super-het. coils, although you will also see POPULAR WIRELESS P-V and P-J coils.

Also, take note of the new Lewcos single and flex-tinned copper braided wire.

An important new Lewcos item is a screened dual-wave hand-pass coil which has an easily "gangable" switch. There is also a suitable H.F. inter-valve coil for use in conjunction with this. The hand-pass coil itself is constructed in a "V" manner, the two sections being disposed similarly to the cylinders of a "V" twin motor-cycle engine.

LOTUS RADIO, LTD.

A miniature differential condenser in two capacities, "Lotus" wall jacks, Lotus single-coil block with terminals, Lotus plugs, Lotus jack switches, anti-microphonic valve holders, and an entirely new Lotus disc drive (for all types of variable condensers).

These are only a few of the many new Lotus components shown. Among the other and larger items is

THE GREAT LITTLE "J"



The type "J" Igranic L.F. transformer may be small in size, but it can hold its own against many of the bigger and higher priced fellows.

a new ganged condenser obtainable in two-, three- and four-ganged types, which are claimed to have accuracies of 5 degrees between each unit.

Again, there is a complete screened coil which is astatically wound, the long and short waves being accommodated on separate formers. Accurate matching and a switch having a silent operation are other features of this component. Constructors should make certain that they inspect the Lotus display, for it embodies one of the season's most important ranges of new radio products.

MAGNAVOX (GT. BRITAIN), LTD.

An extensive range of moving-coil loud speakers of attractive appearance and low prices. Besides cabinet models there are chassis types for constructors.

Attention should also be paid to the "Mershon" high-voltage type electrolytic condenser. While the drawback of a large number of the condensers operating on the electrolytic principle is that they cannot stand up against anything but a low voltage, the "Mershon" is one of the very few that do not suffer from this limitation.

NATIONAL ACCUMULATOR CO., LTD.

The majority of the National accumulators are fitted with the well-known "tell-tale" device which indicates accurately the state of charge of the cell. Even the glass high-tension accumulators made by this company now embody this extremely useful arrangement.

The H.T.'s have only two floats instead of the three as with the L.T., one float being a charge and the other a discharge indicator.

National are also showing jelly-acid types of accumulators for portable receivers and L.T. accumulators fitted with moulded composite containers, but, of course, these do not include the "tell-tale" device.

(To be concluded.)

Next week's "P.W." will be another greatly enlarged Special Exhibition Number. Order your copy now and avoid disappointment.

FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found-?



THE "OSRAM FOUR."

ABOUT six weeks ago, from the time you will be reading these words, I spent a day up at Coventry, the home of the G.E.C., or, at least, one of their homes, for they have seven or eight huge factories spread around the country.

But they make most of their wireless sets and accessories at Coventry. And their premises there are rather more than a factory; indeed, they resemble a large industrial estate.

CONVENIENT CONTROLS



The tuning and other controls are operated from the sides of the set.

There are huge workshops, chimney stacks, power plants, etc., but, in addition, there are whole streets of nice houses rented by the G.E.C. to their fortunate employees, and vast playing fields, sports pavilions, and golf courses, where these same workpeople can enjoy themselves.

Scrupulous Supervision.

You cannot go round the whole of the works in one day, but I was able to see most of the processes involved in producing the "Osram" Four (the new Music Magnet). And it was an extremely fascinating experience. Masses of the rawest of raw material, crude and rough in appearance, but of carefully tested quality, were fed into an orderly sequence of great machines to be diverted at intervals for handling by smaller, refining appliances until, at last, the finished product began to reach its polished completion.

And everywhere the most scrupulous supervision by skilled examiners to ensure that not the slightest flaw was allowed to creep in.

The first thrills and wonderment at witnessing this whirl of scientific mass-production had hardly subsided when a crate arrived at the "P.W." office contain-

ing one of the very instruments I had watched being made—an "Osram" Four complete with an A.C. Conversion Kit. I won't say that the fact that I had mingled with a proportion of the five or six thousand men and women who had directly and indirectly contributed to its construction, and had viewed the colossal machines delicately hewing out the hundreds of required component parts, prejudiced my tests of the set, but they certainly did make them more interesting.

And I can say right away that it is my considered opinion that the "Osram" Four is an excellent receiver. It is easy to handle and it pulls in stations by the dozens. There is ample selectivity for the separation of the most forceful locals and the fidelity of reproduction does justice to the best of speakers.

It is a kit set; that is to say, it is supplied as a set of parts for home assembly. But its assembly is a very simple business, for a greater part of it is already done. The cabinet is supplied and is of handsomely polished walnut and is a fine-looking piece of work.

Simple To Assemble.

The "Osram" Four is a kit that anyone should be able to make up without the slightest difficulty, and the result is a receiver that has every appearance, both internally and externally, of a first-class commercial production.

As it stands it comprises a two S.G. battery set, but there is a conversion kit available in the form of an all-power unit which transforms the "Osram" Four into an all A.C. set (this kit can also be applied to the existing "Music Magnet").

As an A.C. set the "Osram" Four is stable, hum-free and in every other way entirely satisfactory both on radio and with a gramophone pick-up for which provision is made.

I would have liked to have been able to give more details regarding this most attractive proposition, but I fear space considerations forbid. However, those interested will be able to obtain plenty of the appropriate literature from the G.E.C. themselves.

TWO ATLAS COMPONENTS.

There is some fine gear originating at the Atlas Works, Old Trafford, Manchester, these days. For instance, there is an Atlas High Frequency choke, the type of article the non-technical enthusiast might think is a pretty simple sort of thing to produce. But this is very far from being the case, and there are wide differences of efficiency obtaining between the various chokes that are on the market.

However, the Clarke's Atlas H.F. choke is definitely good, and can be used without qualms in the most critical position that H.F. chokes have to grace in modern sets.

For instance, it can figure in the anode circuit of an S.G. valve having a tuned grid coupling following it, in which capacity it functions perfectly. As a matter of fact, I

PLEASE NOTE

Manufacturers and traders are invited to submit radio apparatus of any kind for review purposes. All examinations and tests are carried out in the "P.W." Technical Department, with the strictest of impartiality, under the personal supervision of the Technical Editor.

We should like to point out that we prefer to receive production samples picked from stock, and that we cannot in any circumstances guarantee their return, as it is our practice thoroughly to dissect much of the gear in the course of our investigations!

And readers should note that the subsequent reports appearing on this page are intended as guides to buyers, and are, therefore, framed up in a readily readable manner free from technicalities unnecessary for that immediate purpose.

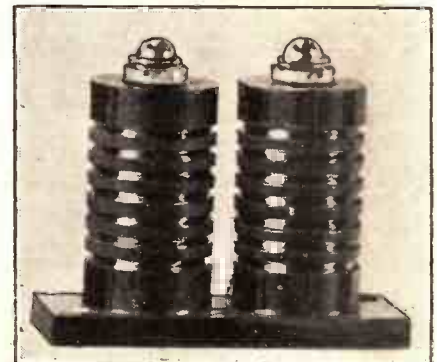
believe it was designed particularly for this job. Of course, if it is completely satisfactory for such work, it will do everything necessary anywhere that an H.F. choke is normally needed. The price of this choke is 4s. 6d., and the accompanying photograph will give you a clear idea as to its construction.

The second Atlas component to which I want to draw your attention is a pentode output choke which, in its way, is equally attractive. It has a D.C. resistance of only three hundred odd ohms, while it will carry up to 60 milliamps of D.C. current and still retain an inductance of approximately 36 henries.

Has Six Tappings.

Its purpose is to take the place of a special transformer for matching a loud speaker to a pentode output valve. It is used as an auto-transformer and has no less than six tappings, enabling varying ratios to be obtained, and they are such that good matching is assured. The price of the component is 17s. 6d. plain, or 21s. shrouded. I have thoroughly tested this choke, and it has proved completely satisfactory for all the usually met valve and speaker combinations.

AN EFFICIENT CHOKE



This is the "Atlas" H.F. Choke.

THE "P.V." PLUS

(Continued from previous page.)

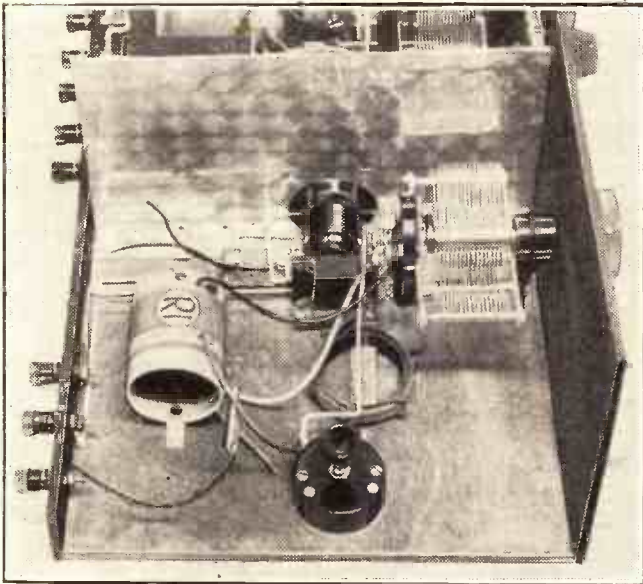
that a "break-up" yields only a few penn'orths of useful material.)

Secondly, a manufacturer has to lay down his plans months before his factory begins to go into production, and once this stage is reached it is extremely costly to alter his models in the slightest degree. On the other hand, the constructor is able to be right bang up-to-date, and can take advantage of the very latest developments in technique.

Mass Production Sets.

Thirdly, a factory product must be shaped in accordance with this or that system of mass-production—a very well-known designer, who works for one of the three greatest wireless corporations in the country, admits that he always reckons that his designs lose at least a quarter of their efficiency in production.

HIGHLY EFFICIENT H.F. STAGE



There is a simple but completely effective screen and adequate component space for the greatest amplification without losses. The Extenser simplifies the wiring and tends to increase the set's overall efficiency.

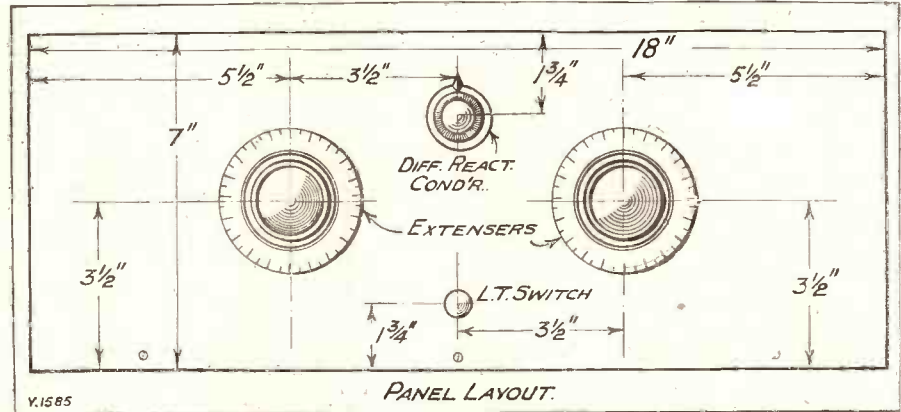
Fourthly, a manufacturer is compelled to make endless compromises, so that his models shall stand a chance of retaining some semblance of appeal for the largest number of customers for the greatest length of time; those who have sufficient skill, or, I must say to be blunt, common-sense to carry out the most trifling adjustments, must lose much because he has to make his gear absolutely "fool-proof."

Little Things that Count.

In short, he has to build down to the lowest intelligence, whereas we know, and so does anyone with the slightest knowledge of radio, that if a man has sufficient "savvy" to string a few wires on to a few components he can safely be depended upon to undertake those minor adjustments which so vastly increase the all-round effectiveness of a "hook-up."

Thus, in "P.V." Plus there are several coils having tappings to which various

NO WAVE-CHANGING IS NECESSARY



There is one Extenser for each of the two tuned circuits, so that you do not have to worry about wave-lengths. All the stations, long and ordinary waves are available merely by rotating the dials. The wave-changing is purely automatic.

clips can be connected, and those of you who build the set will discover how immensely these contribute towards getting "P.W." results, whatever your local conditions and needs. But even simple operations and adjustments of that nature are "taboo" with the commercial design!

By his very limitations of working the manufacturer is unable to place "hot-stuff" receivers of the calibre of "P.V." Plus before his public. However, he does remarkably well in the circumstances, and I raise my hat to this harassed struggler after impossible ideals.

And now to particularise about "P.V." Plus. This has an S.G. H.F. valve, used

Quoit windings and extenders, and that means a very efficient 200-2,000-metres wave-band coverage with no wave-change worries.

Probably the most important component is that high-frequency choke which is marked H.F.C.I, but every other part has its definite task to perform—there are no frills of dubious usefulness—so that if you are wise you will adhere rigidly to our list of recommended component makes.

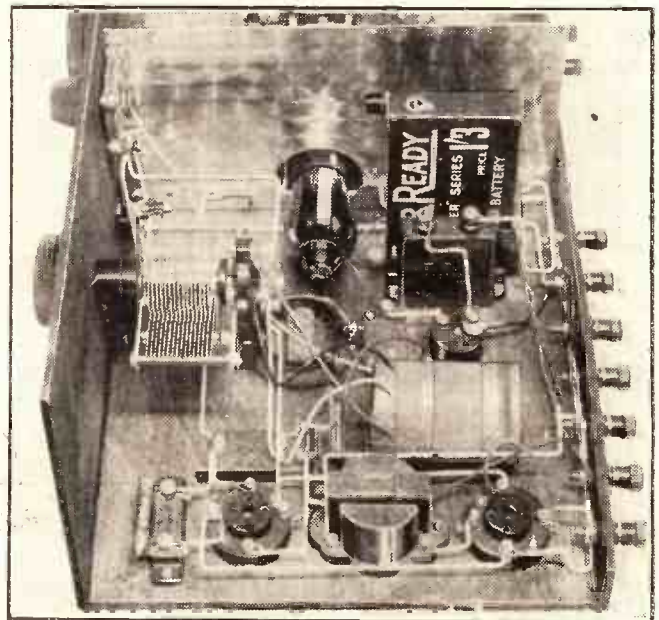
Inexpensive Coils.

I would advise you to purchase the "P.J." coils. They are quite inexpensive items, and the advantage of buying them is that all their leads will be made in the correctly coloured wires, so that it will be an easy task to connect them correctly into circuit.

We are rather proud of our colour scheme for coil connections—it makes the coils less costly than those which are fitted with terminals and definitely assists the constructor.

However, here are the specifications of
(Continued on next page.)

PLENTY OF "PUNCH" PROVIDED



The L.F. end of "P.V." Plus is designed for good loud-speaker volume at excellent quality. Note the P.J.3 coil and Long-Wave Coil Quoit.

in conjunction with an efficient two-band tuned-grid intervalve coupling. "P.V." differential reaction figures in the detector circuit, and there is a straightforward transformer-coupled L.F. stage.

The circuit is one which gives you good selectivity plus ample power to operate the largest loud speaker, and in average conditions you will be able to choose between dozens of British and foreign programmes.

Our new "P.V." coils are used in conjunction with Coil

THE big improvement in all-round signal strength I was bold enough to predict for the first fortnight of September, was kind enough to take place according to schedule, thus saving my reputation as a wireless prophet.

It is so far particularly marked upon the long wave-band, where stations are now coming in with splendid strength. One of them that merits special attention just now is Oslo, who is temporarily at any rate—and let us hope permanently—free from the heterodynes by Russian transmitters from which he has been suffering for some time past.

Motala's Queer Record.

Oslo is a fine station, and you can rely upon him for good programmes. He is therefore sure of a hearty welcome from listeners in this country on his return to the ranks of unheterodyned stations.

The two other Scandinavian long-wavers have also returned to form. In normal conditions Kalundborg is most reliable, but during the recent alleged summer he too often showed poor strength. You can turn to him now with complete confidence.

Motala is a station with a very curious history. When he first came into commission he was by far the most powerfully received Continental station in this country.

FOR practically every day during the last month, I have been taking observations of the strength and general character of W 2 X A D's transmission on 19.56 metres, and, as promised in last week's notes, I am giving a very much abridged form of the log as it now stands.

If there is someone else with sufficient patience and spare time to have kept a similar log, it would certainly be of great interest to compare the two.

I have called "100 per cent." the maximum strength that any telephony signal can safely reach on my receiver. "One hundred" per cent signified absolute discomfort on wearing the 'phones and a fairly severe degree of overload on the L.F. valve. The receiver, of course, is a straight detector and L.F., using indirectly-heated valves, an open aerial, and 100 volts H.T. on both valves—of the "H.L." class, by the way.

W 2 X A D Breaks All Records.

The day on which the test started was August 5th, when he is logged as 70 per cent at 9.30 p.m. B. S. T. With this one exception, all listening was done between 10 p.m. and midnight, rarely continuing after 11 p.m.

On August 12th I have logged 90 per cent, no fading; this applies each evening until the 19th, when he was again 90 per cent, but with a quick fade down to 20 per cent. On August 20th there was not the slightest trace of him at all! August 21st, 30 per cent, bad fading. August 22nd, 40 per cent. August 24th, 90 per cent, steady. August 26th, 100 per cent, fading to 50 per cent. August 27th, 90 per cent. August 28th, 80 per cent. August 29th, 90 per cent, fading quickly down to 60 per cent.



Some practical distant-programme notes compiled by a special contributor who nightly searches the ether in order to obtain really up-to-the-minute information for "P.W." readers.

At my place, which is roughly forty-five miles from Daventry and the best part of eight hundred from Motala, the two stations were received in those days at almost equal strength.

Then Motala began slowly to decline, though he still remained a first-rate all-the-year-round station until last year. Both in 1930 and 1931 Motala was an uncertain "small" station in the Midlands and the South of England, though in the North good reception was the rule rather than the exception. At any rate, Motala is coming in well now, and my log shows that he has scored full marks whenever he has been tuned in recently.

The improvement on the medium waves is confined mainly to the more powerful stations, which are showing fewer and fewer "off" nights. In other words, these stations are now becoming consistent and reliable on every night of the week instead of showing perhaps five nights of good reception, one of moderate, and one of weak in the seven days.

SHORT-WAVE NOTES



News and views regarding an exciting and fascinating wave-band.

By W. L. S.

On August 30th, 100 per cent was touched once or twice, but the average was 80. On August 31st a steady 90 per cent was logged, while on September 1st, I had to scrap all my previous ideas of maximum strength and describe him as 100 per cent plus! Never, since I have heard the Americans on any wave, have I heard such a perfectly tremendous signal coming across. With a further two-valve amplifier and a moving-coil speaker he was audible four or five houses away as early as 9.30 p.m. Later, when he actually increased slightly in strength, I had not the nerve to disturb the neighbours! His strength was greater than that of London Regional going "all out!"

What the Log Shows.

I am convinced that someone else will have logged September 1st as an outstanding night for short-wave long-distance work.

On the 2nd I still logged him as 100 per cent, but without the "plus!" On the 3rd he varied between 90 and 100 per cent again, while on the 4th he had dropped to

Stations which fall definitely into the very first-class just now are Brussels No. 1 and No. 2, Langenberg, Rome, Beromunster, Sot-tens, Frankfurt, Toulouse, and Turin. I would add Gothenburg, but that I have found him subject to fading once or twice recently.

A station that we have not heard for some time is Grenoble, which is now worth your attention. This station operates on 328.2 metres. He is supposed to share this wave-length with the Poste Parisien, but you will find times when only one of the stations is working. Grenoble is then an excellent transmission. If he is silent the Poste Parisien is usually good.

Look out for Lodz.

There is a newcomer that you should look for in the shape of Lodz, the Polish station which is working on 235 metres. His transmissions are still experimental, but I have heard him very well indeed once or twice lately, and he should be a good station this season if he has a chance, though there are times when the Polish stations suffer from jamming so general that it would appear to be organised.

Do not on any account neglect Budapest, Munich, Vienna, Milan, Strasbourg, Breslau, and Hörby.

70 per cent with an unusually bad fade. Strangely enough, the American "hams" could only be described as 5 or 10 per cent on this evening. It shows what a complete difference there can be between two wave-lengths so near together as 19 and 21 metres.

On September 5th he was back to his old style with 90 per cent and moderate fading.

Analysing these records, it is obvious that the month has been quite exceptional for this particular wave-length, although the other American stations have not been up to their usual standard. W S X K, for instance, has been quite mediocre, although W 2 X A F has certainly been "good." One cannot, however, describe the "100 per cent plus" logged on W 2 X A D in such a conservative term as "good!"

How Do You Find Them?

I did not describe him in "R" strengths, since they are misleading at the best of times and vary with the receiver used. The method of giving 100 per cent as the limit to which the receiver will go seems to be more successful for purposes of comparison, as, presumably, I should not have been far out, in proportion, if I had been using quite a different receiver.

Any comparisons of readers' logs with this would be welcomed, since it appears to be the only reliable method of checking up conditions in different parts of the country. I am continuing to log him throughout September, and anticipate that he will reach "zero" fairly suddenly before many weeks pass by.

Incidentally, on account of the good programmes put over, he has become quite a family institution now for "bedtime music," and his winter fade-out will be regretted.

DUX

THE TRANSFORMER FOR THE MILLION

R have designed and produced the "DUX" to provide the British Public with a thoroughly efficient transformer at the lowest possible price.

A TRIUMPH OF EFFICIENCY

"DUX" has won triumph after triumph in every test made by the experts of the Radio Press, who have published their reports in glowing terms of praise.

GUARANTEE OF PERFORMANCE

The full technical information available and given with the "DUX," exactly as with higher priced transformers, is the guarantee, before you buy, of efficient performance. Compare this advantage with uncertain results of the so-called cheap foreign article and inferior transformers.

ECONOMY with SATISFACTION

To-day, when economy dictates, "DUX" will give you certain satisfaction at a lower price. By asking for and insisting on "DUX" you will obtain the best transformer for your money—made by the firm famous for their transformer production since the inception of popular radio.

You are invited to make the acquaintance of "DUX" at the 1931 Radio Exhibition at Olympia:

National Hall, STAND 29, Ground Floor
Be sure you obtain Your Copy of the Fine Catalogue. It contains all R.I. New Productions



"DUX"
The Leader.

The "DUX" L.F. Transformer
Primary Inductance 30 henries
full Technical information and Diagrams
supplied with every "DUX"

6/9

ASK FOR "DUX" THE BEST BRITISH LOW PRICED TRANSFORMER

"Insulated Bridge" Mounting



THE famous "Insulated Bridge" mounting which has been successfully employed in Cossor Valves for Battery operation is also used in the A.C. Mains types. This system of construction permits microscopic precision in the

mounting of the electrodes. As a result absolute uniformity is ensured. Each individual valve conforms accurately to its rated characteristics thus ensuring maximum performance from every type.

exceptionally long life is assured.

Cossor A.C. Mains Valves are stocked by the best Retailers and are obtainable from all good Wireless Shops in types to suit every A.C. All-Electric Receiver.

— ensures maximum performance and length of life

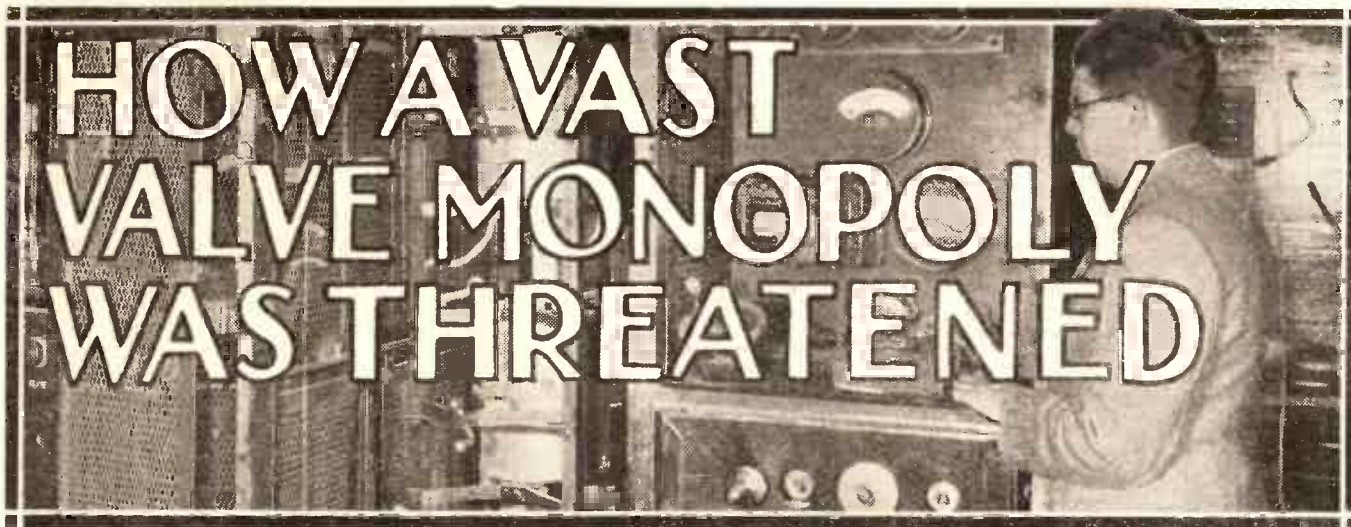
In addition the Cossor "Insulated Bridge" Construction imparts great mechanical strength. Rigidly locked in position top and bottom, the electrode system is proof against damage due to shock or blow. Thus

Folder No. L36 which gives full technical details of all types of Cossor A.C. Mains Valves will be forwarded post free on application.

COSSOR

A.C. MAINS VALVES

FOR ALL-ELECTRIC SETS



HOW many readers of this journal realise that in the background of their enjoyment of broadcasting has lurked for years the threat of a monopoly which would have been disastrous to wireless development?

Think of the wonderful efficiency of modern valves—and then think of what might have happened if there had been none of the healthy competition which exists to-day and which stimulates each manufacturer to outdo the others.

A Momentous Decision.

Yet ten years ago, stranglehold monopolies in the manufacture of wireless apparatus and valves were dreaded.

The matter is brought again into the limelight by a momentous decision which was recently delivered by the Supreme Court of the United States. This tribunal declared as invalid a valve patent which would have given to the General Electric Company of America a complete monopoly of the right to manufacture high-vacuum valves.

Similar corresponding patents have existed in other countries.

In this country the invention was known as the "hard valve patent" (No. 15788 of 1914) and great wireless and electrical companies trembled at the name. The British Government itself—as represented chiefly by the Post Office, the Navy and the Army—was violently concerned about the matter.

Everybody Concerned.

The Army alone had used hundreds of thousands of "hard" valves (i.e. valves with a high-vacuum) and might have been forced to pay enormous "damages" for the use of the patent. The Post Office might have been prevented from establishing its great chain of wireless communications. All sorts of things might have happened.

I say "might" because I cannot presume to know what the proprietors of such a fundamental patent might have done. I can only say that ten years ago

If the validity of a certain patent had been upheld, an American Company would have had a stranglehold on the valve industries of practically every country in the world. Here are some sidelights on this one-time threatened monopoly by a contributor who has been intimately connected with every phase of radio science since its earliest days.

BY A SPECIAL CORRESPONDENT.

this "hard valve patent" was feared by Government and private enterprise alike.

It loomed up as the greatest threat to competition. It barred the road to anyone else not only making modern valves but

selling sets with modern valves, or conducting any wireless telegraph service; it might have altered the whole course of broadcasting.

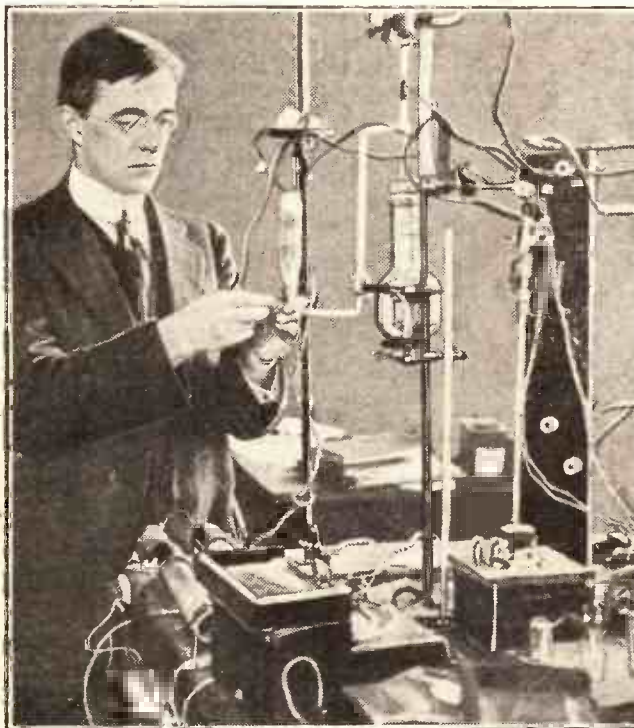
The Anti-Climax.

How we feared this patent in those days! And yet, after all this time, the invention is held by the Supreme Court of the United States to be no invention at all.

What exactly has all the fuss been about? Simply this: The three-electrode valve which we use to-day is a development of a three-electrode valve first patented in 1907 by Dr. Lee de Forest, the eminent American radio inventor. This valve was a vast improvement on the two-electrode valve the application of which to wireless was due to Fleming.

De Forest, in fact, invented the "grid." Just before the war inventors in different countries were realising the extraordinarily useful applications of this three-electrode valve, but the valves used were "soft"—a technical term which means that a certain amount of gas was left in the bulb.

HE DIDN'T BELIEVE IN "GAS"!



Dr. Irving Langmuir was the first man to realise that the less air there was inside the glass bulb of a valve, the better the valve would work.

Irving Langmuir.

It was, in fact, thought by most, if not all, research workers that gas was useful in the valve as it contributed to the sensitiveness of the device. Then, in the autumn of 1913, along comes Irving Langmuir, of the research laboratories of the General Electric Company of America, and says that these gas-containing valves are all wrong; that a better, more stable, more reliable valve is obtained by extracting every possible bit of gas from the bulb: by producing (as far as is humanly possible) a perfect vacuum inside the valve.

The current through the "tube" then consists solely of electrons—the particles of electricity shot off by the hot filament. When gas is present in the bulb the atoms of the gas help to produce the current and incidentally produce irregularity and all sorts of disadvantages.

(Continued on next page.)

HOW A VAST VALVE MONOPOLY WAS THREATENED.

(Continued from previous page.)

Langmuir was right. He revolutionised valve technique. Even though his American patent is now finally smashed, his great contribution remains. From a toy, the valve became the corner stone of modern radio.

The French military authorities were the first in Europe to appreciate the high-vacuum valve. England was years behind-hand.

First in the Field.

As a wireless officer in France I was using French valves in British sets till 1918, when British imitations began to be supplied. This tardiness has been made up for since. To-day British valves cannot be bettered.

After the war various companies wanted to use high-vacuum valves for commercial use. But what about Langmuir's patent? At that time I was patent adviser to a

and, at last, successful fight against the vastly more powerful General Electric Company which owns the Langmuir patent.

Sentimentally, I feel pleased at the result, especially as I have acted as British adviser to De Forest. But morally, one has to recognise Langmuir's great contribution to the art, and great contributions deserve great rewards. If Langmuir's patent had been upheld millions of dollars would have flowed into the coffers of the General Electric Company.

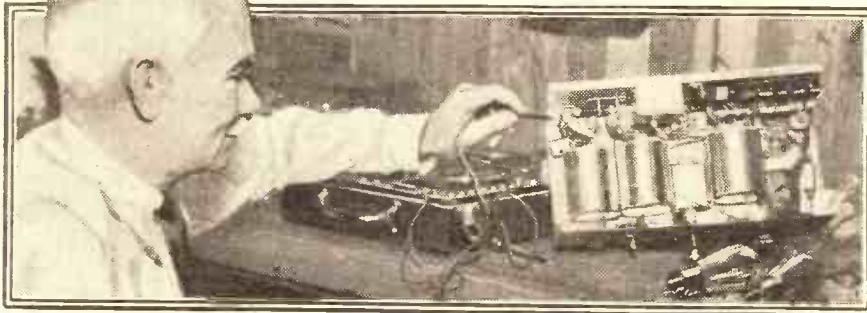
It Made All the Difference.

It may seem a little thing just to pump more air (and other gases) out of a bulb, but it revolutionised valve manufacture. The patent position has naturally always been rather vague.

When does a "soft" valve become "hard"? The American judges have decided that Langmuir merely applied already known methods of producing a high vacuum to an already known valve.

They say that in view of the work of previous scientists, e.g. Lilienfeld, "It required no inventive genius to avoid ionisation and secure the desired result by creating the vacuum in a De Forest tube."

INVENTOR OF THE VALVE GRID



Dr. Lee de Forest, the inventor of the three-electrode valve, at work in his laboratory. He is seen experimenting with a special short-wave receiver.

leading group and had to advise on whether the patent was valid or not.

It was a vital matter because all valves had to have a high vacuum. The various interests concerned—including Government departments—decided to go ahead and make and use "hard" valves.

A Fight to the Finish.

If they were attacked they would fight the patent to the death. It was my work to provide the ammunition for the commercial interests involved. I did so, and as adviser to various foreign concerns passed on the ammunition to help them fight the same battle in their own countries.

Germany, France and America were all "up against" the Langmuir patent. In England the fight to the finish never came off. The Mullard company, for whom I acted as patent adviser, was attacked on two valve patents, but the Langmuir invention was not one, and Mullard won handsomely.

In the States, however, a ding-dong battle has been going on for years. Colossal sums have been paid in fighting Langmuir's patent (No. 1,558,436, actually granted October 20th, 1925, although the invention dates back to 1913).

The De Forest Radio Company is the concern which has put up the gallant

In England, the patent law is different. It would have been interesting to have had a House of Lords decision on Langmuir's British patent. Possibly they would have supported it. Let us be thankful that the British valve and radio industries have avoided these stupendous legal battles and have adopted compromise.

And at a moment when his great patent had been defeated let us do homage to Langmuir as one of the world's greatest physicists who, patent or no patent, gave such a vast impetus to radio development.

ABOUT BATTERIES.

Some hints regarding the power supply for your set.

It is bad policy to allow your accumulator to run right down until it fails to work the set.

There is a simple rule by which you can arrive approximately at the number of hours service the battery should give before requiring re-charging. On the label on the side you will find a figure of the actual ampere-hours capacity, and to find the hours service, simply divide this by the total filament current taken by your set.

Thus a modern 3-valve receiver takes about half an ampere, so that a 30 Actual A.H. accumulator would do about $30 \div \frac{1}{2} = 60$ hours service. The total filament current for any other set can be found by adding up the individual filament currents as given on the leaflets supplied with the valves. Always keep the accumulator terminals clean, smearing them occasionally with vaseline, and wipe off any exuded acid. Have a look inside sometimes, and if there is an increasing amount of deposit at the bottom, it is probably due to an excessive charging rate. White patches usually indicate persistent over-discharging, so bear in mind the above remarks on this point.

H.T. Battery Pointers.

When buying an H.T. battery, remember that the rated voltage and its size are not the only matters calling for attention.

Important as these are, the question of "internal resistance" must not be neglected. A battery having a high resistance fault will spoil the reproduction of the best set, by setting up coupling effects between the various stages. This usually results in distortion.

A battery, otherwise quite good, may develop such a fault at any time, but cheap foreign makes are generally very prone to the trouble. In addition, the resistance may be variable, and then there are present also all sorts of crackling and frying noises, making the battery practically useless.

It is impossible to settle the question of "resistance" when buying it, but experience will serve as a useful guide coupled with the knowledge that this is a point to watch out for.

Finally, beware of batteries that show any signs of dampness or of coloured patches.

SOME ODDS AND ENDS OF RADIO INFORMATION

When using flex leads to carry the heater current in an all-mains receiver, be sure that it is possible to do this without dropping the heater voltage.

Where a large amount of heat has to be dissipated through a resistance a convenient arrangement is a resistance mat, these are provided with asbestos bases, to work in conjunction with D.C. mains valves.

The German broadcasting authorities are now experimenting with wave-lengths of 6.75 metres for television.

During the first half of 1931 the United States was linked by wireless to 10 European countries for regular programmes.

The Prince of Wales spoke twice to American audiences during the first half of 1931, once when in Buenos Aires and once from London.

Germany's great high-power station at Nauen has no less than 30 beam aeriels, and a total of twelve short-wave transmitters.

All the reception work for Nauen is done from a receiving station about 30 miles away, at the village of Geltow.

WIRELESS BATTERY SURPRISES EXPERT

“Almost unbelievable results”

AN EXTRAORDINARY CONTRAST

The writer of the following letter resolved to make a scientific test. He bought two H.T. batteries of different makes. Here, in his own words, is the remarkable result.

“Dear Sirs :


You may be interested in an experiment I am at present making, the details of which I will supply you with from time to time. In March last, I built Mr. James' magnificent set, the 'Super 60,' and I had a doubt as to what batteries to use. I finally decided on a 60-volt EVER READY and a 60-volt '————' my intention being to test them and then carry on with the best make. Day by day I have religiously carried out the tests, each day changing the batteries so that one took the full load every other day : (this in my opinion being the only method of testing accurately). The enclosed graph will show you the almost unbelievable results obtained so far. I am wondering if you have accidentally stored a mains unit in this battery ! The graph of the other battery I dare not send as it may get me into trouble with the makers. Sufficient to state that the EVER READY is worth well over double the price.”

Leonard Foley, Manchester.

(This letter may be inspected at the office of the Company).

This unsolicited testimonial confirms what the EVER READY Company has been telling the wireless public for years—that for elimination of distortion, for unwavering power and for long life, an EVER READY battery is better than any other battery on the market. This is no accident, but the result of the exclusive process by which every EVER READY battery is made. There is an EVER READY battery to power every kind and size of set, portables included. Write for free list to the address below.

THE EVER READY
CO. (GT. BRITAIN)
LTD., HERCULES PLACE,
HOLLOWAY, LONDON, N.7.



THE BATTERY
THAT LASTS A
LONG TIME

25 Fotos valves

For all
receivers
for all
pockets



It is no accident when your reception improves so noticeably upon installing Fotos Valves. Just cause and effect. The Fotos Concert Valves are made by valve specialists. Only materials of the finest quality are used and the design and construction are unsurpassed. The steadily increasing demand for this superb valve accounts for the low price at which it is offered.

FROM

5'6

Ask for
"FOTOS"
Accept no
other valve

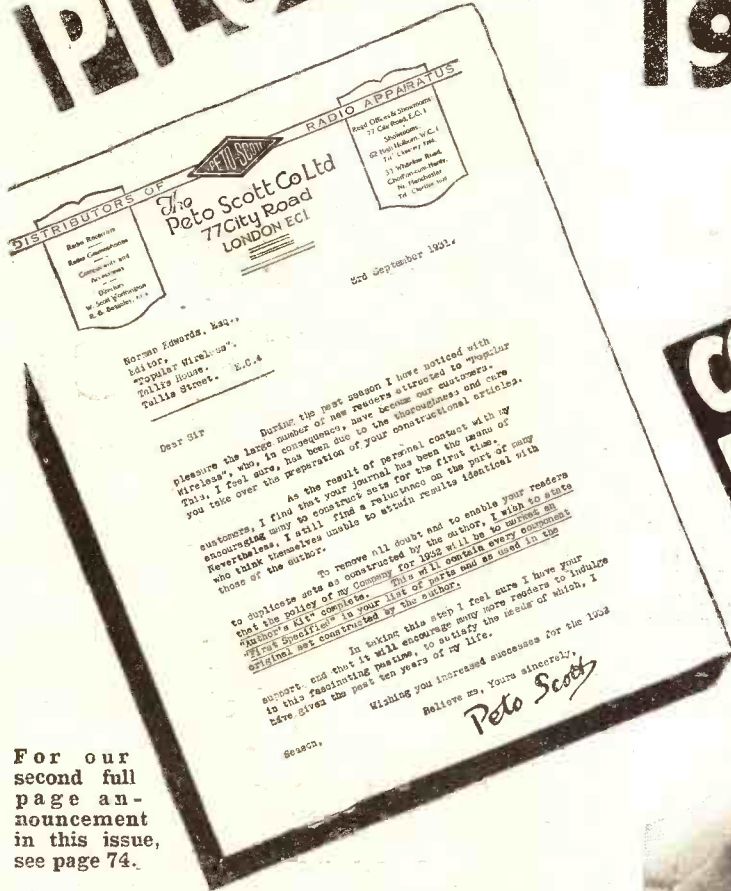
CONCERTON RADIO &
ELECTRICAL CO., LTD.,

256/7, Bank Chambers,
329, High Holborn,
London, W.C.1.
Telephone: Holborn 8667

fotos
CONCERT VALVES
Trade Mark
THE HEART OF EVERY SET

PILOT KITS

VITAL DECISION dictates 1932 POLICY



CONSTRUCTORS!
Build Authors' Sets with
100% SUCCESS

**START NOW
WITH THE
P.V. STAR**

For our second full page announcement in this issue, see page 74.

PILOT AUTHORS' KIT FOR THIS NEW SET
CHECK this list of parts with the Author's specifications, photographs and diagrams on pages 52, 53, 58 and 60.

THE "P.V. STAR"

- | | |
|--|--------|
| 1 Panel, 10" x 8", drilled and slotted | £ 4 0 |
| 1 Baseboard and panel supports | 2 0 |
| 2 Cydon -0005-mfd. drum drive, Extensors' type Ex. 275 | 1 17 6 |
| 1 Ready Radio -0001, -00013 or -00015-mfd. differential reaction condenser | 2 6 |
| 1 Ready Radio -0003-mfd. solid dielectric condenser | 3 6 |
| 1 Lewcos and 1 Telsen H.F. chokes | 9 9 |
| 1 Graham-Parish 2-meg. grid leak and holder | 1 6 |
| 1 Bulgin 600-ohm Spaghetti resistance | 9 |
| 1 Bulgin 25,000-ohm Spazbetti resistance | 1 6 |
| 1 Lotus L.F. transformer | 5 6 |
| 1 Telsen output choke | 8 0 |
| 1 Bulgin filament switch | 1 0 |
| 1 T.C.C. 01-mfd. fixed condenser | 3 0 |
| 1 Dubilier .001-mfd. fixed condenser | 2 0 |
| 1 Goltone -0003-mfd. fixed condenser | 1 0 |
| 1 Formo 1-mfd. fixed condenser | 2 2 |
| 1 Igranic 2-mfd. fixed condenser | 6 0 |
| 1 Bulgin fuse and holder | 1 3 |
| 1 Sovereign P.J.2 coil | 1 6 |
| 1 Sovereign P.J.3 coil | 2 0 |
| 2 Peto-Scott coil quitois | 1 0 |
| 4lb. No. 30 D.S.O. wire | 2 5 |
| 1 Parex screen, 13" x 8" | 2 9 |
| 2 Peto-Scott control discs | 3 9 |
| 3 Goltone crocodile clips | 4 |
| Flex. screws, wire, etc. | 2 6 |
| 1 Pair Peto-Scott swivel-jointed collapsible brackets. | |

KIT "A," Cash or C.O.D. £5 11 11

**C.O.D
CASH
H.P.
as usual**



- KIT "A"** Authors' Kit less valves and cabinet £5:11:11
CASH or C.O.D.
or 12 monthly payments of 10/3.
- P.V. STAR CABINET**, designed by Peto-Scott himself. £1 7 6
See text, as designed and supplied to "P.V." £1 19 0
- KIT "B"** Authors' Kit with valves but less cabinet £7:10:11
CASH or C.O.D.
or 12 monthly payments of 13/10.
- KIT "C"** Authors' Kit complete with valves and cabinet £8:18:5
CASH or C.O.D.
or 12 monthly payments of 16/4.
- Any parts supplied separately. We pay post charges on orders over 10/-

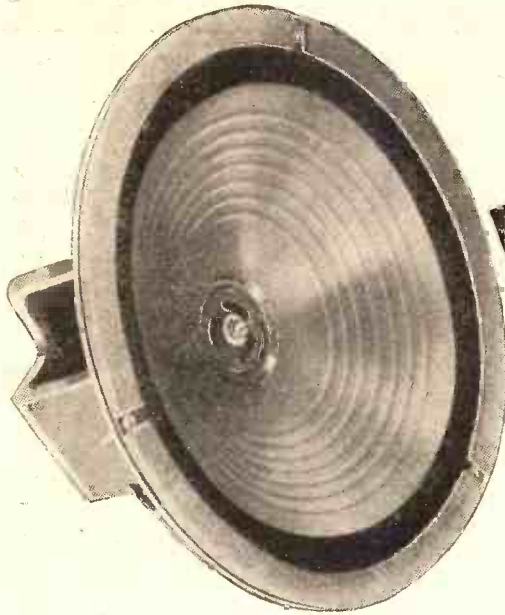
P.S. Of course, customers wishing to depart from the Authors' Kits may depend on the co-operation and advice of my technical staff in the choice of approved substitutes. Again, we shall be pleased to supply separately any part for the sets described whether specified or substitutes.

Send for Peto-Scott Radio Bulletin containing detailed Price List of Pilot Authors' Kits and all "P.V." Sets.

SEE AUTHORS' KITS BUILT AT OLYMPIA STAND 179 EMPIRE HALL (1st floor)

PETO-SCOTT

PETO-SCOTT CO. LTD. Head Office: 77, CITY ROAD, LONDON, E.C.1. Clerkenwell 9406. 62, HIGH HOLBORN, LONDON, W.C.1. Chancery 8266. MANCHESTER: 33, WHITELOW ROAD, CHORLTON-CUM-HARDY. Phone: Chorlton-Cum-Hardy 2023. NEWCASTLE, STAFFS: 7, ALBANY ROAD. Phone: 67190.



NEW R.K.'S

PRICES NOW FROM 3/6

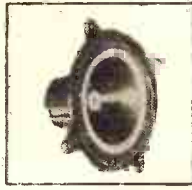
Minor Permanent Magnet Model—A moving-coil speaker to work from a small output valve. Capable of handling outputs up to 2 watts. Performance is comparable with the Senior R.K. Price £2-10-0.



Minor D.C. Model—Similar to permanent magnet Minor, but suitable for 200 volts mains field excitation. Price £1-11-6.



1931/2 Senior Permanent Magnet—Incorporates the highest grade cobalt steel magnet, and 10" corrugated cone. New Reduced Price £5-12-6.



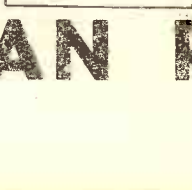
1931/2 Models. Senior A.C. Model—10" corrugated cone. Incorporates Westinghouse metal rectifier. New Reduced Price £7-15-0.



Senior D.C. Model—Similar to A.C. model, but without metal rectifier and suitable for mains field excitation. New Reduced Price £5-5-0.



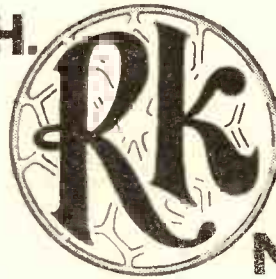
Minor Permanent Magnet R.K.—in fumed oak cabinet. Price £3-17-6. In special walnut cabinet, Price £4-4-0. Dimensions of cabinet 14" high, 13" wide, 7 1/2" deep.



R.K. reproduction is the ambition of every radio enthusiast. Now—that ambition can be realised. The 1931 range of redesigned R.K. moving coil speakers is released to the public!

In this new range, from the "Minor" D.C. Model at 3/6 to the "Senior" A.C. Model at £7.15.0, there is an R.K. to suit your purpose and pocket. Come and see the new R.K.'s at the **RADIO EXHIBITION, STAND NO. 21** or ask your dealer for a demonstration.

B.T.H.



MOVING COIL LOUDSPEAKERS



THE EDISON SWAN ELECTRIC CO. LTD.
Radio Division
155 Charing Cross Road, London, W.C.2.
Branches in all the Principal Towns.

W.159

EDISWAN RADIO PRODUCTS



CLAPHAM AND DWYER, to say nothing of "Cissie the Cow."

OUR radio laugh? Surely it must have been our first audition, when we accepted the B.B.C.'s invitation to appear before the "mike." "Just come

DO YOU KNOW HER?



The well-known comedienne, Ivy St. Helier, who has put over many good broadcasts.

along in and sing," said an official. "But we can't sing," we answered, "we talk." "Well then, talk," said the official.

So we stood in front of the little box and talked our hardest and best, and since we had quite forgotten any preconceived ideas, said everything that came into our heads. We had not been at it long before the official came back and muttered meaningly, "That's quite enough of that, gentlemen. Thank you very much. You'll hear from us later." And very glad we were to finish, too. We were nearing the end of our tether. There was not much more left to say.

At any rate, we thought that the B.B.C. would let us go without comment. Instead we were booked immediately. And we got over!

IVY ST. HELIER, the famous comedienne.

Nowadays, one rarely gets a really funny moment in the studio. The artiste is able to work under conditions of peace and security. Unlike the conditions prevailing four or five years ago when I first commenced broadcasting.

Apparently, I was singing too much in a

* ~ ~ ~ ~ ~ *
 Humorous incidents often occur in the wireless studio, and in this Symposium Harold A. Albert has asked famous wireless personalities to tell "P.W." Readers about their laughable moments.
 * ~ ~ ~ ~ ~ *

treble tone for the microphone, and as I sat at the piano men were coming and going, putting screens around me and taking them away. A miniature army of furniture removers at work around me as I was trying hard to entertain listeners. Most disconcerting!

STERNDALE BENNETT, the well-known entertainer.

My funniest radio experience—though it did not seem at all funny at the time—occurred only a few weeks ago. Shortly before I was due to make a broadcast. I went to see my wife who had just had an operation and was regaining consciousness as I saw her.

I suppose that in bending over the bed I inhaled some of the ether fumes that were still about, and that they "gassed me." At any rate, I was all right at the time, but shortly before I reached Savoy Hill my

head swam, my legs could hardly support me, and I feared that for once I should have to let listeners down.

How I did get through my broadcast, goodness only knows, for I was violently ill no fewer than seven times, and staggered

A GOOD TURN



Sterndale Bennett is a great favourite with listeners. He relates a particularly queer experience.

out of the studio like a drunken man. Afterwards, I went to my club and slept like a log for an hour and a half. Let me hope that my broadcast did not make listeners do the same.

ELIZABETH POLLOCK, who gives impersonations of other stars.

I often suffer from nervousness during broadcasts, and one day not so very long ago decided that I would take a little brandy in a medicine bottle along with me to the studio, to drink just before my broadcast.

At the proper time I secretly seized the neck of the bottle and tiptoed from the studio, intending to swallow the brandy in the passage where no one could see me. I closed the studio door, I looked this way and that, and then, with great caution produced the bottle and raised it to my lips. And somehow it slipped and fell with a terrific crash on the floor, there to break into little pieces whilst the brandy flowed in all directions!

Since I was nervous before this embarrassing accident, you can imagine

(Continued on next page.)

TWO OLD FAVOURITES



We are all familiar with the incorrigible Clapham and Dwyer who consider their first radio rehearsal provided a great laugh.

MY RADIO LAUGH

(Continued from previous page.)

how terrified I was now. There lay the brandy uselessly, there was I weak at the knees with "mike fright" and humiliation—and at that very moment an important member of the B.B.C. staff came into view.

Fortunately, the story has a happy ending. The official listened to my excuses and lamentations, and then took me down to his own little room where he produced a bottle of brandy of first-rate vintage. So I choked and spluttered over this, and eventually went upstairs to make my broadcast feeling perfectly at ease.

Such is the dreadful story of my one and only bout of secret brandy drinking!

LEONARD HENRY, the wireless comedian.

Oh, dear, dear, yes—looking back in my anecdotalage, I can recall many a radio laugh. Oh dear, dear, yes, they were the days.

The time when we celebrated New Year's Eve with real whisky in the studio and made merry whilst millions listened—yes, my son, this was before the time of television—and the day when I played in a "meaty" drama and addressed the heroine as Lazy Mary, instead of Lady Mary. He, he! I was a one I was!

And there was the occasion when I wanted to burst a bagpipe and one of the

ELIZABETH POLLOCK



A very clever impersonator and entertainer who never fails to please many listeners.

studio officials came up with a compression cylinder of such power and force that it sent the curtains of the studio flying over our heads and the dresses of the ladies over theirs. Ah, ha! Ah, ha—they were the days! Pass me my cough drops!

N.B.—but this is not how I shall write my reminiscences—if any.

MONA GREY, the child impersonator.

I was once struck on the head by a conductor's baton, but this was not at all funny to myself, although it supplied a radio laugh to the other people in the studio. Rather let me recall the time not unconnected with broadcasting when I was

due to give a provincial broadcast and was rehearsing with my partner in the coffee-room of our hotel.

I learned afterwards that during the whole time this was going on, a crowd of domestics gathered outside the door and listened to my childish voice. "And if I had that child," said one of my unseen audience, "I know what I would do with her!"

LEONARD KEMP, the lunchtime orchestra leader.

During the hours that we are broadcasting, people seated at the tables adjacent

FULL OF FUN



Radio comedians are always popular, and Leonard Henry, who you see here is certainly no exception to this rule.

to my orchestra are usually polite enough to keep quiet. One day, however, I noticed that a very garrulous old lady sitting at a table very close to the microphone was talking at the very top of her voice, and, in all probability, spoiling for wireless listeners the entire programme.

But what was to be done? One cannot ask a lady not to talk, and I was at my wit's end. Until there came a telephone call from an indignant listener requesting us to play Mendelssohn's "Songs Without Words." So this we did with many a significant glance at the talkative one. It silenced her.

THAT LIGHT MUSIC



Leonard Kemp whose orchestra broadcasts during the lunch hour. He once had a serious problem of "interference" to deal with!

NORAH BLANEY, the popular singer.

I often laugh when I think of the song that I forgot—though I did not laugh at the time. I sang the first verse perfectly,

MONA GREY



Nearly everybody must have heard Mona Grey at some time or another. She does those exceptionally clever child impersonations.

and was half way through the chorus when I stopped.

My memory unaccountably gave way. Although I had sung the tune a score of times before, I found it impossible to remember the words that followed.

The funny part of it was that I apologised to the "mike" and began again. And then, for the second time, came that unaccountable hiatus.

The people in the studio smiled helpfully. My face was such a picture that I was

A POPULAR TURN

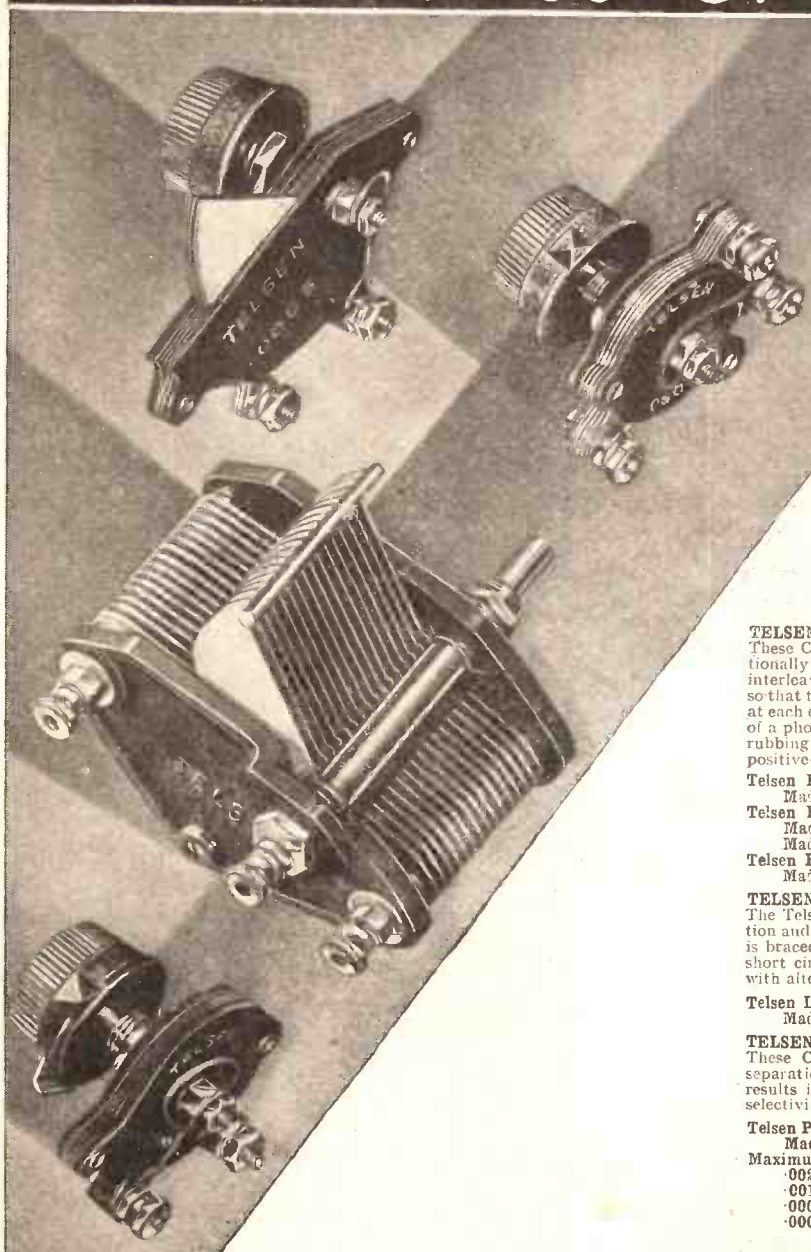


Norah Blaney tells you about a very embarrassing moment. She forgot the words when she was in the middle of a song!

fervently thankful that the microphone transmitted only sound. I was about to begin for the third time, when the Announcer came to the rescue and suggested that I should sing something else. I did so, and finished this other song without a hitch. And five minutes later, as luck would have it, the missing words returned to me.

DON'T MISS YOUR "P.W." NEXT WEEK. IT WILL BE ANOTHER GREATLY ENLARGED EXHIBITION NUMBER.

The choice of experts



TELSEN BAKELITE DIELECTRIC CONDENSERS

These Condensers are of a new and improved type, and of exceptionally compact dimensions. The moving vanes, which are interleaved with finest quality bakelite, are keyed on to the spindle so that they cannot be pushed out of line, and there is a definite stop at each end of the travel. The connection to rotor is made by means of a phosphor-bronze pigtail, so that there is no crackling due to rubbing contacts. The connection to the stator vanes is absolutely positive—a very important point.

Telsens Bakelite Dielectric Differential Condenser—

Made in capacities of .0003, .00015, .0001. Price

Telsens Bakelite Dielectric Reaction Condenser—

Made in capacities of .0003, .00015, .0001. Price

Made in capacities of .00075, .0005. Price 2/8

Telsens Bakelite Dielectric Tuning Condenser—

Made in capacities of .0005, .0003. Price 2/-

2/-

TELSEN LOGARITHMIC VARIABLE CONDENSERS

The Telsens Logarithmic Variable Condenser is of robust construction and high insulation. The H.F. losses are very low and the frame is braced at three points, so that the possibility of distortion and short circuiting is negligible. Substantial terminals are provided with alternative connection to the stator.

Telsens Logarithmic Variable Condenser—

Made in capacities of .0005, .00035, .00025. Price

4/6

TELSEN PRE-SET CONDENSERS

These Condensers have been carefully designed to give proper separation of the vanes when the adjustment is unscrewed, which results in a very low minimum capacity, giving a wide range of selectivity adjustment when used in the aerial circuit.

Telsens Pre-set Condenser—

Made in capacities of :

Maximum capacity	Minimum capacity	Price
.002	.00025	Price
.001	.00004	Price
.0003	.000005	Price
.0001	.000001	Price

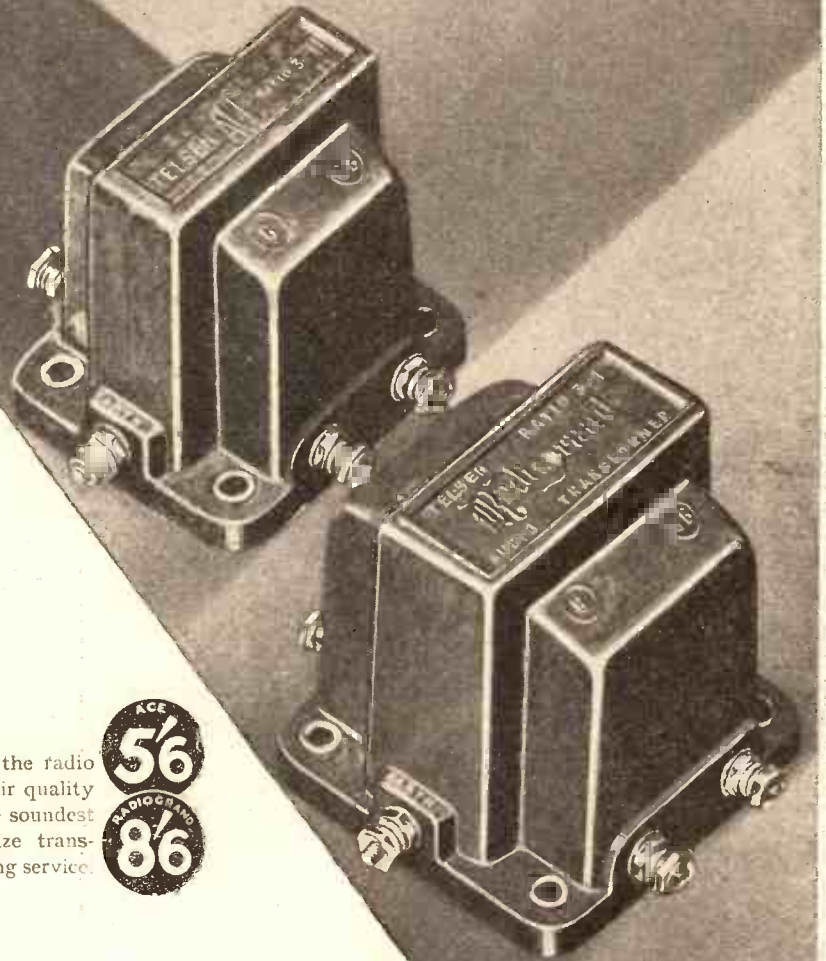
1/6

OLYMPIA
National Hall
Ground Floor
STAND 19

TELSEN

THE SECRET OF PERFECT
RADIO RECEPTION

Telsen's first claim to fame



TELSEN L.F. TRANSFORMERS

Telsen transformers have achieved fame in the radio world on account of the high standard of their quality and performance. Designed and built on the soundest engineering principles, these robust, full-size transformers will give not only efficient but enduring service.



TELSEN L.F. TRANSFORMERS

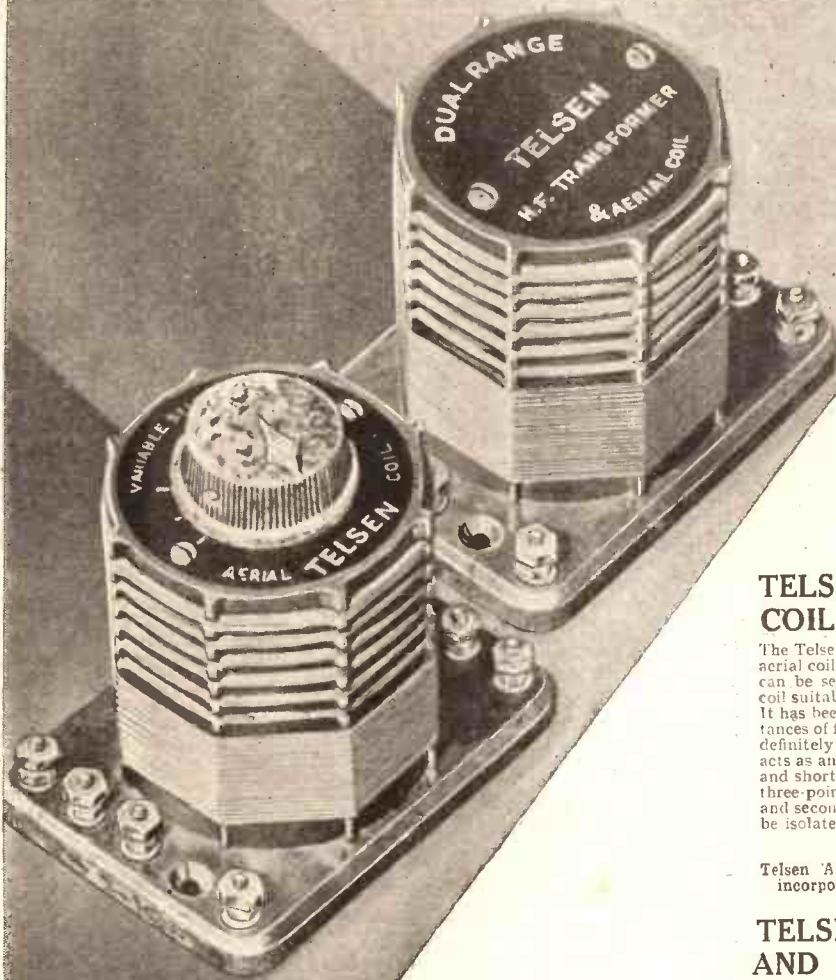
Telsen "Ace" Transformer, Ratios 3-1, 5-1 ..	Price 5/6
Telsen "Radiogrand" Transformer, Ratios 3-1, 5-1 ..	Price 8/6
Telsen "Radiogrand" 7-1 Super Ratio Transformer ..	Price 12/6
Telsen Intervolve Transformer, Ratio 1.75-1 ..	Price 12/6

TELSEN

THE SECRET OF PERFECT
RADIO RECEPTION

DON'T FORGET
STAND 19

One of Telsen's latest achievements



TELSEN DUAL-RANGE AERIAL COIL

The Telsen Aerial Coil is the very latest development in dual-range aerial coil design. It incorporates a variable series condenser which can be set to give any desired degree of selectivity, making the coil suitable for all districts whatever reception conditions may be. It has been tested in various parts of the country, and down to distances of five miles from Regional stations a single-tuned circuit will definitely separate the Regional programmes. This adjustment also acts as an excellent volume control, and is equally effective on long and short waves. The waveband change is effected by means of a three-point switch. A reaction winding is provided, and the primary and secondary windings are separated so that the aerial circuit can be isolated in mains-driven or screened-grid receivers.

Telsen Aerial Coil with Variable series Condenser incorporated

76

TELSEN H.F. TRANSFORMER AND AERIAL COIL

This Coil is primarily designed for H.F. amplification in conjunction with screened-grid valves. It is arranged so that it can be connected as a tuned-grid or tuned-anode coil, or alternatively as an H.F. Transformer.

It also makes a highly efficient aerial coil where the adjustable selectivity feature is not required. A reaction winding is incorporated. When used as an H.F. Transformer the wave-change is effected by means of a two-pole (four-point) switch. When connected otherwise a three-point switch should be used.

Telsen H.F. Transformer and Aerial Coil

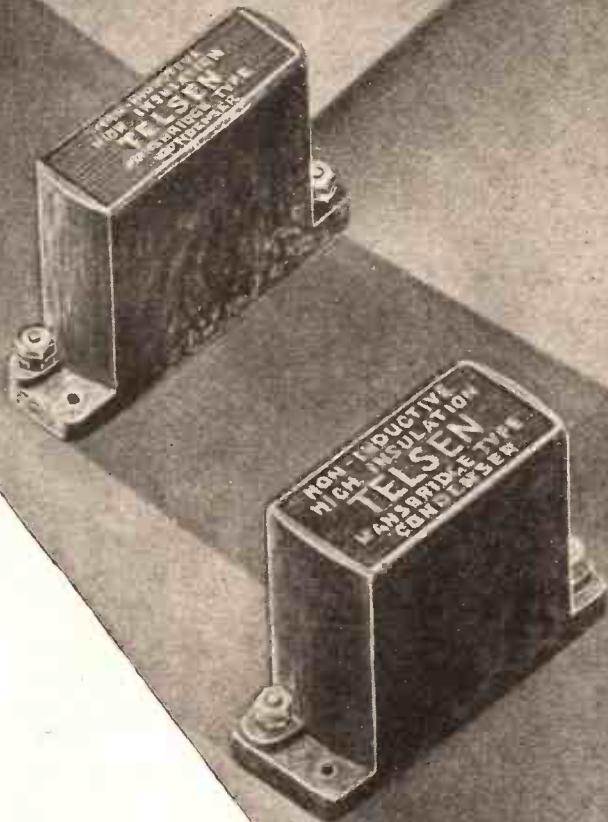
56

SEE YOU ON
STAND 19

TELSEN

ALL BRITISH RADIO COMPONENTS

Another Telsen achievement



TELSEN MANSBRIDGE TYPE CONDENSERS *From* **16**

Telsen have installed the most advanced plant in the world for the manufacture of Mansbridge Type Condensers. Only genuine Mansbridge foil paper and the finest linen tissue are employed in the exclusive method of manufacture. Every Telsen Mansbridge Type Condenser is hermetically sealed from the atmosphere and Post Office standards of insulation are adopted throughout.

The preliminary research, the most modern plant in the world, the finest raw materials, the latest methods of manufacture, and the final test, all combine to give Telsen Mansbridge Type Condensers a high insulation through years of service with freedom from breakdown. The type of construction employed makes them genuinely non-inductive.

The following values are guaranteed within 5 per cent :

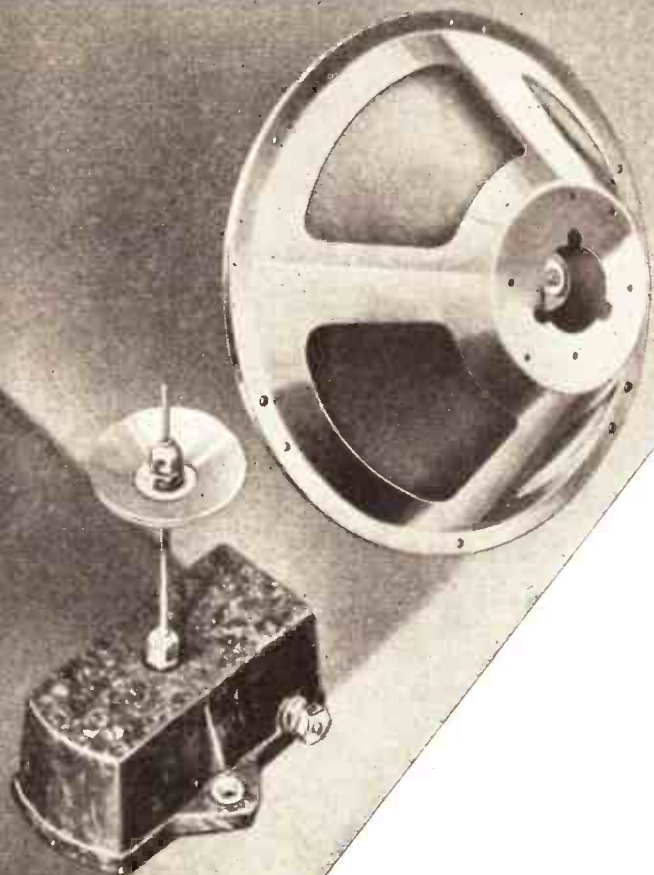
Cap. mfd.	500 Volt Test		1,000 Volt Test	
	Price		Price	
.01	1/6		2/6	
.04	1/9		2/9	
.1	1/9		2/9	
.25	2/-		3/-	
.5	2/3		3/3	
1.0	2/3		3/6	
2.0	3/-		5/-	

TELSEN

THE SECRET OF PERFECT RADIO RECEPTION

Our reputation stands on STAND 19

Telsen for better reproduction



TELSEN LOUD-SPEAKER UNIT

The Telsen Loud-speaker Unit is pleasing to the most sensitive ear. The deep notes of the bass, the brilliance of the soprano, and the crispness of diction are clearly reproduced without any distortion.

It employs cobalt steel magnets, and the detachable rod which carries the cone is fitted with cone washers and clutch. The entire unit is enclosed in a beautifully moulded bakelite dust cover.

Telsen Loud-speaker Unit Price

5/6

TELSEN LOUD-SPEAKER CHASSIS

The fully floating cone mounted on a flexible felt surround renders the Telsen Loud-speaker Chassis very sensitive, giving perfect balance of tone. It is unaffected by damp conditions because the cone material is practically non-hygroscopic. The Telsen Loud-speaker Chassis is substantially made and it is light in weight. Holes are provided for easy attachment to most of the popular makes of loud-speaker units.

The Chassis may be readily fixed to a baffle board or cabinet by three or more wood screws.

Telsen Loud-speaker Chassis Price

5/6

You've an
appointment on
STAND 19

TELSEN

ALL BRITISH
RADIO COMPONENTS

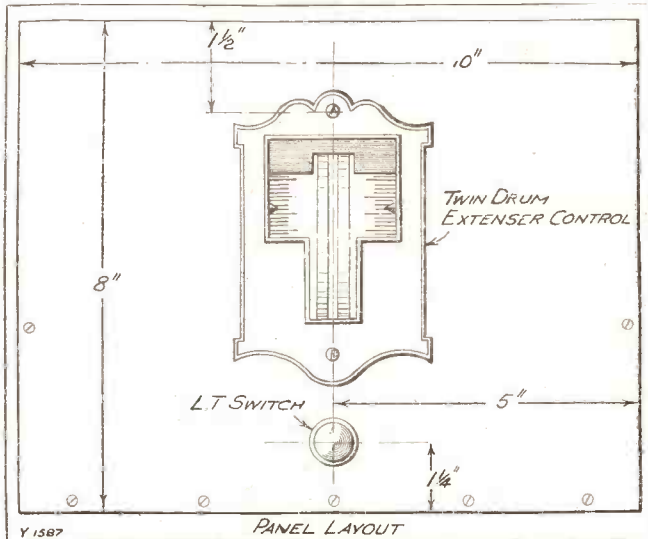
"P.V. STAR" is a receiver having all the advantages of a constructor design plus the controls and appearance of a first-class factory product. Naturally, such a wonderful combination is not the result of an application of existing methods, and so you find in this new "P.W." set several features that are entirely original.

I have already referred to these in a previous article, but only in a general manner ;

same circuit as that which figures in "P.V. Plus." There is an efficient screened-grid H.F. and one transformer-coupled L.F. amplifier. This is the most effective three-valve arrangement for selectivity, range and power.

A good loudspeaker performance can be guaranteed

SCIENTIFICALLY SIMPLIFIED



There are only two items on the front panel—an on-off switch and the station selector, and these are all that need concern the household in general.

the time has now come for more detailed descriptions. However, in the first instance you will probably want to know something about "P.V. Star" as a wireless instrument pure and simple.

Programmes in Plenty.

It incorporates almost identically the

unusually high degree of amplification in "P.V. Star," this has not been attained at the expense of stability. As a matter of fact, the set is so far removed from that deplorable "on the edge" condition that it will hold down with some of the least decoupled mains unit that have ever been made.

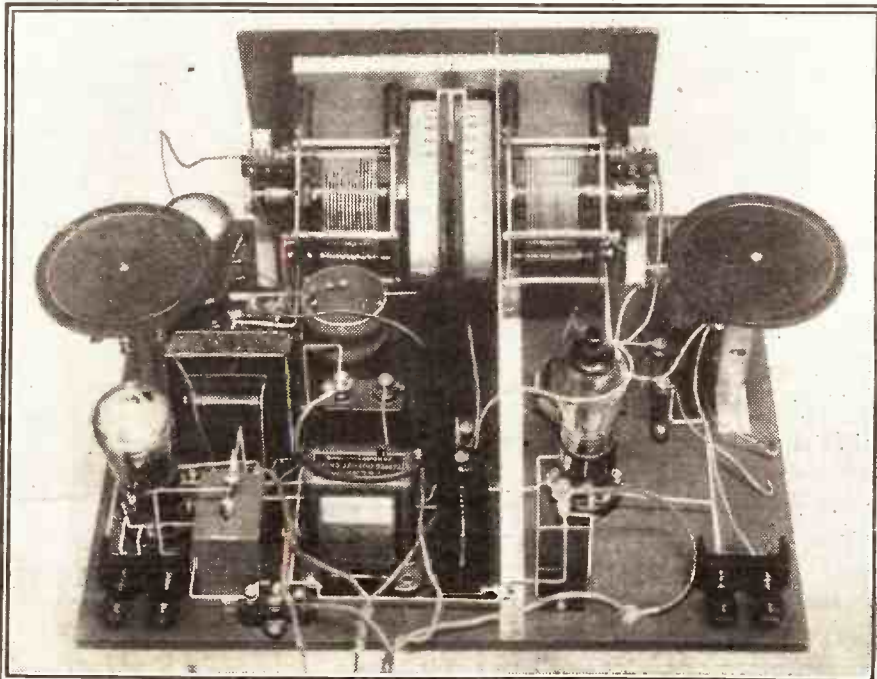
And, as in "P.V. Plus," provision is

under any local conditions, and on even less efficient sets of fundamentally similar calibre forty or fifty stations of real programme value have been recorded.

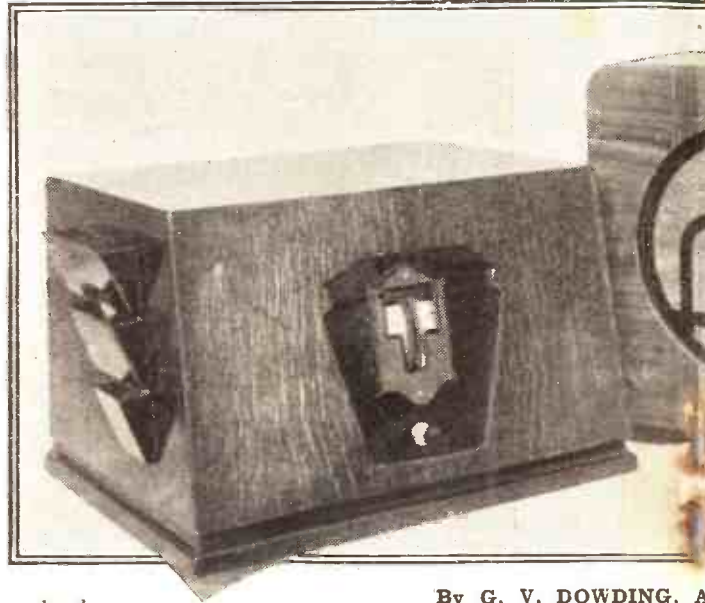
100% Results.

But although we have achieved an

COMPLETELY EFFECTIVE SCREENING



Although very powerful, "P.V. Star" is unusually stable, owing to it being possible to reduce the wiring considerably by using Extensers. Note the neat component layout, the single screen, and the side controls.



By G. V. DOWDING, A

A set that is superior in appearance and performance which includes several completely new structural receiver that is bristling with points—a set that has original ideas in it that

made for simple internal "hotting up" adjustments, so that individual constructors can be absolutely certain that they are getting 100 per cent results.

If anything, "P.V. Star" is a trifle more sensitive than "P.V. Plus," while it possesses every one, and a few more, of that other receiver's qualities. On the debit side it must be admitted that it is slightly more difficult to build and costs just a little more, although I fancy any impartial judge would find it hard to weigh up the pros and cons of the two.

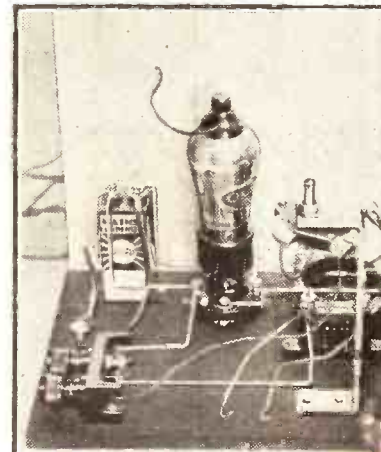
Side Control.

If I had to decide between them I would choose "P.V. Star," for I am convinced that the "extras" are worth every bit of the trifling added cost and time and trouble which they entail, and these I, fortunately, could well afford.

On the other hand, it is only fair to remind you that "P.V. Plus" is itself an outstanding proposition without peer in its class.

But I will cease making comparisons, for I am sure that you are all now able clearly to understand the exact status of our two "exhibition" sets, and the whys and wherefores which prompted them.

FULL-SCALE TUNING

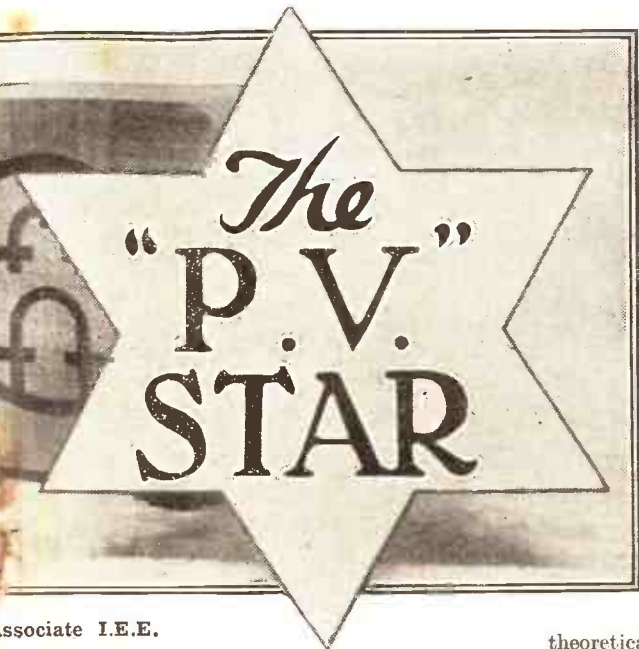


Note how conveniently the self-changer works. Not only are wave-change switches eliminated, but the mechanism is more efficient, and is more

See this on our Stand at Olympia

Many Unique "P.V." Features

A SET YOU'LL BE PROUD OF



associate I.E.E.

...ance to all others of a similar rating and technical features. "P.V. Star" is a set you can show your friends, knowing that it cannot be capped.

The most important feature of "P.V. Star" is the fitting of side controls for the definitely subsidiary adjustments. This scheme was originated in the famous "P.W." "Pop-Vox" set, but it reappears in this present design on quite new lines.

Instead of the side apertures framing conventional knobs, milled wheels unobtrusively protrude. These are not only vastly more accessible, but they are extremely pleasant to handle. The entirely inexperienced can get the closest possible settings with them.

NO SWITCHES



...inals of the Extenser are placed. ... but the wiring becomes decidedly easier to do.

not have to dip deeply into your pocket for them.

Actually, they have turned out so inexpensively and are such attractive variations from normal practice that we will probably be introducing them into quite a few of our future designs.

One of the "P.V. Star" side controls acts as a combined selectivity adjustment and

PROUD TO POSSESS

volume control, and it does these two jobs very efficiently.

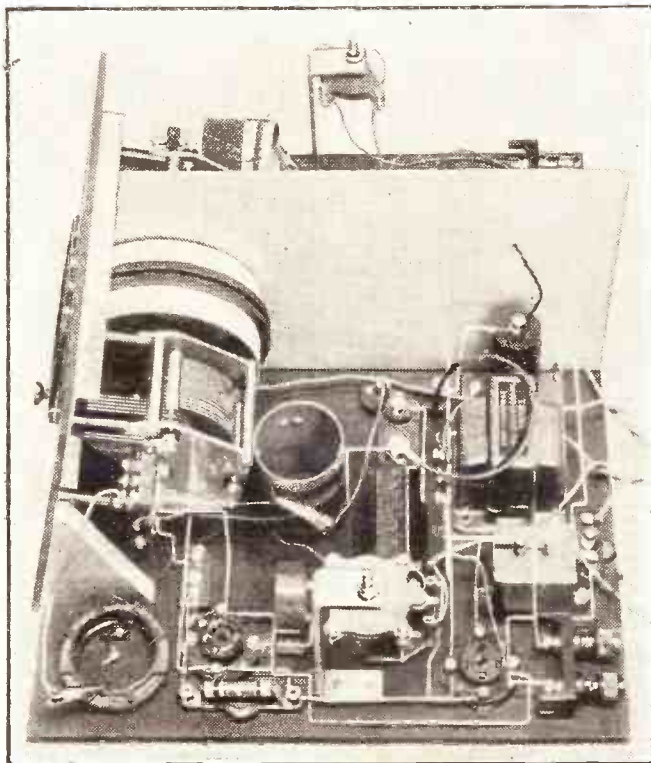
The scheme is almost absurdly simple. You have a .0005 variable condenser in series with the aerial (see

tuning circuit to any antenna characteristic.

The remaining side control, and the one which naturally falls to the right hand, is devoted to reaction.

On the handsomely vignettted front panel are the two primary controls. One is the

NOTE THE SLOPING PANEL



This is the detector and L.F. end of the set. The panel is gently "raked" which makes the tuning delightfully easy and the tuning scale clear to read without that usual craning down.

theoretical diagram). Over a portion of the vane movement there is a fine station-separating action. But when you begin to reduce the carefully chosen capacity below a certain arbitrarily defined point (which you need not worry about) an almost ideal volume control is effected.

The Extenser.

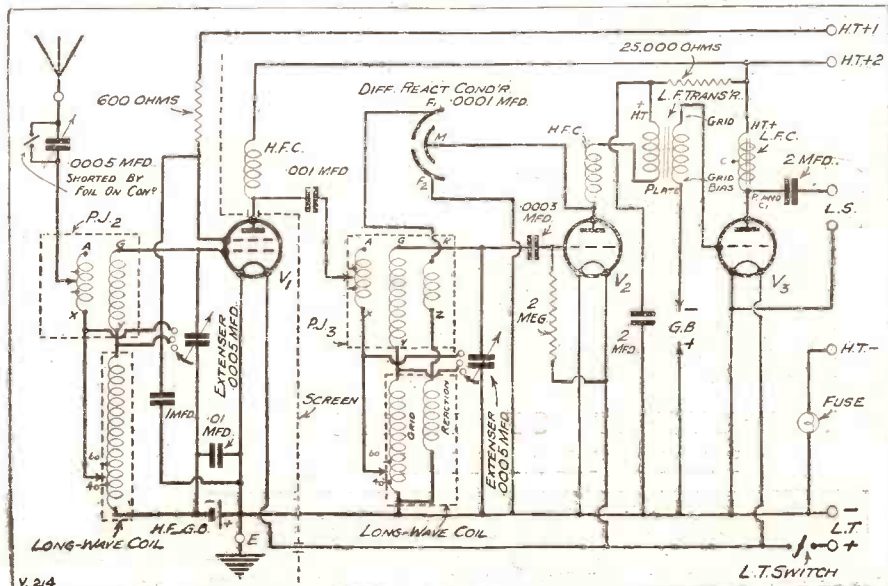
It is in fact a "front door" control, such as Capt. Eekersley and all other radio experts consider to be more desirable than any introduced into the L.F. end of an outfit.

Further, and automatically, this little control immediately compensates the aerial

ubiquitous on-off switch and the other the dual drums of the Extenser. This convenient pair of milled wheels functions as the one and only station selector of the set. (I say "pair" adviscdly, because, in most

(Continued on page 58.)

FEATURES FOUND ONLY IN "P.W." DESIGNS



If you are able to read the above diagram you will note a number of features developed by "P.W." and found in no other designs.

They build better on Telsen



TELSEN BINOCULAR H.F. CHOKE

An inductance of 180,000 microhenries . . . a self-capacity of '000002-microfarad . . . figures which prove that the Telsen Binocular H.F. Choke fulfils its purpose to the utmost and meets the demand of modern set designers and builders. Owing to the binocular formation the external field, and therefore unwanted reaction effects, are reduced to an absolute minimum. It covers the whole broadcast band and it is free from parasitic resonances. Resistance 750 ohms.

Telsen Binocular H.F. Choke

5/-

TELSEN STANDARD H.F. CHOKE

The Telsen Standard H.F. Choke utilises the minimum baseboard space. It is designed to cover the whole broadcast band and has an extremely low self-capacity. The inductance is 150,000 microhenries and the resistance 400 ohms.

It has proved very popular and has been incorporated by set designers in many of the leading circuits.

Telsen Standard H.F. Choke

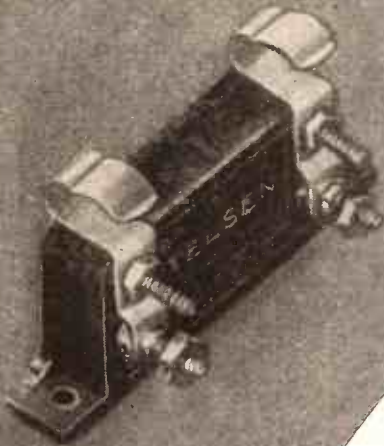
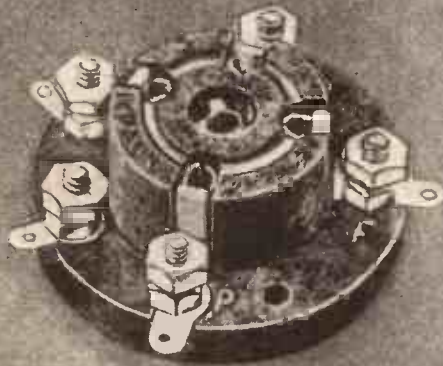
2/-

TELSEN

THE SECRET OF PERFECT
RADIO RECEPTION

Remember
the number—
STAND 19

Typical of Telsen value



6d
each

TELSEN VALVE HOLDERS (Prov. Pat. No. 20286/30)

The Telsen four and five-pin valve holders embody patent metal spring contacts, which are designed to provide the most efficient contact with split and non-split valve legs, and are extended in one piece to form soldering tags. Low capacity and self-locating.

Telsen 4-pin Valve Holder Price 6d.
Telsen 5-pin Valve Holder Price 8d.

TELSEN FIXED MICA CONDENSERS

(Prov. Pat. No. 20287/30)

Telsen Fixed Mica Condensers are made in capacities from .0001-microfarad to .002-microfarad. They can be mounted upright or flat, and the .0003-microfarad Telsen fixed mica condenser is supplied complete with patent grid-leak clips to facilitate series or parallel connections. All Telsen fixed mica condensers are tested at 500 volts.

Telsen Fixed Mica Condensers Price 6d.

TELSEN GRID-LEAK HOLDER

The Telsen Grid-leak Holder will hold firmly any standard size or type of Grid-leak. Ample clearance is provided between the terminal screw leads and the baseboard (underneath), preventing any surface leakage upsetting the value of the grid-leak. The terminals and fixing holes are accessible without removing the grid-leak.

Telsen Grid-leak Holder Price 6d.

TELSEN SPAGHETTI FLEXIBLE RESISTANCES

These are made in a range of values from 300-200,000 ohms, with a maximum current varying from 42 m/a. to 1½ m/a. The terminal tags are firmly fixed to the wire and clearly marked with their respective resistance values; they are impregnated with special insulating compound which renders them proof against corrosion.

Telsen Spaghetti Flexible Resistances from 6d.

TELSEN FUSE HOLDER

This is a neat and inexpensive device which should be incorporated in every set as a precaution against burnt-out valves.

The Telsen Fuse Holder firmly grips the standard radio fuse, giving a perfect contact.

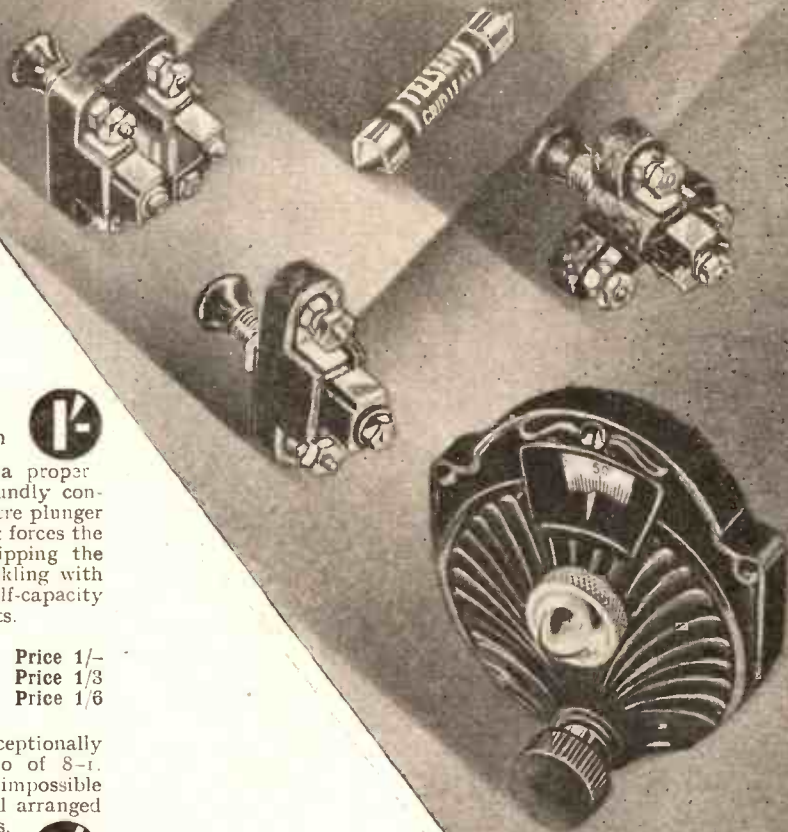
Telsen Radio Fuse Holder Price 6d.

You can't afford
to miss
STAND 19

TELSEN

ALL-BRITISH
RADIO COMPONENTS

Switch over to Telsen



TELSEN PUSH-PULL SWITCHES

(Prov. Pat. No. 14125/31) . . . From **1/-**

The Telsen Push-Pull Switches employ a proper electrical knife switch contact and are soundly constructed on engineering principles. The centre plunger is wedge-shaped, so that as it is pulled out it forces the inner fixed contacts outwards, tightly gripping the moving contacts. There is no fear of crackling with Telsen Push-Pull Switches. Their low self-capacity makes them suitable for use in H.F. circuits.

Telsen Push-Pull Switches—

- Two-point Price 1/-
- Three-point Price 1/3
- Four-point (2 pole) Price 1/6

TELSEN SLOW-MOTION DIAL

The Telsen Slow-motion Dial has an exceptionally smooth action with an approximate ratio of 8-1. There is no toothed gearing, so that it is impossible to strip the dial. The figures are clear and arranged to provide for right- and left-hand condensers.

Telsen Slow-motion Dial Price **2/6**

Supplied in Black or Brown Bakelite.

TELSEN GRID-LEAKS

Telsen Grid-leaks are absolutely silent and non-microphonic, and practically unbreakable. They cannot be burnt out, and are unaffected by atmospheric changes. Telsen Grid-leaks are not wire wound and therefore there are no capacity effects. Their value is not affected by variation in the applied voltage.

Made in capacities ranging from 1-5 megohms.

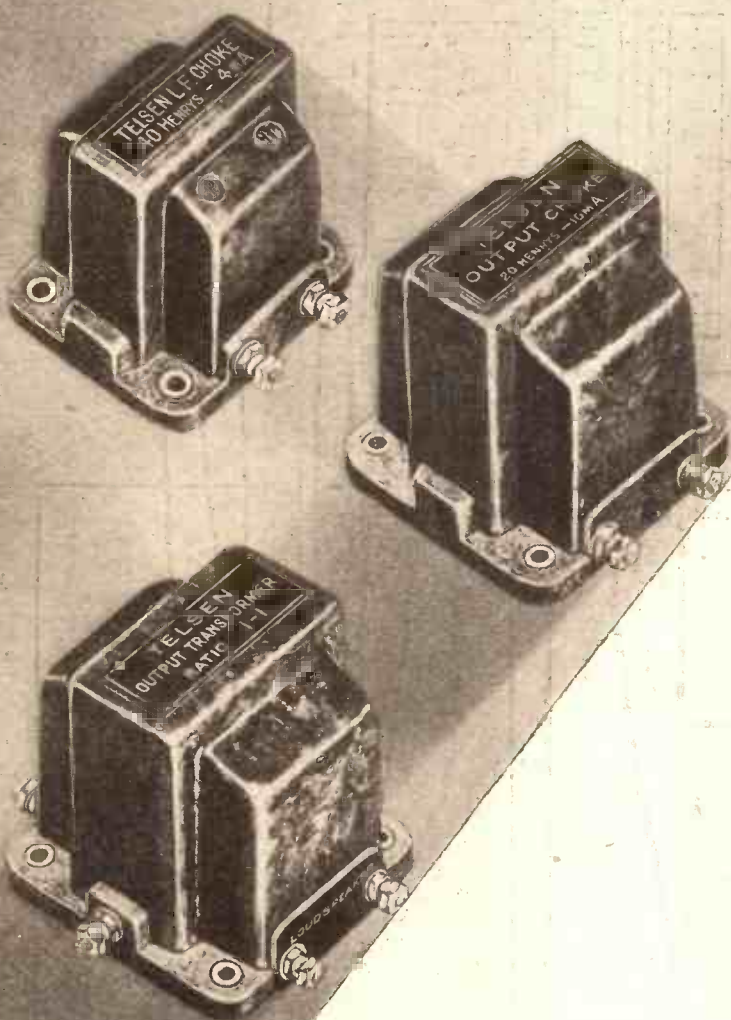
Telsen Grid-leak Price **9/-**

TELSEN

THE SECRET OF PERFECT RADIO RECEPTION

You'll find it on
STAND 19

Telsen for better reception



TELSEN L.F. CHOKES

TELSEN L.F. INTERVALVE COUPLING CHOKE
Specially designed for use as a coupling choke in the L.F. stages of a modern radio receiver. Made in a range of three inductances:—
40, 100, and 125 henrys Price **5/-**

TELSEN HEAVY DUTY POWER-GRID L.F. CHOKE
Most modern Radio Circuits now employ some form of Power Grid Detection. The Telsen Power Grid L.F. Choke fulfils this need.
Telsen Heavy Duty Power Grid L.F. Choke, 40. henrys Price **8/-**

TELSEN OUTPUT CHOKES

TELSEN OUTPUT CHOKES (TAPPED AND PLAIN)
Designed for use as Output Filter Chokes, and should be used with a Coupling Condenser of not less than 2 mfd. capacity. For last stage valves of 3,000 ohms or less the plain Choke should be used with all Loud-speakers having impedances of about 3,000 ohms.

Telsen Output Choke, 20 henrys .. Price **8/-**

Telsen Tapped Output Choke, 20 henrys.. Price 8/6

TELSEN OUTPUT TRANSFORMERS

Telsen Multi-Ratio Output Transformer, giving three Ratios of 9-1, 15-1, 22-5-1 Price 12/6
Telsen Output Transformer, Ratio 1-1 Price 12/6
Telsen Pentode Output Transformer Price 12/6

OLYMPIA
National Hall
Ground Floor
STAND 19

TELSEN

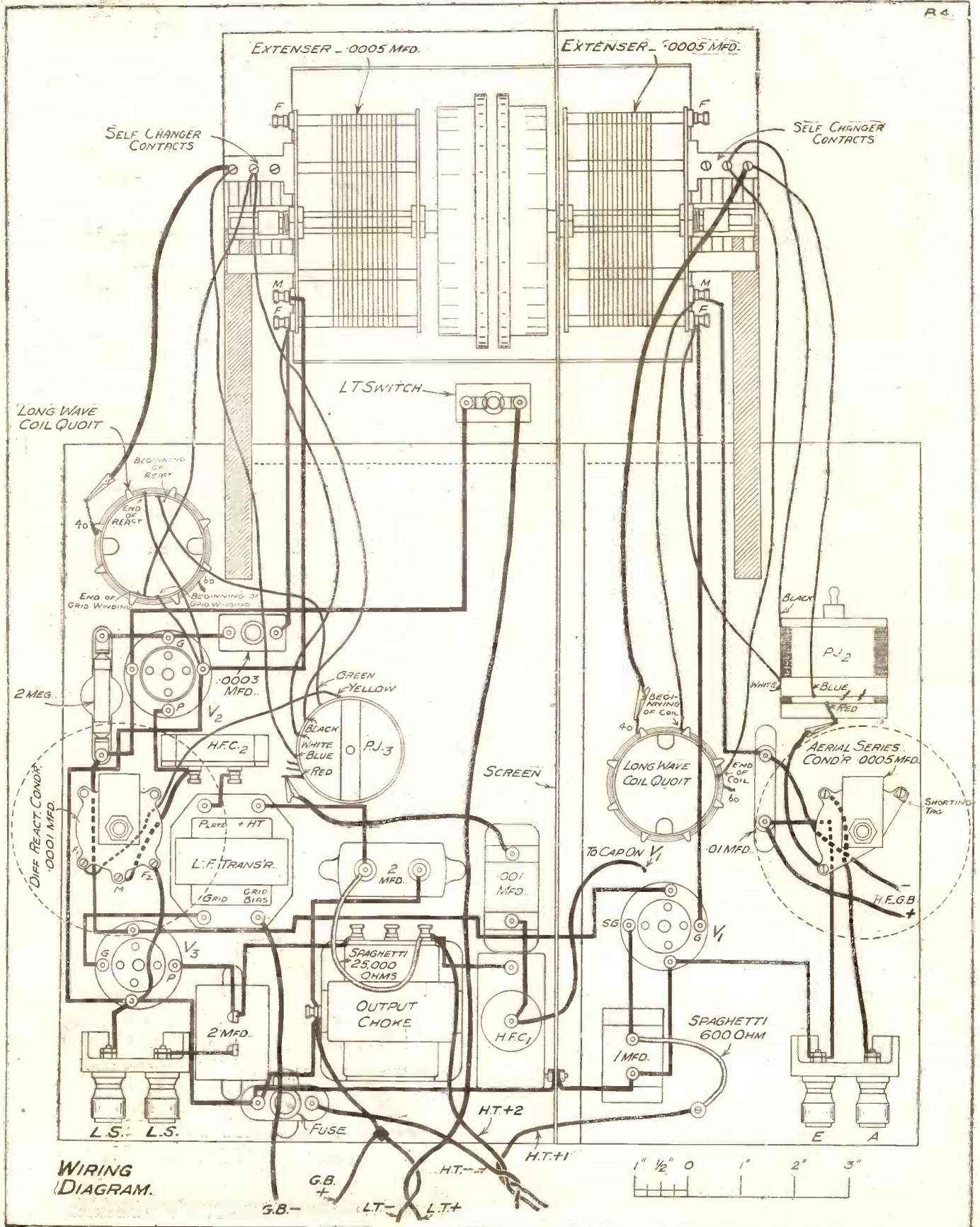
ALL BRITISH
RADIO COMPONENTS

THE "P.V." STAR

cases, they can be operated simultaneously).
 The Extenser covers the whole broadcasting band of 200—2,000 metres, and you do not have to worry about formal wave-band divisions. One complete rotation of

the drums brings in medium and long-wavers alike, and there is only one station to each dial reading.

The Radio Exhibition at Olympia will be
 (Continued on page 60.)





At your command

G.P. Kendall
CHIEF ENGINEER
READY RADIO

As still further proof of our aim to maintain an unrivalled service, both before and after sales, we have now secured the full-time services, as our Chief Engineer, of Mr. G. P. Kendall, B.Sc.

★ When you buy Ready Radio Kit Components you are definitely assured that they are the finest possible for their particular job. Mr. Kendall is your surety. Every Ready Radio Kit Component is chosen by him only after submission to stringent laboratory and broadcast tests. And again, before despatch, they are tested and passed under his personal direction.

★ Should you ever be in difficulties with your set, you can avail yourself of his wide and experienced technical knowledge, FREE. Mr. Kendall controls the new Ready Radio Technical Department, formed mainly for the purpose of helping you out of your radio troubles.

THE "P.V." PLUS

KIT "A" (Less valves and cabinet)	£4. 5. 6
or 12 equal monthly instalments of	8. 0
KIT "B" (With valves less cabinet)	£6. 4. 6
or 12 equal monthly instalments of	11. 6
KIT "C" (With valves and cabinet)	£7. 9. 6
or 12 equal monthly instalments of	13. 9
Completely assembled Receiver, Aerial tested, Royalties paid	£8. 19. 6
or 12 equal monthly instalments of	16. 6

THE "P.V." STAR

KIT "A" (Less valves and cabinet)	£5. 18. 6
or 12 equal monthly instalments of	11. 0
KIT "B" (With valves less cabinet)	£7. 17. 6
or 12 equal monthly instalments of	14. 6
KIT "C" (With valves and cabinet)	£9. 5. 0
or 12 equal monthly instalments of	17. 0
Completely assembled Receiver, Aerial tested, Royalties paid	£10. 15. 0
or 12 equal monthly instalments of	19. 9

All Ready Radio cabinets have the special Landon finish. The beautifully subdued effect of the Landon process will give your set the same handsome appearance as that of the most expensive and exclusive receiver on the market.

TO INLAND CUSTOMERS.—Your goods are despatched Post free or Carriage Paid.

TO OVERSEAS CUSTOMERS.—Everything Radio can be supplied against cash. In case of doubt regarding the value of your order, a deposit of one-third of the approximate value will be accepted and the balance collected by our Agent upon the delivery of the goods. All goods are very carefully packed for export and insured. All charges forward.

If you do not need the complete kit you can buy any of the parts you require separately. See page 61 for full list of parts and prices.

★ Mr. G. P. Kendall, B.Sc., was for many years Assistant Technical Editor and Chief of Research at "Popular Wireless" and "Modern Wireless."

**MEET HIM AT STAND No. 6,
 NATIONAL RADIO EXHIBITION,
 OLYMPIA.**

Adv. of Ready Radio Ltd.

**159 BOROUGH HIGH STREET
 LONDON BRIDGE-S-E-1**
 HEAD OFFICE AND WORKS
EASTNOR HOUSE · BLACKHEATH
 PHONE: LEE GREEN 5678
 (SHOWROOMS, PHONE HOP 3000 GRAMS: READIRAD, SEDIST)

THE "P.V. STAR"

(Continued from page 58.)

running at full strength from the 18th of September onwards, and as many "P.W." readers as can should make a point of going along and examining the original model of

ACCESSORIES WE RECOMMEND

- LOUDSPEAKER.**—(Amplion, Blue Spot, Celestion, B.T.H., Mullard, Undy).
VALVES.—1 S.G. (Osram S.22, or Cossor, Mazda, Mullard, Dario, Eta, Six-Sixty).
 1 H.L. or Special Det. (Mazda H.L. 210, or Cossor, Osram, Eta, Six-Sixty, Mullard, Tungfram, Dario, Fotos).
 1 Power (Six-Sixty, or Mazda, Osram, Mullard, Tungfram, Dario, Fotos, Eta, Cossor).
BATTERIES.—H.T. 120-150 volts. Double or super capacity (Ever Ready, Drydex, Pertrix, Magnet).
 1 G.B. for S.G. valve '9 or 1.5 volts (Ever Ready, etc.).
 1 G.B. for L.F. valve 9-15 volts, to suit valve (see above).
ACCUMULATOR.—2-volt (4- or 6-volt if 4- or 6-volt valves are used) (Exide, Ediswan, Pertrix, G.E.C., Lissen).
MAINS UNITS.—(Regentone, Ekco, Tannoy, Atlas, R.I., Heayberd, Lotus). (State details of set and give voltage and type of mains when ordering.)

"P.V. Star" at close quarters. It will be on view at our stand, where it will be decidedly strange if a large crowd does not congregate.

It is a fitting exhibit for "P.W." in that it is a concentration of peculiarly "P.W." features, and holds more marked individuality in its ostensibly simple cubic foot or so than almost any other receiver ever produced.

Some of the Star Features.

I will briefly tabulate these. For the cabinet design we lay no great claims. It is a fine looking cabinet, but there will be many commercial sets having almost equally artistic cabinets. However, bearing in mind that anyone can make "P.V. Star" at home, this is, in its way, a distinct and strong tribute to the design.

But note the side controls. These are an original "P.W." feature, more particularly in regard to the mechanical structure of the fittings themselves.

"P.V. STAR" CAN BE EXAMINED ON OUR STAND AT OLYMPIA

There are P.V. coils backed up by "P.W." Coil Quoit windings, and "P.W." differential reaction (the last has now been duplicated all the world over).

Finally, there is the Extenser.

How to Begin.

Undoubtedly the best way of beginning the assembly of this magnificent set is to purchase a complete kit of parts from one or other of our regularly advertising kit suppliers. You will get your panel all ready drilled, and every necessary item of material

down to the screws and connecting wire will be included.

Also you will be sure to get components of correct make and value. It is so easy for the less expert of us to be fobbed off with sub-standard articles by glib-tongued salesmen!

Next week I will give you as many constructional hints as I can.

THE P.J. COILS

P.J.2.—Former 2-in. diam., 2-in. long, wire 30 D.S.C. Medium-wave aerial unit without reaction.

AERIAL WINDING. 9 turns, tapped at 4 and 6. Beginning "A" (red flex); end "X" (blue flex). Space $\frac{3}{8}$ -in. between aerial and grid.

GRID WINDING.—64 turns. Beginning marked "G" (white flex); end marked "Y" (black flex). Space between grid and reac. windings $\frac{1}{4}$ -in.

P.J.3.—Former 2-in. diam., 3-in. long. Inter-valve medium-wave unit with reaction. Wire 30 D.S.C.

PRIMARY.—30 turns, tapped at 10 and 20 from beginning marked "A" (red flex); end marked "X" (blue flex). Space between prim. and grid windings $\frac{3}{8}$ -in.

GRID.—64 turns. Beginning marked "G" (white flex); end marked "Y" (black flex). Space between grid and reac. windings $\frac{1}{4}$ -in.

REACTION.—34 turns. Beginning marked "Z" (green flex); end marked "R" (yellow flex).

Windings of ALL coils in SAME direction.

In the meantime you will be able to collect all the necessary components, and I need hardly say that the closer you stick to the list below the better!

YOUR GUIDE TO THE COMPONENTS REQUIRED

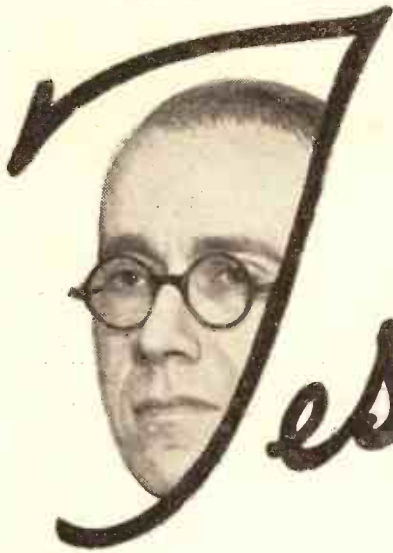
- | | | |
|--|---|--|
| <p>1 Panel (10 by 8 in.). (Permcot, or Goltone, Red Seal, Parex, Wearite, Becol).
 1 Cabinet with baseboard (Peto-Scott, or Ready Radio).
 1 .0005-mfd. double drum drive Extenser (Cyldon, or Wave-master).
 1 .0001, .00013 or .00015-mfd. differential reaction condenser (Ready Radio, or Telsen, Lotus, Igranic, Wavemaster, Polar, J.B., Parex, Burton, Formo, Cyldon).
 1 .0005-mfd. solid dielectric condenser (Ready Radio, or Telsen, Polar).
 2 H.F. Chokes (Lewcos and Telsen, or Ready Radio, Peto-Scott, R.I., Varley, Dubilier, Wearite, Watmel, Sovereign).
 1 2-meg. grid leak and holder (Graham-Farish, or Telsen, Ready Radio, Dubilier, Ediswan, Ferranti, Mullard, Varley).
 1 600-ohm spaghetti res. (Bulgin, or Ready Radio, Lewcos, Telsen, Peto-Scott, Sovereign, Graham-Farish, Goltone, Igranic, Varley).
 1 25,000-ohm spaghetti res. (Varley, or see above).
 1 L.F. Transformer (Lotus, or Telsen, Ferranti, Igranic, Varley, R.I., Mullard, Lewcos, Goltone, Formo).</p> | <p>1 Output Choke (Telsen, or Ferranti, Igranic, R.I., Varley, Atlas, Wearite, Bulgin, Lotus).
 1 Filament switch (Bulgin, or Ready Radio, Telsen, Goltone, Igranic, Lotus, Benjamin, Peto-Scott, Wearite).</p> | <p>1 .001-mfd. fixed condenser (Dubilier, or Ready Radio, Telsen, Watmel, Igranic, Dubilier, Ediswan, T.C.C.)
 1 .0003-mfd. fixed condenser (Goltone, etc.).
 1 1-mfd. fixed condenser (Formo, or Telsen, T.C.C., Igranic, Mullard, Hydra, Helsby, Dubilier).
 2 2-mfd. fixed condensers (Igranic and T.C.C., etc.).
 1 Fuse (Bulgin, or Ready Radio, Telsen).
 1 P.J.2 coil (Sovereign, or Lewcos, Ready Radio, Peto-Scott, R.I., A.E.D., Wearite, Formo, Watmel, Parex, Ferranti, Goltone).
 1 P.J.3 coil (Sovereign, or see above).
 2 Coil quoits (Peto-Scott, or Ready Radio, Sovereign, Wearite).
 4 oz. of No. 30 D.S.C. wire.
 1 Screen 13 by 8 in. (Parex, or Ready Radio, Peto-Scott).
 2 Control discs (Peto-Scott).
 Two terminal blocks and terminals (Belling & Lee).
 4 Crocodile Clips (Goltone).
 Glazite or Lacoline.
 Flex, screws, Battery plugs, etc. (Belling & Lee, Igranic, Eelex, Clix, etc.).
 2 brackets.</p> |
|--|---|--|

A FINE CABINET DESIGN



The cabinet was especially designed for "P.V. Star," and is not a stock model, although it is easy to get and quite inexpensive.

- 3 Valve holders (Lotus, or Telsen, Benjamin, Formo, Igranic, Clix, Bulgin, Graham-Farish, Junit, Wearite).
 1 .01-mfd. fixed condenser (T.C.C., or Dubilier, Telsen, Ferranti, Mullard, Igranic, Goltone, Watmel, Graham-Farish).



Tested & passed
G.P. Kendall
 CHIEF ENGINEER, Ready Radio

Every Ready Radio Kit consists of chosen components exactly as used in the tested model and all components are tested and passed before dispatch. Every constructor using a Ready Radio Kit is assured of being able to build a receiver identical in performance and appearance to the original model.

Ready Radio "P.V." Kits are READY for Immediate Despatch

THE "P.V." PLUS

	£	s.	d.
1 Ebonite panel, 18" x 7" x 3/16", drilled to specification	5	6	
1 Polished oak cabinet, with baseboard 10" deep	1	5	0
2 Wavemaster .0005-mfd. extenser condensers with S.M. drive	1	11	0
1 ReadRad filament switch	2	6	
1 ReadRad .00015-mfd. differential condenser	1	0	
2 Four-pin valve holders	2	1	0
1 Junit horizontal valve holder	1	9	
1 T.C.C. 1-mfd. fixed condenser, type 50 (non-inductive)	2	10	
1 T.C.C. .01-mfd. fixed condenser, type 40	1	9	
1 T.C.C. .001-mfd. fixed condenser, type 34	1	10	
1 T.C.C. .0003-mfd. fixed condenser, type 34	1	6	
2 ReadRad "Popular" H.F. chokes	4	0	
1 Lewcos 600-ohm Spaghetti resistance	1	4	9
1 ReadRad 2-meg. grid leak and holder	6	9	
1 R.I. Dux L.F. transformer	6	9	
1 P.J.2. coil unit	2	0	
1 P.J.3. coil unit	2	6	
1 Terminal strip, 18" x 2" x 3/16", drilled to specification	1	6	
1 Bulgin grid battery clip	1	4	
1 Aluminium screen, 10" x 6"	2	0	
2 ReadRad long wave quoit coils, ready wound	1	0	
6 Belling-Lee wander plugs	1	0	
1 Siemens 1½-volt grid cell, type G.T.	1	9	
2 L.T. spade terminals	2	8	
1 Belling-Lee indicating terminals, type "R"	2	8	
1 Sovereign .001-mfd. compression condenser	1	3	
1 Packet Jiffilinx for wiring	2	6	
3 Mullard valves to specification: P.M.12, P.M.1H.L. and P.M.2A.	1	19	0
Flex, screws, crocodile clips, etc.	1	9	5
TOTAL (including valves and cabinet)	£7	9	6

RECOMMENDED ACCESSORIES

	£	s.	d.
1 Fuller 120-v. super-capacity H.T. battery	15	3	0
1 Fuller 9-v. grid bias battery	1	0	0
1 Fuller type S.W.X.H.7. L.T. accumulator	10	3	0
1 Amplion A.B.4. loud speaker	2	10	0

If you do not need the complete Kit you can buy any of the parts you require separately.

THE "P.V." STAR

	£	s.	d.
1 Ebonite Panel 10" x 8" x 3/16", drilled to specification	3	6	
1 "Londor" Cabinet to specification, with baseboard as specified, including panel and baseboard supports	1	7	6
1 Wavemaster double .0005-mfd. Extenser with thumb control	1	15	0
1 ReadRad .00015-mfd. Differential reaction condenser	2	8	6
1 ReadRad .0005-mfd. "Brookmans" condenser	3	6	0
1 Lewcos H.F. choke	4	6	0
1 ReadRad H.F. choke	4	6	0
1 ReadRad 2-meg. Grid Leak & Holder	1	4	4
1 Lewcos 600-ohm Spaghetti resistance	1	9	
1 Lewcos 25,000-ohm Spaghetti resistance	1	6	
1 Lotus L.F. Transformer	5	6	
1 R.I. Output choke, type G.P.	12	6	
3 Four-pin Valve holders	1	6	
1 T.C.C. .01-mfd. fixed condenser, type 40	1	9	
1 T.C.C. .0003-mfd. fixed condenser, type 34	1	6	
1 T.C.C. 1-mfd. fixed condenser, type 50	2	10	
2 T.C.C. 2-mfd. fixed condensers, type 50	7	8	
1 T.C.C. .001-mfd. fixed condenser, type 34	1	10	
1 ReadRad Fuse and holder	1	3	
1 P.J.2. Coil unit	2	6	
1 P.J.3. Coil unit	2	6	
2 ReadRad Long wave Quoit coils, ready wound	5	0	
1 Aluminium Screen 15" x 8"	2	0	
1 ReadRad Filament switch	1	0	
2 Control discs	3	0	
4 Belling-Lee Indicating terminals, type "I"	1	0	
5 Wander Plugs	1	0	
2 L.T. Spade terminals	2	3	
1 Packet "Jiffilinx" for wiring	2	6	
2 Sovereign Terminal blocks	1	0	
1 Siemens 1½-volt Grid Cell	1	0	
2 Brackets as specified	1	9	
3 Mullard Valves: P.M.12, P.M.1H.L., P.M.2A.	1	19	0
Flex, screws, crocodile clips, etc.	1	9	11
TOTAL (Including valves and cabinet)	£9	5	0

RECOMMENDED ACCESSORIES

	£	s.	d.
2 Fuller 60-v. triple capacity H.T. batteries	1	3	0
1 Fuller 9-v. grid bias battery	1	0	0
1 Fuller 2-v. 40-amp. L.T. accumulator	12	9	0
1 Celestion D.10 loud speaker (oak)	3	0	0

See also pages 59 & 81.

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Complete range of capacities upright or flat mounting. Registered design No. 723271, and tested on 750 volts D.C. .00005 mfd. to .002 mfd. — 6^D. .003 mfd. to .006 mfd. 1/- 6^D. .007 mfd. to .01 mfd. 1/6^D



GRAHAM FARISH KONE KAP GRID LEAKS.

A good carbon type Grid Leak. Fits all condensers and holders. Made in 1, 2, 3, 4 and 5 megohms. Price .. 9^D.



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Counterpart of above, but fitted with terminal ends for sure contact. Price .. 10^D.



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Suitable for all resistances. Upright or horizontal mounting. Price 6^D.

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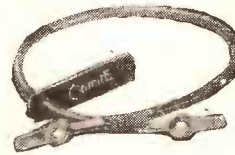


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A solid dielectric tuning condenser with log mid line capacity variation. With knob. Made in capacities .0001 mfd., .0003 mfd. and .0005 mfd. Price .. 2/-

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Similar to the tuning condenser but with two sets of fixed vanes each side being accurately matched. Complete with knob. Capacities .0001, .00015, and .0003 mfd. 2/-



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Extraordinary large output with even balance. Moulded in walnut or mahogany in modern design. Ball bearing pivots. Price 32/6

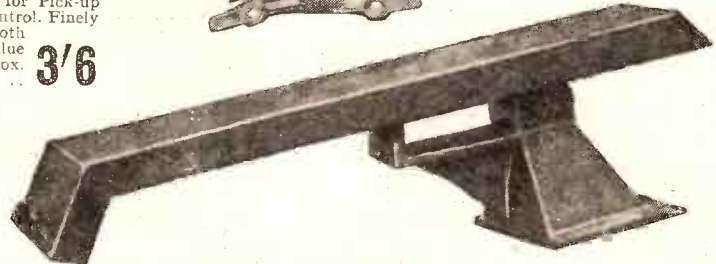


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Popular capacities covering all requirements.

- F. .00005 to .0001 mfd.
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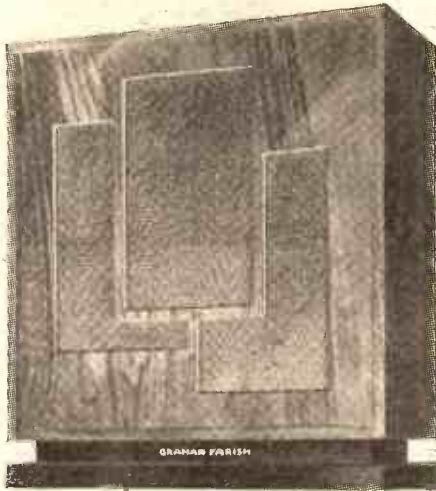


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Of new design, this choke covers medium and long broadcast wave-lengths. D.C. resistance 400 ohms.

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GRAHAM FARISH PUSH-PULL SWITCH.

Exceptional value. Positive contact with snap action. Will give satisfaction for years. Self-cleaning contacts.

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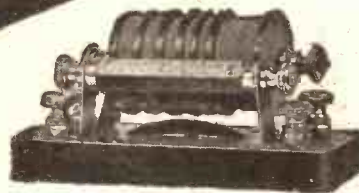
Beautifully sprung with spring contacts, sure grip, easy withdrawal.

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A complete H.F. Coupling unit incorporating the "Multiwave" H.F. choke and "Megite" grid leak, mounted on base with sealed condenser.

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A continuously variable condenser for series aerial connection, conveniently arranged for mounting.

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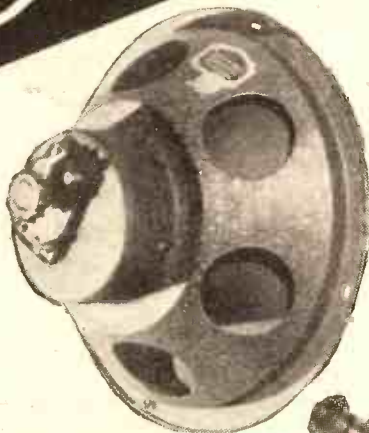
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Incorporating powerful and sensitive motor with special waterproof fabric cone of new design. Aluminium housing finished in frosted black.

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A popular resistance for all general purposes "Better than Wire Wound."
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will have a complete range of our Radio Components. We shall be there to answer your questions. You will have an opportunity of seeing the quality of Graham Farish components. Our eleven year experience of component manufacture has enabled us to give you tip-top quality at rock-bottom prices. This is our invitation —we shall be pleased to see you at Olympia.

CAPT. ECKERSLEY'S QUERY CORNER



**DETECTOR SENSITIVITY—H.T. FROM
D.C. MAINS — GRID-LEAK VALUES.**

Under the above title week by week our Chief Radio Consultant comments upon radio queries submitted by "P.W." readers. Don't address your questions to Capt. Eckersley, however—a selection of those received by the Query Department in the ordinary way will be answered by him.

Detector Sensitivity.

B. R. J. (Hayes).—"Recently I read in an article on improving reaction control that in some cases it was of advantage to add a small fixed condenser connected to plate and negative filament terminals of a leaky grid detector.

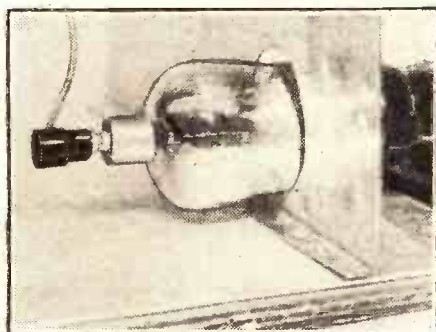
"I tried this in my receiver which incorporates one stage of screen-grid amplification and a leaky-grid detector with differential condenser controlled reaction, and the result was that signal strength was almost as strong with reaction at zero as it was previously with the reaction adjusted to almost oscillating point.

"In fact the reaction does not seem to increase the sensitivity of the receiver so markedly as before, although signal strength with the new arrangement is about the same as if reaction were pushed. The receiver can still be made to oscillate if desired.

"Why does the addition of this extra condenser, actually a .0008-mfd. (1 .0003 and 1 .0005 in parallel) increase the sensitivity of the receiver and lessen the extra benefits usually conferred by reaction?"

I am not absolutely certain what effect is predominating as regards reaction effects in the circuit that you have described. You

FOR S.G. TERMINALS



Instead of fiddling with a screw-down connection, you can now get a proper anode-connector for a few pence.

must understand that in a common or garden leaky-grid detector without reaction, the inter-electrode capacity of the valve tends to give an out-of-phase effect, diminishing the over-all sensitivity of the device from

its theoretical value. Reaction applied in such circumstances reduces the effect.

There is, however, another way of reducing the effect, namely to connect a small condenser between the anode of the detector and earth. Thus by connecting such a condenser you have made the whole device more sensitive, and the necessity for reaction is not so great. Hence the effect is less pronounced.

This may be a complete explanation of

ONLY IN "P.W."

can you read Captain Eckersley's replies to listeners' own problems.

And Remember—

Captain Eckersley's technical articles appear only in the "Big Three,"

POPULAR WIRELESS,
MODERN WIRELESS and THE WIRELESS CONSTRUCTOR

the effects that you have noticed, or it may be that the condenser itself does in some spurious way introduce a measure of reaction apart from removing the inter-electrode effect. I think my first explanation is probably correct.

H.T. from D.C. Mains.

B. R. (Chelmsford).—"I have been informed by the electrical supply authorities that the negative side of my D.C. mains is earthed. Is there any reason why I should insert a fixed condenser in series with the earth lead of my receiver when using an H.T. eliminator. My set is quite O.K. without it but I should be glad to know definitely whether there is any danger in using this arrangement."

There is no danger whatsoever in directly earthing the negative side of your set supplied from D.C. mains where the negative side of the D.C. mains is earthed. You are only repeating what has been done before by the supply authorities in a more thorough way.

The only possible danger that you run is

if the supply authorities were suddenly to change their mind and "unearth" the negative and earth their positive. I don't think the supply authorities are at all likely to do this, and on their own head be it if they do; but I can assure you that your present arrangement is absolutely safe.

Grid-Leak Values.

R. J. (Balham).—"Does it follow that because I am able to vary the detector and grid leak in my Det. and one L.F. set from 5 to 6 megohm without noticing any difference in results that the set is faulty?"

"If the set is O.K., then why should a two-megohm leak have been specified?"

The value of a grid leak in a leaky-grid detector type of arrangement is not superficially critical. There is, however, a reason for specifying a certain value of condenser and a certain value of leak, which has to do with the reproduction of quality rather than the determination of sensitivity.

If you don't notice any difference, then, the proof of the pudding being in the eating, you need not worry, and the set certainly is not faulty.

There is a difference, but it is in the
ENSURES GOOD CONTACT



If your valve has split plugs, don't forget that they may be better for opening occasionally with a penknife.

quality of reproduction. Quite likely this is not noticeable with the type of loud-speaker used.

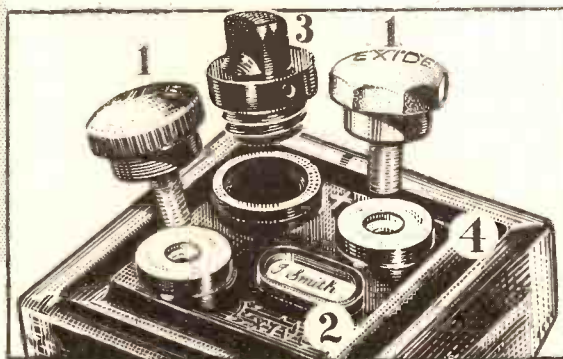
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The wonderful **NEW** "D" TYPE BATTERIES



FOR LOW TENSION

Another Exide achievement! Presenting to you the new "D" Type Batteries for wireless low tension. Exide claim that on no other battery will you find all the improvements which Exide designers have incorporated in this splendid new battery.



- (1) **NON-INTERCHANGEABLE TERMINALS.** Here the positive and negative screw terminals are not only shaped and coloured differently, but they are of different sized threads. A blind man could not muddle them! Immune from sleeping acid.
- (2) **NAME SLOT.** The new Exide name slot is a convenience to both owner and re-charging station alike. Mistakes become impossible.
- (3) **FILLER AND CAP.** And now a larger filler cap easy to screw and unscrew, and rendering the battery almost unspillable.
- (4) **IMPROVED LID.** A finely finished moulded lid with high insulating properties.

Note also **THE NEW CARRIER.** Specially designed to fit the new shape of the container: the battery may be carried with ease and safety.

● PRICE PER 2-VOLT CELL

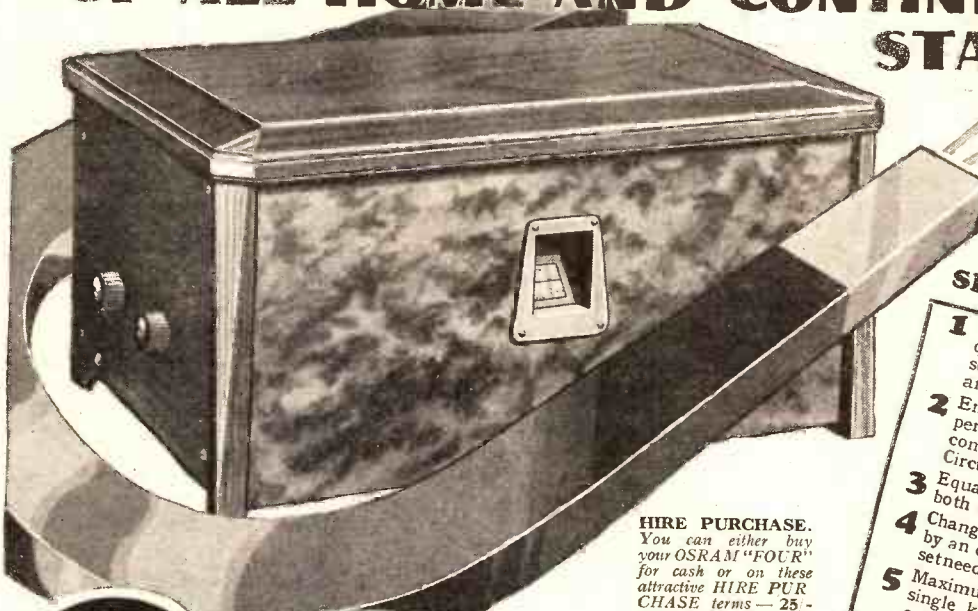
DTG.....20 ampere hours.....	4/6d
DFG.....45 ampere hours.....	8/6d
DMG.....70 ampere hours.....	11/-
DHG.....100 ampere hours.....	14/6d

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Exide Batteries, Clifton Junction, near Manchester. Branches: London, Manchester, Birmingham, Bristol, Glasgow, Dublin, Belfast

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The MAGNET OF ALL HOME AND CONTINENTAL STATIONS



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- 1 The two Screen Grid high frequency stages give extreme selectivity and sensitivity with an unrivalled range.
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- 3 Equal efficiency guaranteed on both wavelength bands.
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- 5 Maximum ease in tuning with single knob controlling triple gang condenser.
- 6 Assembly is the essence of simplicity.
- 7 Volume control is provided not only to act as such, but to procure extreme selectivity.
- 8 Two terminals provided for connection to Gramophone Pickup.
- 9 Attractive Walnut Constructor's Cabinet of modern design with front panel to match.

HIRE PURCHASE.
 You can either buy your OSRAM "FOUR" for cash or on these attractive HIRE PURCHASE terms — 25/- Deposit and 12 monthly payments of 17/-. Your dealer will give you full particulars.

Osram "FOUR"

NEW MUSIC MAGNET

A high-class radio kit both in performance and appearance, with an established reputation. Amazing range, power and tone. Reliable GECOPHONE components and OSRAM VALVES. . . . Ease of assembly. . . . Simplicity of control. . . . Handsome polished walnut cabinet. . . . Low selling price of £10-15-0. These are the qualities that make the OSRAM "FOUR" another big Music Magnet success. The OSRAM "FOUR" introduces an entirely new and improved conception of home-assembled circuits.

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 The General Electric Co. Ltd.
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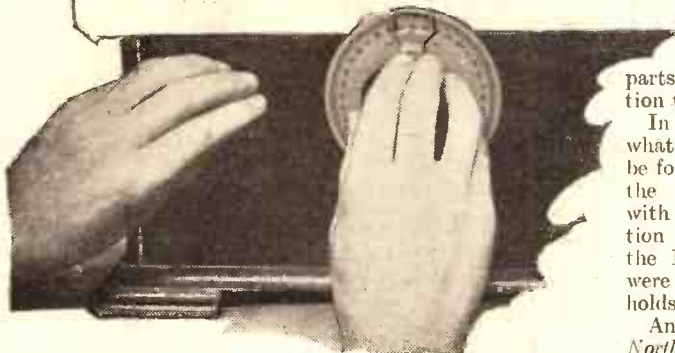
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P.W. Cut out and paste on postcard, or enclose in unsealed envelope. Halfpenny postage in either case.

NOTES FROM THE NORTH

By OUR SPECIAL CORRESPONDENT.

Strong criticism of the new arrangements, in which talks have a strong hold on the National B.B.C. programme, is made in this despatch from the North of England.



FROM the point of view of many thousands of wireless listeners in the provinces, the revision of B.B.C. programme arrangements at the beginning of September, when the Talks Department captured the National programme, is a blunder in which the interests and the point of view of people in many provincial parts of the country have been overlooked by Savoy Hill.

Localised Interest.

On numerous occasions in POPULAR WIRELESS I have requested the B.B.C. officials in London to raise their eyes from the Strand, to cast their gaze further afield. Many things have happened to show that there is a lurking danger of Savoy Hill forgetting that it is merely the London headquarters of a national system of broadcasting. Certain decisions of policy, remarks sometimes made by announcers and others, quite frequently the style and presentation of revues and vaudeville and talks in the National programme have, for instance, indicated that it is easy for Savoy Hill to forget that its microphone is not just a London, but a National microphone.

This talks decision is the latest example. The talks rearrangement is premature. The Director of Programmes should have waited until the Chief Engineer could guarantee reception of alternative programmes by practically the whole population of Great Britain before he sanctioned this new arrangement.

Unlucky Areas.

At present the B.B.C. can guarantee good reception of two programmes to only three areas—the south-east of England, the Midlands, and part of the North of England.

The Moorside Edge station does not (as some people imagine) give alternative programmes to the entire North of England. Large parts of Durham, Northumberland, and the Lake District are beyond its range.

In these areas (in Newcastle, for instance, where the local transmitter has been relaying the National programme again since the synchronisation with North Regional failed), listeners depend on the National programme. The same applies to listeners throughout Scotland and in most

parts of Wales (not to mention the West of England).

In these circumstances what justification can there be for so heavily weighting the National programme with talks? The justification that simultaneously the Regional programmes were lightened obviously holds no water.

And in point of fact the North Regional programme still has its talks. When

Savoy Hill announced that "the fixed talks which have hitherto found a place on the Regional wave-length are to be incorporated in the National programme," it really meant the London Regional wave-length.

So Northern listeners now receive from the Moorside Edge station National talks (via North National), plus London Regional talks transferred to this wave-length, plus North Regional talks.

The North Regional Director can hardly be expected to stop talks in the North Regional programme, because talks about North Country subjects have a legitimate

before, and listeners outside that area are stranded with a National programme in which talks predominate.

The Belfast Station Director has attempted to lessen the deluge of talk from his station by making Belfast a National programme relay on Mondays, Wednesdays, and Fridays (with talks until 8 p.m.), and adhering to "Regional" timings (entertainment from 6.30 p.m.) on Tuesdays, Thursdays, and Saturdays. That this is a clumsy arrangement is not the fault of the Belfast Director, but of this ill-conceived scheme of Savoy Hill's which makes such a dot-and-carry-one system necessary.

The Newcastle Contretemps.

One of the best arguments for the continued existence of Regional B.B.C. offices at Manchester, Edinburgh, Belfast, Cardiff, and Birmingham is that they ensure to a certain extent a proper consideration for provincial listeners, but the trouble is that these offices are definitely subordinate to Savoy Hill, and when the latter comes out with a sweeping scheme which overlooks provincial points of view, all the Regional officials can do is to try to patch things up locally.

A COLLIERY BROADCAST FROM NEWCASTLE



Although Newcastle now takes its programmes from the North Regional station, it is still expected to supply an occasional item of northern interest for radiation from the North Regional programme. Such items are often of an outside-broadcast type, and here we see officials of the Benwell Colliery broadcasting.

place therein. What he is doing, however, is making the Regional talks as topical as possible, and timing them so that they are given when the National programme is providing entertainment.

Too Many Talks.

That does not overcome the fact that under Savoy Hill's new arrangement listeners within the area of the North Regional station get more talks than ever

The contretemps at Newcastle makes one wonder anxiously about the future of Aberdeen, which will be beyond the range of the new Scottish Regional high-power transmitter, just as Newcastle is beyond the range of North Regional. At Aberdeen, as at Newcastle, the B.B.C. has a local population to serve.

If the synchronisation experiment at Newcastle had succeeded, the problem of

(Continued on page 98.)

PROTECTING YOUR VALVES

A short article which tells you how to convert those little fuse holders, which we all know so well, into useful protective gadgets which can be mounted in an accessible position outside the set.

By F. BRIGGS.

MOST of us have a junk box of one sort or another. At least, I have yet to meet the wireless enthusiast who does not possess a collection of "bits" which the lady of the house looks upon as so much rubbish!

Not so the owner, however, for he knows very well that if he throws away the smallest piece of ebonite, it is ten to one that the next day he will want it for some little job.

It was only a few days ago that the real value of the junk box was further impressed on my mind. I was talking to a fellow radio fan about H.T. fuses, when he produced the two little gadgets illustrated here from his trousers pocket.

Ingenious Adaptations.

They were such neat little affairs, and the way they had been improved from their original form was so ingenious that I felt sure "P.W." readers would be interested in them.

When my friend found them down at the bottom of his junk box, they were the ordinary fuse holders which connect in the negative lead to your H.T. battery.

The one in the larger photograph you will no doubt recognise, as it is here seen in its original form. The other one shown to the left of the smaller illustration has been considerably changed.

In its younger days it possessed a small ebonite base, carrying a second terminal instead of the plug arrangement now fitted.

These fuse holders are very handy, but a large number of constructors discarded them while they were still in good condition. They were probably not included in the set when it was built, but were bought as an extra afterwards.

A number of people would not trouble to alter the wiring inside the receiver, so they would insert them in the negative H.T. circuit.

It was to overcome the inconvenience of this method that my friend devised the

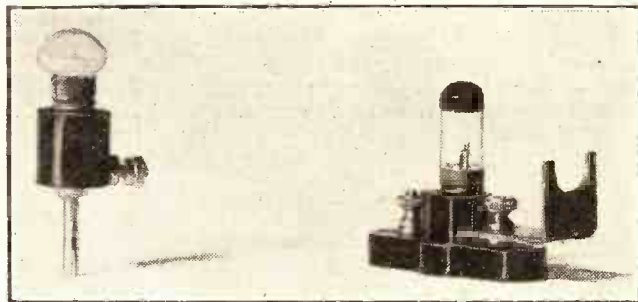
present scheme. You will see that in their converted form they are more or less fixtures.

The larger one fixes on the H.T. negative terminal of your receiver and the other replaces the negative wander plug. Either type is very easily modified.

Fits on the Terminal.

I will deal with the larger one first. All the tools required are a hacksaw, a drill, a file, and a good strong pair of pliers: or, better still, a small bench vice. The first thing to do is to cut out a small strip of copper or brass—you are sure to have a bit

In their fully converted form these useful little contrivances appear as shown in this picture. The job of conversion is extremely simple and is well worth doing.



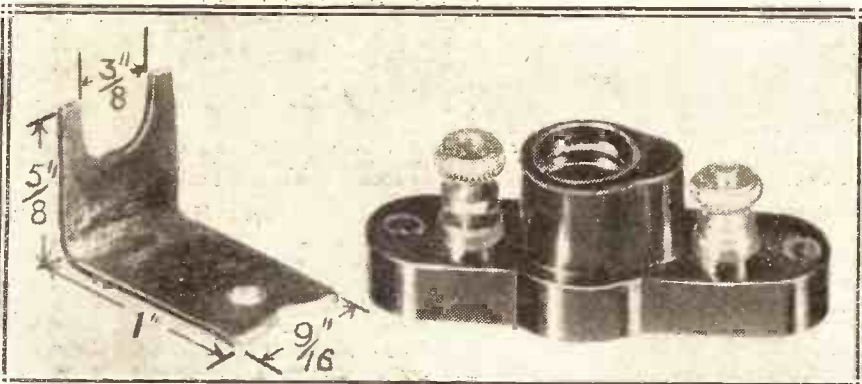
knocking about with your odds and ends—and cut it out to the size given in the photograph.

If you are lucky you may find a piece about the right size, which will save you the bother of cutting it out. Then at one end you drill a small hole to fit over one of the terminals on the fuse holder.

Makes It Permanent.

Now with the assistance of hacksaw and file you make a slot at the other end to fit on the negative H.T. terminal on the wireless set. A right-angle bend is then made 1 in. from the end with a hole in it—and there you are!

YOU CAN MAKE THE BRACKET FROM SCRAP METAL



When you have made the bracket seen on the left, it enables you to mount the fuse holder on the negative H.T. terminal of your set. From the accessibility point of view this is much better than having it inside the receiver and ten times more satisfactory than having it kicking about the table.

There is a much easier way of making this bracket, and although it does not make such a rigid job it is quite useful when there is a shortage of tools. Instead of a piece of copper or brass, get a bit of tin and cut it to shape with a pair of old scissors. An old milk tin would serve the purpose very well.

Only a Screwdriver Needed.

Perhaps you have one of the other type of fuse holders. If you have, there is a much simpler job before you, for really the only tool required is a screwdriver. This type of holder has a little round ebonite base carrying the second terminal, and is held on to the holder proper by a central screw.

All you have to do is remove the screw and take off the base. Then you look out an old valve leg, or the bottom part of a small wander plug, and fix this in the hole from which you took the screw. The result can be seen from one of the illustrations.

Either of these little dodges is well worth carrying out, as when in place the fuses are quite rigid and may easily save you the price of a new valve.

FUSES FOR YOUR SET

So now all you gadget enthusiasts, have a scrounge round your junk boxes and see if you can find one of these little fuse holders and fix it up as I have told you; it is well worth while.

WIRE AND WIRING

Some useful reminders and hints.

When wire is described as "D.S.C." these initials mean double silk covered.

"S.S.C." wire is that which has a single silk covering.

When a double winding of cotton is wound over the wire to insulate it, it is known as "D.C.C." (double cotton covered).

The abbreviation of "S.C.C." after a gauge of wire indicates that it has a single cotton covering.

Enamelled covered wire is quite satisfactory for coil winding so far as insulation goes, but it results in a coil of rather high self-capacity.

One advantage of using enamelled covered wire for coil winding is that it is impervious to damp, and does not absorb moisture like silk and cotton coverings.

If you have to run a flex lead across the ceiling remember that it can be obtained quite cheaply in white silk covering which has the advantage of being almost invisible against the ceiling.

How to build a 2-guinea Loudspeaker for 5/6

Here is an intensely interesting development—the Home Constructor's Loudspeaker, which you can build for 5/6 and which for tone and volume compares with many 2-guinea speakers you may have heard. And from a distance of 2 feet away its handsome appearance closely resembles a solid walnut cabinet of fine finish.

A WONDERFUL FREE GIFT to every purchaser of the NEW LISSEN SOLENOID SPEAKER UNIT

That extra loudspeaker for the other room is now available to you at small cost. See the completed loudspeaker above. That is what the Lissen free gift enables you to build. You buy the new Lissen Solenoid Cone Unit for 5/6. With it you will get



1. Special Cone paper printed to exact size ready for cutting out and gluing up to make a 14-inch cone.
2. Full Instruction Sheet with complete diagrams showing each operation in the building.
3. Sheet, size 28 in. x 35 in. lithographed walnut grained panelling, printed on reverse exact shapes and sizes for cutting out, including front fret. You have only to stick this on to cardboard to build up cabinet shown above.
4. The postal tube in which these gifts are packed, and which is also used in the construction.

Anybody can easily build this speaker—the essential parts are all provided for you at an all-in cost of 5/6. The other sundries such as gum you probably have at home already.

NOW YOU CANNOT FAIL TO MAKE A SPLENDID SPEAKER

LOOK WHAT YOU GET FREE!

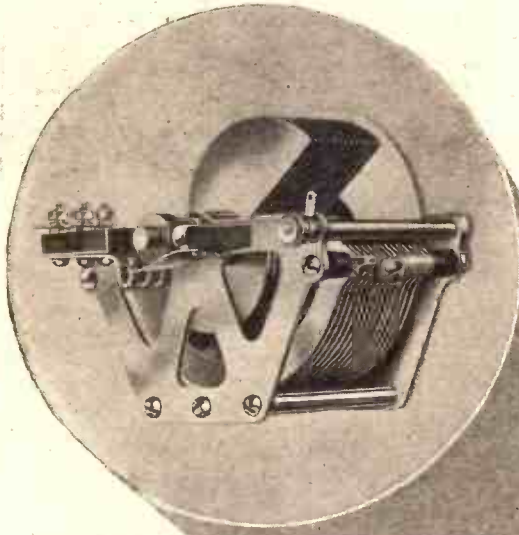
Go to your radio dealer now—he will tell you anything more you may want to know about how to build this fine loudspeaker for 5/6 only.



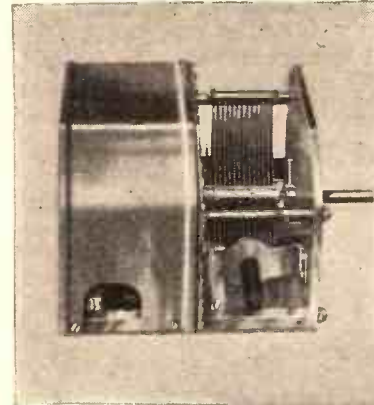
NEW LISSEN SOLENOID CONE UNIT 5/6

LISSEN LIMITED, WORPLE ROAD, ISLEWORTH, MIDDLESEX.

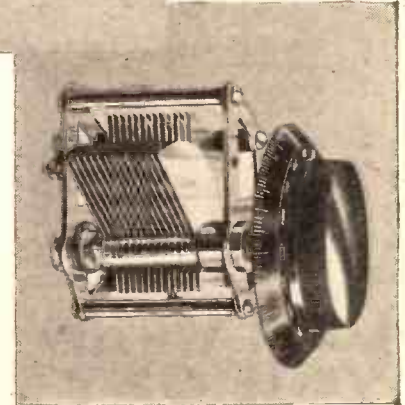
WORTH WAITING FOR— THE NEW J.B. EXTENSER



J.B. EXTENSER. Individually adjustable switch contacts. Rigid 4-point braced frame. Highly finished. Complete with Illuminated Vernier Disc Drive. '0005 mid. 14/6.



**J.B. "DREAD-
NOUGHT" ('0005).** Extremely rigid. Totally enclosed. Units matched within 1% and fitted with '0001 "trimmers." Mounted on side or base.
2-Gang - 20/-
3-Gang - 29/6



POPULAR. Extra heavy gauge Brass vanes. Nickel-plated Brass frame. High grade ebonite insulation.
SLOW MOTION TYPE (35-1) as illustrated, with 3 in. dial, 8/6.
PLAIN TYPE, 6/-; 4 in. dial, 1/6 extra.



BASEBOARD DRUM DIAL for use with ganged condensers. 4-inch Drum. Ratio 16:1. Oxidised silver or bronze panel plates. 7/6.

If it's a tuning device, J.B. make it—and make it better. In the new J.B. Extenser, for example, a silent brush contact is combined with the switch gear. And not only are the switch contacts noiseless and self-cleaning, but they are *individually adjustable*—a J.B. feature that ensures perfect contact over long periods of use. Other new J.B. products include Air-Spaced Differential Condensers at 4/3; Baseboard Trimming Condensers at 1/-; a Coupling Device at 9d. to gang two condensers while insulating the rotors, etc. See them all at

STAND No. 62, NATIONAL RADIO EXHIBITION, Olympia.



PRECISION INSTRUMENTS

The WIRELESS CHORUS



TO the majority of listeners the Wireless Chorus is a body which, like the identities of our radio announcers, is wrapped in mystery. The name "Wireless Chorus" is, of course, familiar enough to us—as familiar as the nightly "Good night, everybody—Good night," or the quarterly peal of Big Ben before the News Bulletin.

Well Known to Everyone

We know the Chorus as an expert body of singers which appears with amazing frequency in the weekly programmes, inevitably linked up with the name of Mr. Stanford Robinson. In fact, the work of the Wireless Chorus has become such a regular part of our domestic entertainment that were it to suddenly cease, we would notice its absence rather more than at present we notice its appearance.

It is strange, therefore, that having received this hall mark of "stardom," the Wireless Chorus should yet remain pretty much of an unknown quantity. Have you never asked: *What is the Wireless Chorus?* How many voices are there in it? How does it encompass so many varied types of work?

You know the name of Mr. Stanford Robinson as the Chorus Master, but what do you know of the manner in which Mr. Robinson has gradually developed the Chorus to its present high level of efficiency? You know nothing of how the Wireless Chorus gave rise to another famous body of choristers, the Wireless Singers, or of the way in which the Chorus first started the now famous Sunday-night institution, the Epilogue.

Mr. Stanford Robinson.

A few words first as to Mr. Stanford Robinson. He joined the staff of the B.B.C. early in 1924, in the days before anyone had even so much as thought about a wireless choir.

On meeting him for the first time, one has difficulty in accepting him as the brilliant musical personality the world knows him to be. He is still a young man with nothing the least extravagant or exaggerated in his appearance.

He speaks of his work as though it were the most ordinary thing in the world to institute and develop a choir that for technique and efficiency has certainly no equal in Europe. That verdict is not a personal view, but the opinion of many of the finest Continental conductors of our time.

"Let's All Sing Together" is not so easy as it sounds! Read and enjoy this interview with the B.B.C. Chorus Master, Mr. Stanford Robinson.

When I interviewed Mr. Robinson in his office at Savoy Hill, he took down from a shelf six red covered diaries which form an almost complete record of the Wireless Chorus since its inception in the late part of 1924.

"The first choir to be employed for a B.B.C. production was an amateur body

THEIR LEADING LIGHT



Mr. Stanford Robinson joined the B.B.C. way back in 1924. From that day to this he has never looked back, with the result that his Wireless Chorus is famous the world over.

called the London Operatic Choir," Mr. Robinson told me. "It was, of course, an outside organisation, and it was not until we saw the growing demand for chorus work on the wireless that we decided to form a choir of our own.

"In October, 1924, the London Wireless Chorus was formed with about twenty voices. I rehearsed them for their first microphone appearance in 'The Immortal Hour.'

But even so, comparatively little chorus work was done until early in 1925. Then we began to rehearse more frequently—twice a week instead of once a week or once a fortnight. We appeared in the Sunday Studio Services, and early in February we attempted our first big work, 'The Creation.'

Daily Rehearsals.

Mr. Robinson explained how he gradually developed the Wireless Chorus on lines that had probably never been possible before. He rehearsed his singers daily, much in the same way that he might have rehearsed an orchestra and in this way they developed a style particularly their own.

The year 1926 proved to be one of great achievement. The first big landmark in the history of the Wireless Chorus was on March 30th of that year when, augmented to eighty singers, it appeared under the conductorship of Albert Coates in a performance of "Kitesh," at Covent Garden.

The broadcast was an enormous success, and from that time chorus work became an essential part of the B.B.C.'s programmes. It is interesting to note that the Chorus took part in further performances of "Kitesh" on April 9th and 10th of this year.

The Epilogue.

On May 30th, 1926, the Wireless Chorus sang a closing hymn to a Sunday service—"Holy, Holy, Holy," and this proved to be the forerunner of the Epilogue. The Chorus had already given its first "Plantation" programme on April 26th, and one steaming July day the singers made their first gramophone records, singing Christmas Carols at Bow Church.

Mr. Robinson revealed that it was so hot that most of the male members of the Chorus had to remove their jackets. On October 7th, 1926, there came the maiden effort to sing lengthy unaccompanied works by performing Parry's "Songs of Farewell." These lasted thirty-five minutes, and Mr. Robinson still occasionally dreams of the anxiety of that performance.

In spite of his fears, however, it proved a great success, one which was immediately overshadowed by a recital of Christmas

(Continued on next page.)

WAVELESS WIRELESS?

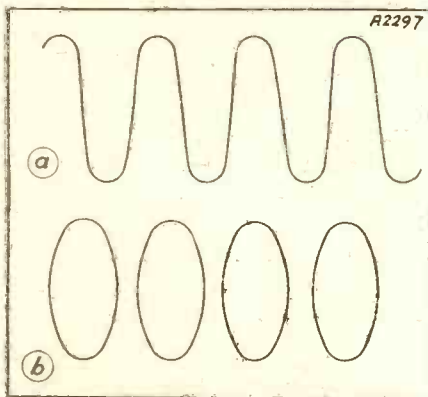
By G. H. DALY.

ARE wireless waves really waves—that is, in the true meaning of the word?

We have grown so accustomed to speaking of wireless in terms of waves in the ether that it seems absurd to suggest that wireless radiations are anything else. Yet this is the view put forward in a recent scientific discussion.

Professor G. P. Thomson, the discoverer of the radiations which accompany the movement of electrons in the atom, has been speculating upon the medium in which

WHAT'S A WAVE?



We always think of waves as in (a), but the new conception is of separate radiations, as in (b).

these waves take place; in other words, the ether.

On the other hand, another scientist puts forward the suggestion that a medium such as the ether is not now required to explain these or any other so-called ether vibrations. In short, they are not waves in any medium at all—that is, as we understand the undulations of the sea, for instance.

In our student days the first lesson on ether waves always consisted of that hoary example where a stone was thrown into a pool, thus causing ripples. Immediately our minds pictured wireless radiations as

something vaguely similar to this, but taking place in another and more mysterious and peculiar medium, the ether.

That conception is apparently wrong; we do not need a medium through which wireless waves can travel. The ether is unnecessary for the propagation of light, wireless and all other rays of the spectrum.

If this theory is correct it means goodbye to the ether, for undoubtedly this new conception is much more likely, and puts far less strain on the imagination.

The New Theory.

We do not, however, dispense with waves altogether; the whole science of wave mechanics has been built upon the fact that light and other radiations are in the form of waves. We have always regarded them as being in this formation because, if they were not, such phenomena as interference, polarisation and refraction would be impossible; yet we may be wrong, and these phenomena may occur without waves.

Nor does this new theory rest here, for if we accept it as being correct it is hardly correct to speak of ordinary sound being in the form of waves; instead, we must regard it as being variations in the pressure of the air.

Truly, the old order changeth!

GENTLE REMINDERS

Erratic reaction or no reaction with a dual-range coil is often due to a reversed winding.

A continuous howl that does not vary with the tuning adjustment is a sign of L.F. instability.

The grid leak of a short-wave set can often with advantage be increased up to 10 megohm.

THE HANDY SHAVING BRUSH

IT is a mistake for any radio man to throw away his old shaving brush, for it is capable of playing a very useful rôle.

When, therefore, your shaving brush

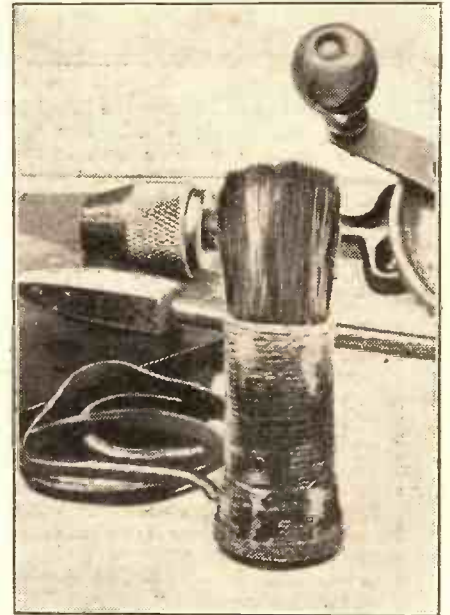
passes its normal working days, take it and soak it in water for twenty-four hours in order to extract all remnants of soap and alkali from it. Give it a good rinse in running water, and then allow it to dry.

Trimming it Down.

Now, with a pair of scissors, trim down the bristles so that they are about an inch in length and stubby all over.

A brush in this condition is an excellent adjunct to the radio worker's outfit, particularly amongst the soldering kit. For cleaning up parts previous to soldering, for removing traces of flux from a wired-up panel, and for doing all sorts of similar jobs,

“AND THE NEXT, PLEASE!”



Don't throw your old shaving brush away, but use it as suggested in the accompanying article.

a pensioned-off shaving brush of this nature will often be found to be “a boon and a blessing.”

For cleaning a soldering iron, too, the shaving brush will have its use, and an iron which is given a brush-up with this handy implement after every use will generally be a tool which is kept in good condition and possessed of a long working life.

Carols from Whitechapel Church on December 24th. Letters of appreciation were received from all over the world.

The present standing strength of the Wireless Chorus is forty voices, and it is frequently subdivided to undertake different styles of work. For instance, one section of the Chorus may be engaged on a Bach Cantata for a Sunday programme, whilst another may be working on musical comedy or revue. For such is its versatility.

Recruited from the “Ranks.”

The total number of rehearsals is now anything from twelve to eighteen a week, but, as a rule, no single person undertakes more than twelve, for the work is particularly exacting.

Practically all the singers have been recruited from unknown applicants for auditions, and Mr. Robinson assured me that he would welcome any new singer of

THE WIRELESS CHORUS

(Continued from previous page.)

outstanding ability for the Wireless Chorus. But remember—every member is not only a first class choral singer, but a competent musician as well.

The Wireless Singers are an offshoot of the Wireless Chorus, and bear the same relation to the Chorus that a string quartet bears to a full orchestra. The Singers were originally specially selected members of the Chorus.

There are now eight of them in all—four of them were with the original team—and besides leading the Chorus they perform the more specialised types of vocal ensemble music, such as Madrigals, Gleees, Part Songs and Folk Songs.

The National Chorus of two hundred and sixty voices, of which Mr. Stanford Robinson is also Chorus Master, bears only a distant relationship to the Wireless Chorus. In 1927, a large chorus was required to broadcast a recital of new works from the Albert Hall. This was recruited from volunteers, and on two or three subsequent occasions re-formed for fresh recitals. Finally, the B.B.C. decided to form a new amateur choir, and christened it the “National Chorus.”

Real Hard Work.

That, in brief, is the story, and perhaps, when next you hear the Wireless Chorus through your loudspeakers, you will spare a thought to the months and years of thought, practice, and experience which have raised the Chorus to its present state of excellence. We listeners are sometimes apt to be too hasty with our grumbles and too frugal with our thanks.

THE FULLER BATTERY 'LIFE PRESERVER'

The new patented Fuller "Life Preserver," which tells the state of the charge at a glance.



Every Fuller L.T. Accumulator of the Free Acid Type in glass or celluloid box is now fitted with these simple but invaluable indicators. You can't mistake the message. When both indicators are at the top, the battery is fully charged. When the white indicator sinks to the bottom, half the charge has been used. When the red indicator sinks, the battery needs re-charging immediately. With this infallible guide, you need never find yourself without an active accumulator, doomed to a week-end of silence and boredom. More than this—the life of the battery will be lengthened. Nothing puts a battery out of action so quickly as allowing it to become completely discharged. This is just one more illustration of Fuller attention to details. Type L.D.G.H., L.T. Accumulator has other patent devices, exclusive to Fuller. Patented double grease-cup terminals, with moulded polarity signs, preventing corrosion by acid. Mammoth plates, with micro-porous paste. A patented non-slip metal carrying handle which folds out of the way when not in use. Ask your dealer to show you type L.D.G.H.-2v. 60 a.h. Price, 9/6. Dry charged—also other sizes for low intermittent current service.



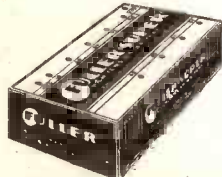
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Contractors to British and Overseas Government Departments, Railways, etc.



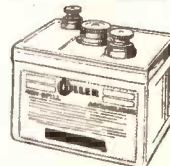
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Patent double grease-cup terminals eliminate risk of acid creep. Strong, durable ebomite container. Micro-porous paste. There is a type for every car and motor-cycle. Ask for lists.



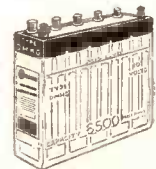
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FULLER ACCUMULATOR CO. (1926) LTD., CHADWELL HEATH, ESSEX Telephone: Seven Kings 1200. Telegrams: "Fuller, Chadwell-Heath."

100% SUCCESS AT LAST

SEE PAGE 43

Conforming with our NEW 1932 POLICY announced in Page 43 of this issue, PILOT KITS for all "P.W." Sets are now prepared as AUTHORS' KITS exact to the specification of author's original published design.

PILOT AUTHORS' KITS FOR P.V. PLUS

KIT "A" AS IN AUTHOR'S SET

£ s. d.		£ s. d.	
1 Panel, 18 in. x 7 in.	6 0	1 Dubilier 2-meg. grid leak and holder	2 9
1 Baseboard 10 in. deep	1 6	1 R.I. P.J.2 coil	1 6
2 Formo-0005-mfd. Extens. sors	1 9 0	1 Ready-Radio P.J.3 coil	2 0
1 Ready-Radio Filament switch	1 0	1 C.B. Battery clip	6
1 Ready-Radio 0001, 00012 or 00015-mfd. differential reaction condenser	2 6	1 Terminal strip 18 in. x 2 in. ready drilled to specification	2 0
1 T.C.C. 1-mfd. fixed condenser	2 1 0	10 Indicating Terminals	2 6
1 T.C.C. 01-mfd. fixed condenser	3 0	2 Goldtone electrode clips	3
1 Telson 001-mfd. fixed condenser	6	1 Parexscreen, 10 in. x 6 in.	2 0
1 Telson 0003-mfd. fixed condenser	6	2 U.B. 4 H.T. and 2 L.T. Belling-Lee plugs	1 4
1 Ready-Radio and one Telson H.F. Choke	6 6	2 Coil Quits	1 0
1 Bulgin 600-ohm spaghetti resistor	9	Flex. screws, wire, etc.	2 6
1 Igranite L.F. Transformer	10 6	4 oz. No. 30 D.S.C.	2 6
1 Handsome cabinet	£1 0 0	Kit "A" Cash or C.O.D.	£4 7 8
3 Valves (as specified)	£1 19 0		

C.O.D. CASH H.P. as usual

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EKGO H.T. UNIT. Type A.C.25. For multi-valve sets requiring up to 25 m.a. 3 tappings. S.G., detector and 120/150 volts. For A.G. Mains. Cash or C.O.D. Price £3 17s. 6d. Balance in 11 monthly payments of 7/1 only. Send **7/1**

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EKGO K.12 COMBINED H.T. ELIMINATOR and L.T. TRICKLE CHARGER. 12 m/a suitable for 1- to 3-valve sets. S.G. 80v., 120/150v. charging rate 1 amp. at 2, 4, or 6 v. Cash or C.O.D. £3 19 6. Balance in 11 monthly payments of 7/4. Send **7/4**

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AMPLION M.C.S. MOVING-COIL SPEAKER, with output transformer and permanent magnet. Complete. Cash Price £3:7:6. Balance in 11 monthly payments of 6/2 only. Send **6/2**

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LAMPLUGH OR FARRAND INDUCTOR SPEAKER for perfect reproduction. Unit and chassis complete, ready mounted. Cash Price or C.O.D. £3 10 0. Balance in 11 monthly payments of 6/5. Send **6/5**

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Improved version of this famous 4-valve set. 2 Screened-grid, Detector and Power. With valves and cabinet **£10:15:0** or 12 monthly payments of 13 8.
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Screened-grid, Detector and Pentode. With valves less cabinet **£6:10:0** or 12 monthly payments of 11/4
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THE GERMAN EXHIBITION



ALTHOUGH there is said to be a shortage of money in Germany their Radio industry seems to be in a most flourishing condition, so far as one can judge from the variety and excellence of the sets, and the crowds which daily throng the Berlin Exhibition.

It is rather difficult to understand why this should be so at first sight. But it was explained to me that the average German is turning to radio as the cheapest form of entertainment now open to him. Time was when he spent the greater part of every evening in his favourite café, where, for a few pence, he could sip his glass of beer or cup of coffee and listen to a good orchestra.

High Licence Fee.

At the present time prices are so high that he cannot afford, as a regular habit, the cost of the single drink that entitles him to a seat in the café for the whole evening. So he is beginning to cultivate seriously the practice of listening to the broadcast programmes at home. And even this privilege costs him pretty dearly, because he has to pay a licence fee of two shillings a month, as compared with our 10s. a year.

This comparatively stiff licence fee is, of course, rather a handicap. There are very nearly four million licensed listeners in Germany, just as there are over here. In fact, it is a neck-and-neck race which country will reach the four-million mark first, but as the total German population is more than double ours, they have still a lot of leeway to make up before they can compete with us on an equal footing.

Spacious and Artistic.

The first thing to impress the English visitor to Berlin is the spaciousness and artistic surroundings of the Exhibition as

A BREAKAWAY



This all-mains receiver has most of its controls placed on the lid, and is quite unlike the usual British receiver of the same class.

* * * * *

We hear those German stations so easily nowadays that a review of their great Radio Exhibition cannot fail to be interesting. Here is a first-hand account of Berlin's "Olympia."

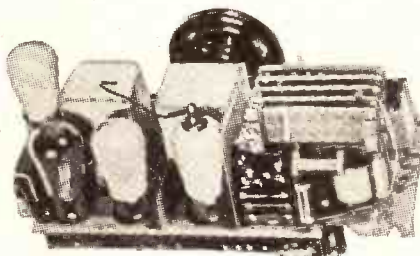
By THE EDITOR.

* * * * *

a whole. The main display halls are grouped in a vast quadrangle around the foot of the "Funkthurm" (or aerial mast) of the well-known Witzleben Station. This soaring structure—an ideal centre for a radio exhibition—is the most prominent landmark for miles around.

The space between the Funkthurm and the main buildings is given over to cafés and

THE CHASSIS SYSTEM



The advantages of a metal chassis with its own rigid screening have led to the introduction of many models on the lines shown here.

restaurants; so also are the lower stories of the tower itself. In fact, there is little need for the visitor to look long, or far, for a place of rest and refreshment when the more serious side of the Exhibition begins to pall. There is ample room to sit at ease and drink in comfort. One is inclined to regret that the same cannot be said of our own Radio show at Olympia!

At night, when the Funkthurm and buildings are lit up, the Exhibition is easily the outstanding centre of attraction for the whole Charlottenburg district, which lies just to the west of the famous Tiergarten or Hyde Park of Berlin.

"Talkie" Gear as Well.

Besides radio sets and components the Show includes sections devoted to the Phonograph and Talking-film industries, both of which are becoming more and more closely linked up with radio through the thermionic amplifier.

On the radio side the number and variety of sets and components are legion, the all-mains type being specially prominent. Receivers ranged from cheap two-valvers for local loudspeaker reception, to expen-

sive five and six-valve models, usually with two stages of S.G. amplification for long-distance working.

Strangely enough, the Super-het circuit was not much in evidence. This I was told was due to the fact that the German listener is satisfied with the selectivity obtained from two S.G. stages in a "straight" circuit. He does not, so far, favour what he considers to be the unnecessary "complication" of the Super-heterodyne with two tuning controls.

Not up to British Standards.

On this point I advised my informant to come over and see for himself what the British designer could do in the way of Super-hets at Olympia. There he will be able to find Super-hets as simple to operate as any straight-circuit receiver, and combining razor-edge selectivity with excellent quality.

We may perhaps fall a little short of perfection in the way of artistic surroundings and of "comfort" for the "inner man," but we can certainly deliver the "goods" so far as Super-hets are concerned or, for the matter of that, any other type of circuit.

Apart from the high standard of workmanship in straightforward design and assembly, there is little calling for special mention in circuit developments, though there were various ingenious improvements in points of detail.

A Handy Gadget.

One gadget—the autoscale—seemed to be very popular. It is a handy method of marking-off stations on a plain tuning-dial. Made-up sets of from 20 to 100 flat clips, each printed with the name of a different

(Continued on next page.)

DESIGNED TO LAST



As in this country there is a tendency in Germany to cover and completely enclose the receiver so as to protect it from dust and disturbance. Here is a Telefunken set for local reception that illustrates this trend in design.

THE GERMAN EXHIBITION

(Continued from previous page.)

transmitting station, are adapted to slip over and grip the edge of an otherwise unmarked tuning-dial, so as to indicate the point where the station is brought in.

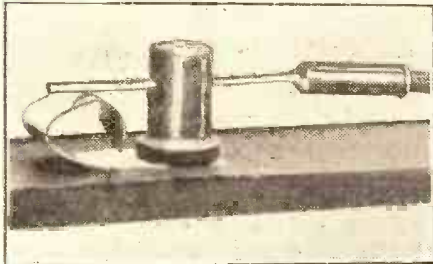
The idea is simply to allow each listener to calibrate his own set in an effective and inexpensive fashion, and in such a way that rapid readjustments can be made for any alteration in the official wave-length allotted to any particular station.

Kit-Sets Popular.

Although the home constructor is perhaps not so much in evidence in Germany as in England, he is being catered for to an increasing degree. A brisk trade was done, for instance, in blue prints and layout schemes, particularly for fighting interference kit-sets.

There did not, however, appear to be much variety in the circuits available,

FOR QUICK CONNECTIONS



The springy brass strip makes a good joint in an instant (see below).

whilst the price of the blue print seems rather high at half-a-crown. The amateur interested in television can also obtain blue prints of recurring circuits, though the supply of the necessary components is limited.

I noticed an ingenious little tool for constructors called the "Nagelfix," for driving home small nails—of the kind that are so irritating to handle in the ordinary

way. The gadget consists of a small tube about 3 in. long, and hollow at the bottom.

The nail is slipped head-first into the hollow end, where it is held fast by a magnet at the bottom of the bore, so that it stays in position whilst the tool is turned over and placed over the precise spot on the panel or board into which the nail is to be driven.

A sharp downward thrust then causes the lower part of the tool to telescope into the upper part, the nail being simultaneously driven in flush with the surface of the panel at the selected spot. A very simple and handy performance, calling for none of the strong language which often accompanies such a job.

It is part of the German character to be thorough in whatever he does. In one respect English listeners might well follow the methods adopted over there to cope with the problem of man-made "static."

The "Deutsch Funkhilfe" or German "Broadcast Listeners' Association," which occupied one of the stalls, has been organised with the object of tracking down any noisy electric motor or similar source of local disturbance, and of making polite remonstrations to the owner to the effect that he is disturbing the peace of broadcast listeners in the neighbourhood.

If this is not sufficient, the methods of the organisation become less polite, and, unless the owner of the offending apparatus takes proper measures to stop the disturbance, he is promptly prosecuted in the local court.

The organisation now counts upwards of 7,500 official helpers or "static sleuths," and in addition to more drastic methods is engaged in conducting a vigorous publicity campaign throughout the country against all disturbers of the peace and quietness of the ether.

The knob-twirling fiend is evidently rampant in Germany, judging by the amusing protest against his activities which occupied another stall. The "exhibit" consists of a large sheet of canvas painted to represent the outside of a tenement house of the typical Berlin type.

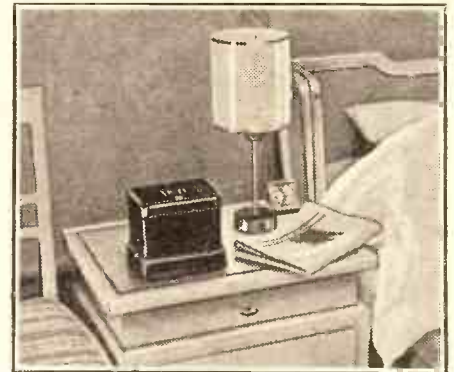
Presently the outside wall is illuminated from behind, and one sees the corresponding

interiors—all except one room, which is left dark. In each case the inhabitants seem to have been stricken mad. Some are pulling at their hair, others smashing furniture, and all behaving in the most frantic fashion.

Crushing The "Howler"!

A few seconds later these scenes are wiped out and replaced by a view of the interior of the room previously left dark. Here is the source of all the commotion—a looney-looking individual calmly and methodically twisting the dials and swinging the reaction coils of a set that looked as if it had come out of the ark.

A TINY TOT



Inside the box is a complete set—a feat in radio engineering of which the Germans are very proud.

Crude, perhaps, but good publicity. At all events it made a strong appeal to a large and shifting audience, many of whom, judging by their remarks, had suffered from the same kind of annoyance.

The famous "Bar" valve, made in the shape of a thin cylinder with an external grid, of which so much was heard last year, has apparently not proved a success in practice.

At all events, it does not appear to be used in any of the ordinary sets. The Telefunken Company are, however, marketing a new "variable mu" valve in which the grid and plate electrodes have a graduated instead of a fixed spacing, relative to the cathode.

ABOVE is illustrated a handy pattern of terminal which will make its appeal to many a radio worker.

The design is simple and obvious enough. An ordinary screw-down terminal has its upper screw removed, and a piece of springy brass, bent in the manner shown, is secured to the panel beneath it.

The advantage of this terminal is, of

SOON MADE!

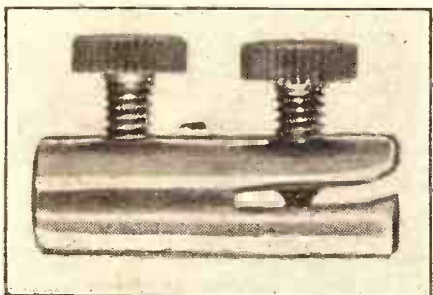


Fig. 1. The single hack-saw cut converts it to a battery connector.

TWO USEFUL HINTS.

A Spring Terminal—Barrel-Type Connectors.

course, merely one of rapidity of working. A stiff wire or tag when pushed through the terminal will be held in good electrical contact by the upward pressure of the springy brass. Moreover, the wire tag can be withdrawn in less than a second, there being no clamping screw to manipulate.

Barrel-Type Connectors.

Ordinary barrel-type brass connectors make excellent terminals for flash-lamp battery use and it will pay users of these batteries to have a few such accessories handy.

Place one of the barrel-type connectors in a vice and, by means of a fine saw, make a cut about half-way along its length. You will have now provided yourself with a

terminal of the type illustrated in Fig. 1.

This connector is useful for taking leads from a flash-lamp battery, the lead wire being joined up at one end of the terminal, and the slot serving to allow the article to be slipped over and screwed to the flash-lamp battery tag.

If, instead of making a saw cut at one end of the connector only, we make a cut at both ends, the resulting product (Fig. 2) is a handy little device for rapidly (and securely) joining up two battery tags.

JOINING BATTERY STRIPS

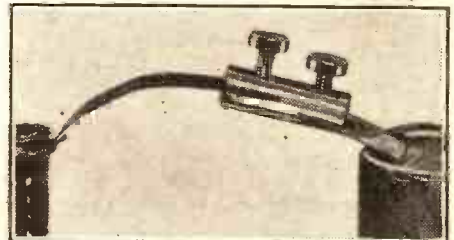


Fig. 2. Here a cut at both ends makes good contact the work of a moment.

AMAZING NEW FILAMENT

10% MORE FOR YOUR MONEY!

Another great triumph for Osram Valves!

After extensive research and experiment a new 2-volt filament has been evolved giving:—

**10% GREATER ELECTRON EMISSION
THAN ANY OTHER 2-VOLT FILAMENT OBTAINABLE**

This is the latest discovery of the G.E.C. Research Laboratories at Wembley. The "Wembley" filament means, that without loss of amplification, valves of amazing efficiency can be made with adequate electrode clearances. The avoidance of close electrode clearances results in:

- 1 Greater consistency between valve and valve.
- 2 Cutting out internal contacts and valve troubles.
- 3 Production of non-microphonic valves even under most exacting conditions of use.

THE NEW "WEMBLEY" FILAMENT MEANS MORE RELIABLE WIRELESS, PURER TONE AND MORE FOREIGN STATIONS.

**LONGEST
2 volt VALVE
FILAMENT
IN THE
WORLD**

**GREATER
EMISSION
FOR
LESS
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Osram
2 VOLT BATTERY
Valves
MADE IN ENGLAND

SOLD BY ALL
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with the
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Write for the Osram Wireless Guide (1931 Edition), Sent POST FREE on request.

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Advt. of The General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2 (also at the National Radio Exhibition)

BATTERIES *for* COLLECTORS

By R. E. BLAKEY.

Some interesting specimens that are readily obtainable.

IN a previous article I dealt with various antique components, and so in this article I will deal with perhaps the oldest form of antique we can hope to possess, namely, the primary cell in some of its various forms.

A Very Early Type.

THE VOLTAIC CELL (1799). This is perhaps the most primitive type of cell; personally I can think of no other before it. It consists of a glass jar, generally cylindrical in shape, which contains a zinc and copper plate.

These elements protrude above the top of the jar and connections are made at the top by means of copper wires. They are immersed in sulphuric acid.

THE BUNSEN CELL

Seeing this cell is so simple in form, we shall have to keep a sharp lookout for fakes. When in battery form, the cells are simply arranged in a row upon a wooden board, and are connected together by means of the copper wires. So far as I can discover the E.M.F. of the cell should be 1.5 volts.

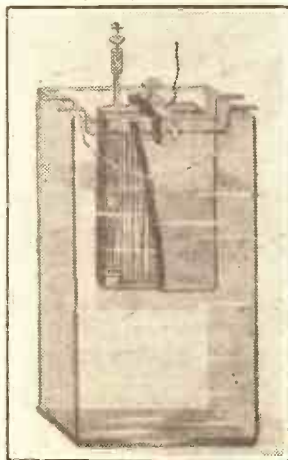


One of the first popular type cells.

Over a Hundred Years Old.

CRUIKSHANK'S BATTERY (1801) is made up in a wooden trough which is divided into a number of compartments by means of rectangular copper plates; a sheet of zinc is soldered to each copper plate, and the compartments filled with dilute sulphuric acid. A single plate of copper is plunged into the acid at one end of the battery, and a zinc plate at the other end, forming respectively the positive and negative terminals.

SMEE'S BATTERY



Note the "half-way" plates.

WOLLASTON'S BATTERY (1802). This is an improvement on the Cruikshank battery. The zinc is a substantial plate, rectangular in shape, having a portion projecting upwards and soldered to a copper strip.

The copper plate is thin, and is bent round the zinc one in a U-shaped formation. The plates are prevented from coming into contact by means of cork spacers at the top and bottom. The copper plate projects upwards in the form of a strip, which forms the means of external connection.

Popular in its Day.

GROVE CELL (1838) had a number of forms, but the following seems to have been very popular. The outer vessel consists of porcelain or ebonite, and measures 5 in. high by 3 in. by 2 in. The positive element consists of amalgamated zinc bent in to the form of a "U."

In the bend of the zinc is placed the porous pot, rectangular in shape, which is made of unglazed earthenware. The negative element consists of a plate of platinum which measures 5½ in. by 2¼ in. .002 in.

Remember such a cell can be expensive if the platinum is in good condition. If the owner does not know it is platinum, well, I wish you a great bargain!

SMEE CELL (1830). This cell is made up in a number of ways, the following being one of the most popular: The positive element consists of two rectangular plates of thoroughly amalgamated zinc, in between which lies the negative element in a parallel direction.

This negative element is either of solid platinum, and has a fine black powder which is some form of platinum also, from what I can learn, electrically deposited upon it; or a silver plate with this same "platinum powder" deposit; or a copper plate, first with a silver deposit, and then a platinum deposit.

So take pains to see what you are buying here. The container is of glass, and the plates are but half-way down the container, not right to the bottom as our present-day batteries.

Cutting the Cost.

BUNSEN CELL. This cell was produced to bring down the cost of batteries. It is like the Grove cell but for one point. That is the negative element consists of a block of hard retort carbon instead of platinum.

The carbon block carries a terminal at the top. It is square in section and is contained in a circular porous pot. The zinc forms a nearly complete cylinder encircling the porous pot, and the whole is contained in a circular pot of glazed earthenware.

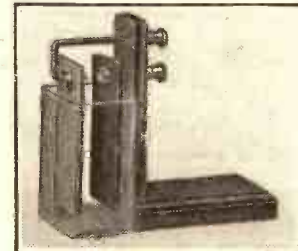
BICHROMATE CELLS. The Bottle type. The negative element is composed of two



carbon plates which are fixed parallel to each other and fixed to them is a brass terminal which protrudes from the top of the bottle.

The positive element consists of a zinc plate which is situated between the two carbons and parallel to them. The upper portion of the zinc plate is attached to a

A SIMPLE VOLTAIC



A very early cell comprising two simple plates immersed in acid.

brass rod which slides tightly through a collar in the ebonite top, and by means of which the plate can be raised out of the liquid or immersed in it when desired.

Whilst on this subject, it would not be out of place to procure a standard Leclanché cell, seeing this is really old in design.

Interesting Possessions.

Now, cells are very attractive things to possess, but

it will be hard work finding them; of course, as mentioned in a previous article, they will be unearthed when their owners get to know they are "marketable." Pay particular attention to the condition of the cells, and look after them well.

It is surprising the amount of interest that can be obtained from them. What is more, they may prove valuable in years to come.



A later voltaic type. But even these are so primitive that faking is easy.

MIND THE FAKES

A MOVING COIL UNIT BY AMPLION

FOR 676

THE famous Amplion M.C.6 Unit is acknowledged as representing the best value and the greatest efficiency amongst small permanent magnet moving coil speakers. Its reproduction and sensitivity are really remarkable, and it will handle without distortion adequate volume for all normal requirements. It requires no external excitation and the universal transformer which is fitted, enables the speaker to be correctly matched to either Power, Super Power or Pentode output from standard British 2, 3, or 4 valve receivers.

Make a point of visiting the Amplion Stand No. 75 in the EMPIRE HALL, Olympia, during the Radio Exhibition, where all AMPLION Moving Coil Speakers will be working.



M.C.6 UNIT

Complete with transformer ready to mount on baffle, or in cabinet.



**Also in
Handsome
Cabinets**

(complete with transformer)

The M.C.6 Unit is also available in handsome cabinets of very modern and striking design. The oak model is illustrated here.

M.C.6 Oak £5-10-0

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Available on Deferred terms

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The M.C.9 Unit is also a permanent magnet type, but is much larger and more powerful than the M.C.6. A suitable matching transformer for this model can be supplied at 15/- extra.

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D.C. ENERGISED MODEL

A most efficient unit for D.C. Voltages 100/110, 203/240, very suitable for A.C. sets. Unit only.

29/6 Unit with matching transformer **42/-**

Write for folder W.L.51, which gives full details.



WHILE staying with friends at Hillmorton, I received an invitation from one of the engineers in charge at the Rugby station to have a look round the station.

The route to it is somewhat roundabout, for any attempt at a short cut is summarily dealt with. The station looks tantalisingly near, across the green fields, but in every direction save the public highway large red notice boards caution one with "Danger," so we judged discretion to be the better course, and after a two-and-a-half miles stroll found ourselves at the main gates.

The Station Entrance.

Here we paused and looked down the long, deserted avenue leading to the station buildings. Somehow, one had an uncanny feeling as though about to enter a huge trap; once through the archway, and those hefty currents might get to work. We took the plunge, and were a little disappointed to find that not even a hair of our heads crackled.

At the end of the avenue we had our first "close up" view of one of the 820-foot masts. Seen from the surrounding country they appear as tall, slender spires; close at hand one is literally awed by the vastness of the structure, and wonders that the skill and ingenuity of man can handle such a mass of material.

Once see the area of solid concrete in which they are embedded and you have no fear for their safety in the wildest gale. The insulators are about the size of armchairs, while the lead-in wire looked fit to anchor the Mauretania.

Cracked by Lightning.

A glass window several inches thick, close to the lead-in, was badly cracked, and we learnt later that this was the result of a direct hit on the aerial by lightning. Even the enormous down-lead had been unable to carry the current away fast enough.

Inside the station we found someone in charge, who took us along to our friend in the control

A "P.W." correspondent describes his visit to the World's International Radio Telephone Exchange.

room. This room runs the full length of the building and contains the whole of the main transmitting apparatus.

At one of the control panels we found our engineer busily engaged in plotting a complicated graph. In front of him were rows of dials. The most interesting was a

set of dials, about alarm clock size, giving the current consumption of the valves, not in milliamps, but good solid amps.

Some Circuit!

My eye caught what looked like an Ordnance map on the wall. "That's the circuit diagram, have a look at it and see if you can make anything of it." I discovered the aerial and earth, when I must have taken a wrong turning, for I ran bang into a bank of amplifiers, relays, and heaven knows what. It was too much, and I threw up the sponge.

"Oh, it's easy on paper," said the engineer. "What do you think of this?" Opening a panel at the back of the control board he disclosed a perfect maze of wiring, the whole length of the panel, disappearing far into its depths.

Meanwhile, on three sides of us valves glowed brightly in banks of about a dozen, surrounded by a network of steel safety grilles. Open the door to reach the valves and the current is automatically switched off from that bank.

Should a valve "blow up" it cuts itself out of circuit, and the remainder continue the good work. The anodes, like old-fashioned carriage lamp sockets, dipped into water, and well they might with 7,000 volts on the plate. One could plainly hear the water sizzling under the great heat developed.

Fifty Pounds Each!

A cupboard held many specimens of these giant "tubes," and we were allowed to handle one. Very gingerly, I may say, after our friend had warned us "Don't let it drop, or it's £50 gone west."

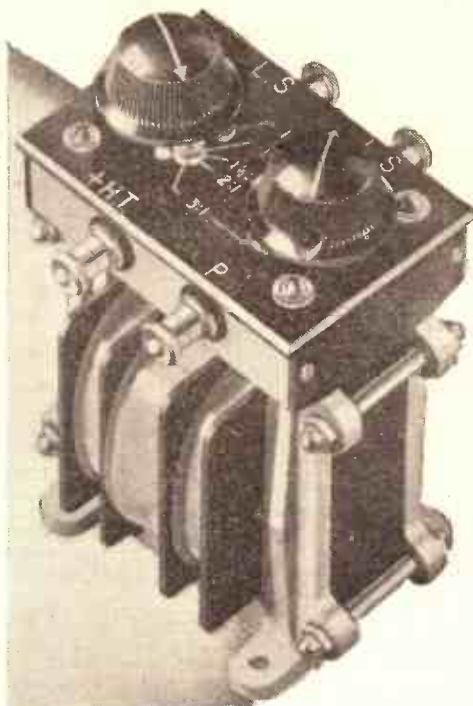
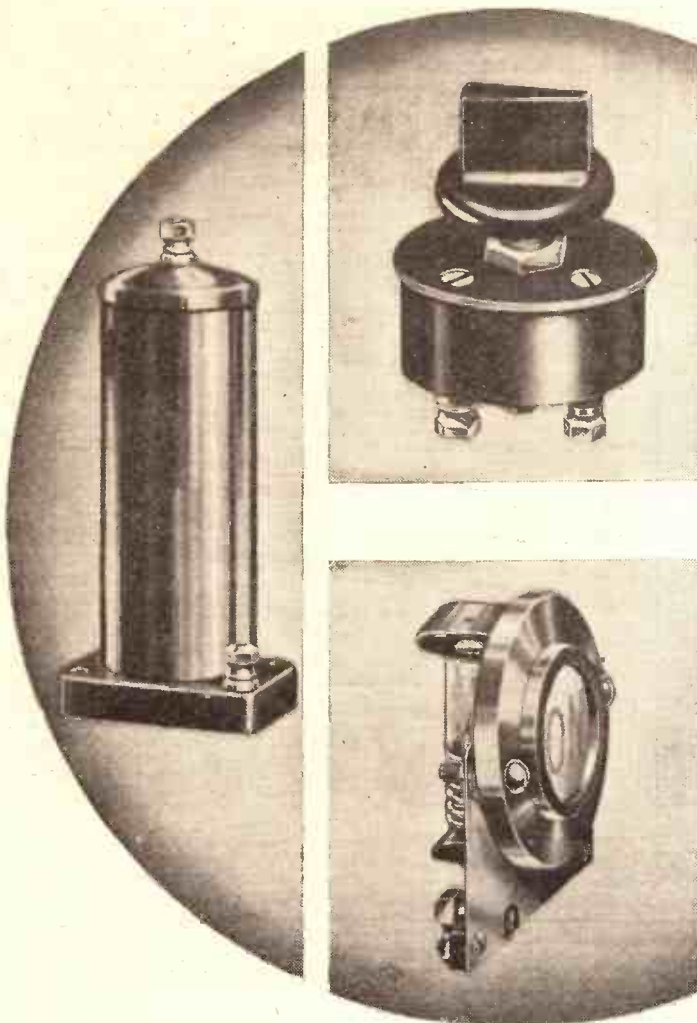
Unfortunately our guide's time was up, and he had to go on duty. Before parting with us, he took us to the exit at the rear of the station, and showed us one of the aerials of the beam transmitter.

After a few minutes' chat we thanked our friend and departed. As we walked away from the buildings we could not help marvelling at the ingenuity of the designers of this colossal station.

THE EAR OF THE WORLD



The New York telephony set at Rugby, the giant station through which a British telephone subscriber can now speak to about 90 per cent of the whole world.



READI-RAD SUPER-HET H.F. CHOKE

Specially designed for use in the modern type of Super-Het frequency for excluding the intermediate frequency circuits from the low frequency circuits. Should also be used wherever a Choke of extra high inductance is advisable. Price 5/6

READI-RAD STANDARD H.F. CHOKE Price 4/6

READI-RAD SNAP SWITCH

Almost instant action, the elimination of all noises and the instant suppression of arcing with exceptional positive and direct contact. Made in two types—"Radio-Gram" (single pole change over) and "On-Off." Price 2/9

READI-RAD PANEL LIGHT

Shows the word "ON" in glowing red when the set is switched on. Adds a distinctive touch to the set and prevents battery wastage. For battery-operated and mains sets. Price 2/3

QUALITY

depends on
ACCURATE MATCHING
of valves and speaker

The most certain way of obtaining perfect balance between your output valve and loud-speaker, is to use the INSTAMAT Output Transformer. The INSTAMAT is the only Output Transformer capable of giving you perfect quality instantly by the turn of a switch. Just connect between the output from your set and your loud-speaker, turn the switches until valve and speaker are accurately matched and you will be delighted with the improved quality.

INSTAMAT
OUTPUT TRANSFORMER

(Guaranteed for five years)

For all types, except moving-coil speakers. Five different ratios all clearly marked.

Price 27/6

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For low resistance moving-coil speakers. Six ratios: 10 to 1 up to 25 to 1.

Price 37/6

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BE
SURE
TO
VISIT
STAND
6
OLYMPIA

DAILY MAIL RADIO

GET YOURS TO-DAY

"At-a-Glance"

Hallo!
Hallo!

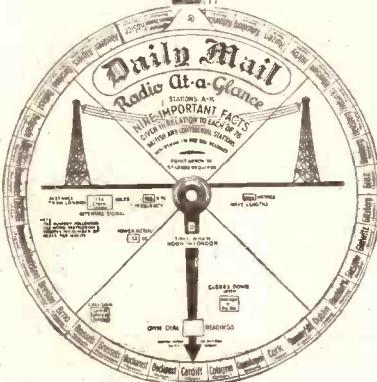
Polskie Raadjo Varshava.

How many times does your radio set bring in stations which you cannot locate?

Identify them with the aid of this chart which gives

76 BRITISH AND CONTINENTAL RADIO STATIONS with frequency, power, wavelength, interval signal, closing down announcement, call-sign, etc., etc.

How often haven't you longed for a ready-to hand way of recording and discovering your own dial readings for various foreign stations?



1/- EACH

DIAMETER 9 1/2 IN.
DOUBLE-SIDED.
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At all Wireless Dealers, Bookstalls, Stationers, etc. If any difficulty, write direct to **FRANK PITCHFORD & CO., LTD.**, Well House, Well Street, London, E.C.1.

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The British Ideal "DAPTACON" PICK-UP and PATENT CARRIER-ARM is a complete departure from anything of its kind. Even though your radio be only a ONE-VALVE Set the "Daptacon" is so sensitive that it will give splendid loudspeaker reproduction from Gramophone Records. This Pick-up is supported by a patent Carrier-Arm which ensures that the Pick-up travels across the record in a dead straight line, minimising wear on the record grooves.

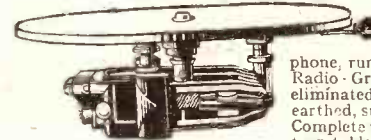


PRICE **32/6** COMPLETE

The Set, beautifully finished in Florentine Bronze, is absolutely complete in box with full instructions, ready for use with any power or make of radio set. This Pick-up is also supplied on a straight arm of conventional type at the same price.

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The "DAPTACON" ELECTRIC GRAMOPHONE MOTOR is the only universal A.C. or D.C. motor covering all voltages 100 to 120 and 200 to 250. Therefore can be used anywhere by simply plugging into any electric light socket. All frictional surfaces automatically lubricated.



spindles run in best bronze bearings, and have ball-bearings to take up end play. Guaranteed not to heat up. Fits easily into any Gramophone, running costs negligible. When used in a Radio-Gramophone electrical interference is eliminated by use of a small condenser, fully earthed, supplied without extra cost. Complete with 12-inch plush-covered turn-table **55/-**

The well-known "DAPTACON" products are on sale at leading dealers everywhere. Trade Enquiries to: **BRITISH IDEAL PATENTS, LTD.**, Green Street, Brimsdown, Middlesex. Phone: Enfield 1741-1808. Or to the usual factors.

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Pulpit Pedestal, 12/6, Pedestal Broadcaster, as illustrated, 18/6, Microphones with handle, 15/-, powerful Public Address Models, 55/- and 65/-, Transformers 4/6, Couplers, 15/-, Valve Amplifiers, 55/-, for Band Repeater or Public Address work, Home Recorder for Gramo. New Carbon Insets, 2/2 each.



Everyone with a valve set will find our Microphones of great use and interest. and we stock a wide range of Best British from 1/- to £20. A very sensitive pendant model in cast aluminium case with brass front and flex cord is only 4/6.

METERS, Portable or Switchboard, 2-in. to 8-in. dia., all ranges. **RELAYS** for battery or mains to control anything. Receivers at Bargain Prices. **VALVES**, 1,000 volt, 100 mfs., 30/-, **DYNAMOS** from 4 volts to 4,000 volts. **ALTERNATORS** to 500 cycles. **MOTOR-GENERATORS**, by D.C. and A.C.

DIXOHMETER

is an OHMMETER or Insulation and Voltage Tester for High Resistance Values. It has a moving-coil Voltmeter and is a valuable aid to all engaged in electrical work.

For testing at 500 volts and reading from '01 Megohm to 50 Megs. Terminals for use as a Voltmeter; D.C. 0-250 volts and 0-500 volts. Price £8 10s. No. 2 has the same features as No. 1 above but in addition the Voltmeter can be used on either D.C. or A.C. Price £9 10s.

THE MULTI-RANGE DIX-ONEMETER
6 TERMINALS.
60 RANGES.
50/- Worth £10.
(Multipliers extra)

Latest Model. To 1st Grade Brit. Eng. Standard. Mirror Double Scale. Moulded Base. The Finest Precision Multi-measuring instrument obtainable.

Test Booklet Free.

SWITCHGEAR for all work. Charging panels and chargers for any mains. Send your enquiries.

All at wonderfully low prices which will be appreciated when you see our new Sale List, sent on application.



MICRO-AMPS to 20 AMPS
MILLIVOLTS to 2,000 VOLTS
50 OHMS to 50 MEGOHMS

WITH ONE METER

ELECTRADIX RADIOS,
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H & B SUPER QUALITY P.W. COILS

P.V.1 and P.V.2 - 3/- each
P.J.1 and P.J.3 - 2/6 each
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EVERY COIL GUARANTEED.

Wound to P.W. Specification with Lewcos silk covered wire. All coils fitted with fixing brackets.

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A TRICKLE CHARGER FOR 7/-!
Postage 9d. The "Tonic" self-generating trickle-charger Kit will help you economise by keeping your 2-v accumulators fully charged at home. A boon to town or country dwellers.
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Transformers 4/-. Headphones 4/-; all repairs magnificised free. Tested, guaranteed, and ready for delivery in 24 hours.

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The "Popular." 42" high, 21" wide, 14" deep, for panels 18" x 7". Can be adapted to other sizes by suitable free vignette. Speaker chamber 18" square fitted with 7-ply sub-baffle, hole cut to suit type of speaker used. Back wholly removable. Soundly constructed of oak and richly polished. Price 30/-
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No. 50

WUFA CABINET SPEAKER

No. 50. The purity of reproduction and artistic design of this "Wufa" appeals to all who require a good speaker at a reasonable price. Fitted with "Wufa" 60-pole Unit. Artistic polished walnut cabinet. Price **50/-**

YOUR CHOICE WILL BE 'WUFA'
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READ THIS LETTER AND THEN COME AND PASS YOUR OWN JUDGMENT!

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"At a test, my 'WUFA' was found to be the winner out of 25 speakers of all makes, including two moving-coil speakers."

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No. 75. The fact that this speaker is fitted with the famous "WUFA" 60-pole Unit guarantees the most perfect quality of tone. Its classic appearance is in keeping with its perfect reproduction, and it is therefore an asset in every home. Cabinet of highly polished walnut **75/-**



WUFA 60-POLE UNIT WITH CHASSIS.

The combination which has received such remarkable praise from all sections of the Press and public. Can be matched to the output of power, super-power or pentode valves by resistances embodied. Handles huge volume without stress. Extremely sensitive to even weak signals. Price complete 40/-. 60-pole unit only, 27/6.



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Price complete **40/-**
Unit only **27/6**



WUFA ★★ UNIT.

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A unit of compact design. Highly sensitive. Matches all types of output valves. Perfect reproduction. Wonderful volume.

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★★★ UNIT

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They're all going to hear-

WUFA
(OPPOSITE OLYMPIA)
SEPT. 18 - 26

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This chassis takes ANY type of unit. Rigidly built. Any make of unit is easily mounted. Accurately designed 15 in. cone. No metal parts to cause resonances.



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FORMO SOUND PROTECTIVE

Type 1 .. 2/9
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(See also page 93)

"P.J." COILS

RED BLUE WHITE BLACK

Easy wiring up of the coils is ensured by the different colours of the systo-flex covering the leads. Ordinary coils wound with the usual type of wire are liable to cause trouble by the leads breaking off. A piece of shaped wood is supplied with each coil in order that it may be securely mounted either perpendicular or horizontal, at will.

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CHASSIS £3 : 10 : 0

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AFTER every newspaper radio ballot in which members of the public are invited to put the most important items in the wireless programmes in order of preference, someone is sure to suggest that by virtue of the number of votes given to such-and-such an item it should obviously be featured very much more strongly.

It may be vaudeville, dance music, news, sports commentaries, or anything else; there is always someone ready to come forward and state very firmly indeed that by the acid test of the ballot one or other of these is a prime favourite with the public; and, furthermore, that the public does not get enough of this particular form of entertainment.

Are They a Fair Test?

It is assumed, in short, that such ballots are a fair test of the public preference in the matter of wireless fare.

But is it not possible that this is a

 An Exclusive Contribution
 from
RUSSELL HEATLEY.

totally false conclusion? Do these ballots, in fact, tell us anything of real value regarding the vexed question of what the listening public wants?

Only a Rough Indication.

These neat little lists, with military bands, after-dinner speeches, chamber music and the rest, arranged in so comfortable an order do tell us something. But they are interpreted far too widely and carelessly. They do furnish a sort of rough indication of what the public likes and does not like, but it is, for many good reasons, an indication which is so rough as to be almost valueless.

Let me state to begin with that I have no

patience with the superior sort of person who disagrees violently with the supposed tastes revealed by these ballots. Dance music and vaudeville invariably come near the head of the list, and there is a noisy and disagreeable kind of critic who does not happen to think that such things are good for the souls of listeners!

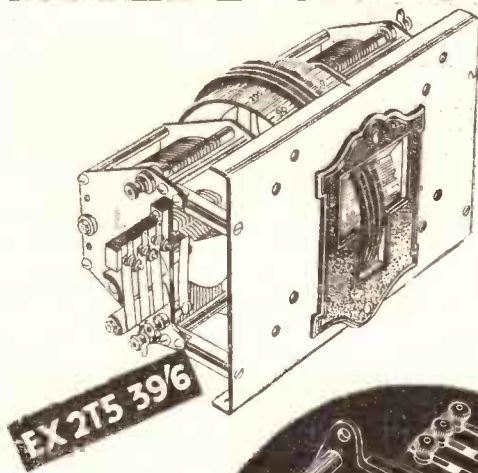
The man who pays his wireless licence is entitled to dictate what sort of radio fare shall be provided for him, just as the man who pays his water rate is entitled to insist that his kitchen tap shall yield water—and nothing else. Without its army of millions who pay their annual ten shillings there would be no wireless programmes for the great ones at Savoy Hill to provide.

Having His Say.

Quite clearly then the listener pays the piper, and is accordingly entitled to call the tune.

(Continued on page 86.)

**ACCEPT NO SUBSTITUTE FOR CYLDON
 EXTENSER IN THE
 "P.V. STAR"**



FOR P.V. STAR

CYLDON Double Extenser controlled by Double Drum mounted on stout aluminium chassis. Complete with Drums, escutcheon, fixing screws and steel template. Fitted with Insulated Commutators. PRICE 39/6

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CYLDON Slow-motion, Type Ex5V. Fitted with Insulated Commutator, wedge drive disc type Slow-motion Control. Hair-line sight. 5 to 1 reduction. Perfectly timed Extenser wavechange switch. PRICE 16/6

ALL CYLDON EXTENSERS ARE NOW SUPPLIED WITH INSULATED COMMUTATORS

Insist upon CYLDON for Extenser Sets — perfect wavechange switch, noiseless wipe contacts, 4-pillar construction, rigid and fool-proof. Be wise—refuse to accept substitutes for specified CYLDON EXTENSERS in Kits of Parts you buy for the "P.V. Star." Don't risk trouble — those who know Extensers build with CYLDON.

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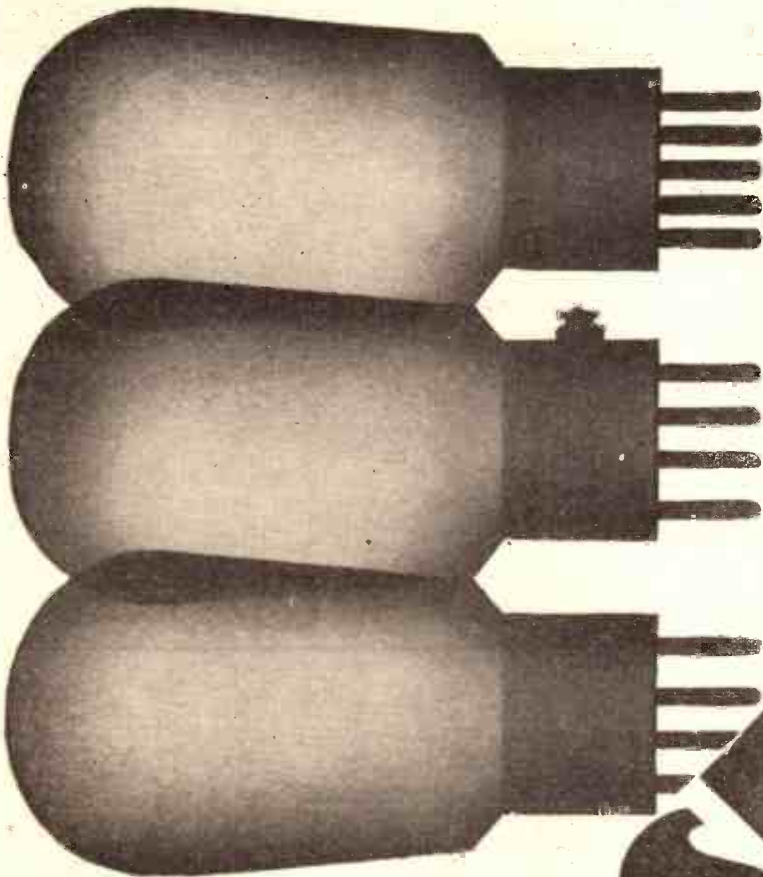
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TUNGSRAM

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Using these four types, an undistorted output of the amplifier ranging from 500 to 4,500 milliwatts can be obtained. The filaments can be operated from a 4-volt accumulator, or from the secondary winding of a suitable transformer.

P414, P430, P460 are suitable for operation at an anode voltage of 200, 250 and 220 volts respectively. The anode current consumption is 18, 25 and 50 m/a respectively at Grid Bias voltages of 20, 25 and 35 volts. P4100 can be operated at an anode voltage of 400 volts, the grid bias at this voltage being 35 m/a and it consumes 30 m/a. It has an undistorted output of 4,500 milliwatts. By connecting two or more valves in push-pull or parallel even greater output can be obtained. Write for further particulars to Dept. S.T.3.

PRICES: P414, 8/-; P430, 11/-; P460, 16/-; P4100, 17/-. Other types from 5/6 to 19/-.

Tungsramp Barium Valves are manufactured under one or more of the following British patents: 289,762, 289,763, 311,705 and 313,151.

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Tungsramp Photo Electric Cells: Nava "E" (for scientific measurement), £2 17s. 6d.; Nava "R" Red sensitive cell (for colour matching devices), £3 5s.; Nava "EH" (for talkie work) £3 13s. 6d.

RADIO BALLOTS PROVE NOTHING!

(Continued from page 84)

I protest against the importance which is attached in certain quarters to the results of these radio ballots, not because I don't happen always to agree with their verdict, but because they do not do what they pretend to do. I do not cavil against the radio ballot because it reveals preferences with which I am not in sympathy, but because it really reveals nothing of importance, because it is not, and cannot be under present circumstances, an accurate guide to the public taste.

Something for Nothing.

Why is this so? Primarily because people enter radio ballots for what they can get out of them, and not from any real desire to help those who are responsible for the devising of programmes. They are attracted by the possibility of winning a big money prize.

Accordingly, they do not vote according to their personal inclinations. They base their order of preference on what they think the verdict of others will be.

If I happen to like chamber music better than any other part of the programme, I am not foolish enough to put this at the head of the list, because I know very well that this will not be the verdict of the majority of my fellows.

Apart from this, there is the possibility

that I may submit half-a-dozen entries, all different, in the hope that I may thus be lucky enough to hit on the winning sequence. The result of a radio ballot is, therefore, nothing more or less than what Smith thinks that Robinson likes best, and what Robinson thinks that Smith likes best, multiplied many thousands of times.

How, then, can it be relied upon to tell us anything valuable about what the great body of listeners really wants? It is really little better than a glorified guessing game.

There are other considerations which make these ballots meaningless, except as a method of getting rich quick, or of helping some charity. Suppose that every entrant really did put his own personal preference at the head of the list. Even then we should be very little better off.

Even if five million listeners declared, quite honestly, that they liked vaudeville better than most other parts of the programme, this would not mean that they would like to listen to vaudeville for all or greater part of the time.

They Don't Hear Everything.

Listening to the radio for many busy people is something which is fitted in at odd moments. This means that many listeners pick out a few items from the programme and never listen to the others.

Thus their placing of their own favourite items in an honest no-prize ballot might conceivably reflect their personal point of view, but their placing of the other items to which they never listen would of necessity be purely arbitrary, not based on

experience or knowledge; as arbitrary as the choice of alternatives in a cross-word puzzle.

And even where the choice of favourite items is based on listening experience, that experience may have been misleading.

Think of two listeners faced with the placing of after-dinner speeches. One may only have heard the dry-as-dust Mayor of Little Puddleton, whereas the other might have most pleasurable remembrances of some excellent orator—the only speech he ever listened to!

Unable to Judge.

Neither of these listeners could really judge after-dinner speeches fairly, but their votes would solemnly be taken into consideration in the result of a radio ballot.

Again, the terms used in these ballots are capable of too wide an interpretation. How can a man usefully say whether or not he likes symphony concerts—or, rather, how well he likes them in comparison with news bulletins—when the term "symphony concerts" covers all serious music which takes more than ten minutes or so to perform—excluding chamber music, of course? Or how well he likes light music when this includes everything between "In a Monastery Garden" and the "Valse des Fleurs" from the Nutcracker Suite?

Radio ballots, like cross-words or picture-puzzles, may serve a useful purpose by stimulating newspaper sales or helping our hard-pressed hospitals; but, for the reasons given, they cannot be used as instruments for gauging the public taste, except in a most rough-and-ready manner.

DEMONSTRATING DURING RADIO EXHIBITION AT 67 HAMMERSMITH ROAD (FACING OLYMPIA)

176 POLE SPEAKER !!!

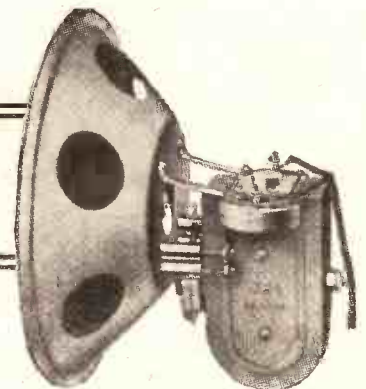
The Cifel Multipole Speaker, made under American licence on the Inductor principle, is not a 4 pole—8 pole—60 pole or 100 pole—but a 176 pole unit. However, never mind about the poles, the essential thing about this new Loudspeaker is its purity of tone, its true response—treble or bass—and combined with its wonderful qualities as a loudspeaker is the high standard of workmanship. It is definitely superior to the majority of loudspeakers on the market, and equal to the best. Take advantage of our offer and judge for yourself in your own home—make certain that the Cifel Multipole Loudspeaker is superior to the one you have at present. Seven days' trial.

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If not satisfied return it carriage forward and your money will be refunded.



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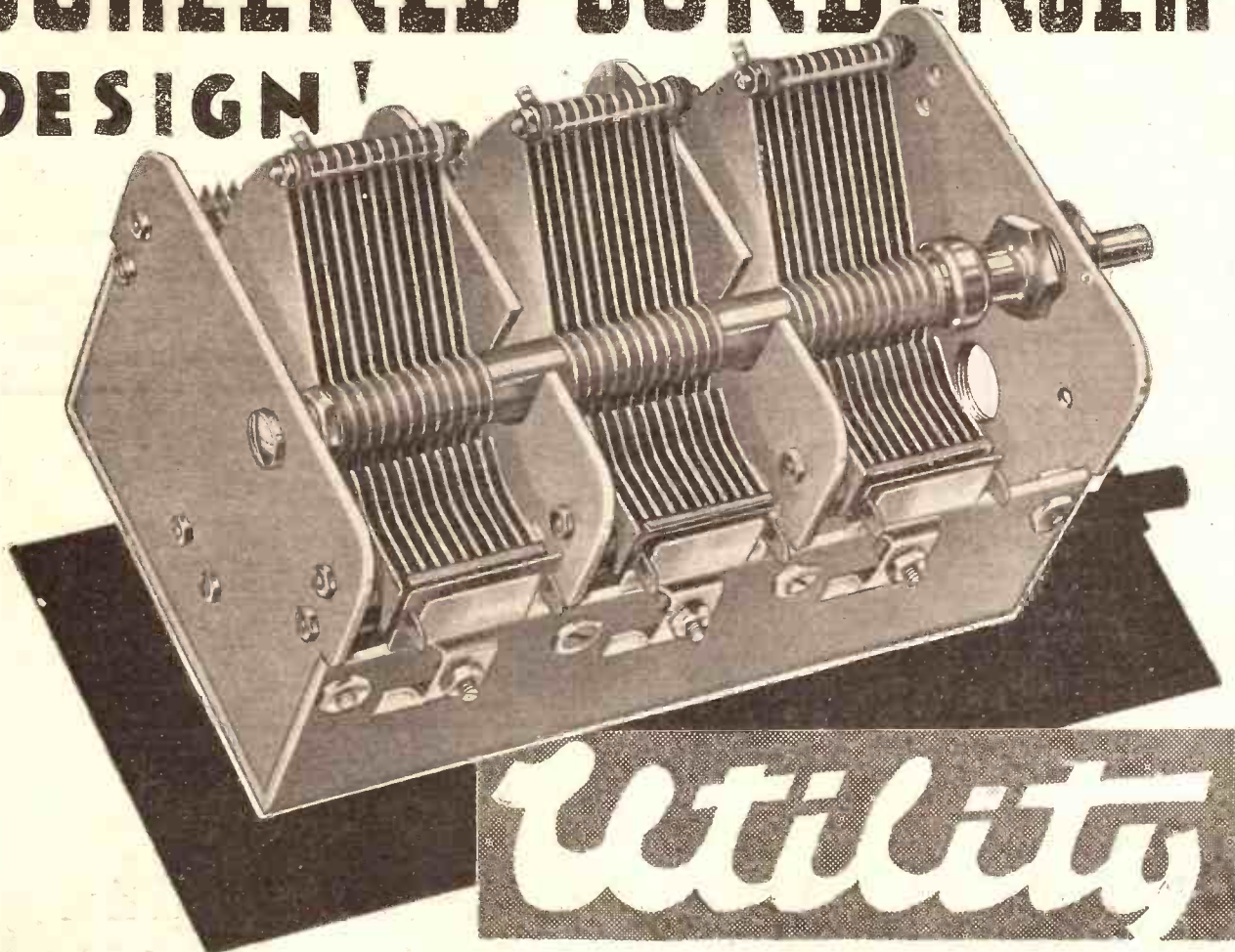


The above illustration gives some idea of the excellent workmanship and clean finish of the Cifel Multipole Inductor Speaker

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BIG DEVELOPMENTS IN SCREENED CONDENSER DESIGN!



Realising the increasing importance of screened ganged condensers, "UTILITY" designers have produced this year a range of instruments which for construction and performance surpass all others. All the ingenuity of these experts has gone to the making and perfecting of these condensers. A new, high degree of matching has been achieved, and there are ingenious trimming devices to make any slight adjustment which might be necessary. Unlike most other ganged condensers "UTILITY" are so constructed that torsional stresses are impossible during tuning operations. This means that capacity remains balanced—the most important factor in securing correct tuning. A ball-bearing centre spindle provides an incredibly smooth action and the special trimmers ensure dead accuracy of tuning.

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RADIOTORIAL

All Editorial communications should be addressed to the Editor, POPULAR WIRELESS, Tallis House, Tallis Street, London, E.C.4.

The Editor will be pleased to consider articles and photographs dealing with all subjects appertaining to wireless work. The Editor cannot accept responsibility for manuscripts or photos. Every care will be taken to return MSS. not accepted for publication. A stamped and addressed envelope must be sent with every article. All inquiries concerning advertising rates, etc., to be addressed to the Sole Agents, Messrs. John H. Lile, Ltd., 4, Ludgate Circus, London, E.C.4.

The constructional articles which appear from time to time in this journal are the outcome of research and experimental work carried out with a view to improving the technique of wireless reception. As much of the information given in the columns of this paper concerns the most recent developments in the radio world, some of the arrangements and specialities described may be the subject of Letters Patent, and the amateur and the trader would be well advised to obtain permission of the patentees to use the patents before doing so.

QUESTIONS AND ANSWERS

COIL QUIT CONSTRUCTION.

In order to make it possible for the set builder easily to wind his own efficient coil units, for a fraction of the cost of a ready-made coil, "P.W." recommends the recently-introduced "P.W." Coil Quits for many of the circuits published.

These "Coil Quits" are simply inexpensive

coil formers, easily wound by the constructor, and quickly fastened in position. They enable really efficient coils to be made at home—results with coil quits are actually better than with many far more expensive coil units. A typical instance of the use of coil quits is in the "P.W." "Plus," where they figure as long-wave units for aerial and inter-valve coupling. The method of construction is detailed below.

The beginning of the 30 D.S.C. wire is fastened to the coil quit in the usual way, by threading it two or three times through small holes in the coil quit until it holds fast. (About 6 or 8 in. should be pulled through

the hole first, and will be used later for making the connections.)

The first coil quit in the "P.V. Plus" has no reaction winding, being a plain 150-turn coil, with taps at the 30th and 60th turn from the earth end. So the commencement of the winding should be labelled "Earth," and then 30 turns are neatly wound on. Do not break the wire at this point, but twist a neat loop in it, about 1/4 in. in length.

This loop will be allowed to stick out from the winding, and when its insulation has been scraped off the wire it enables a crocodile clip to make connection at the 39th turn.

YOUR BIT TOWARDS ECONOMY

Have you ever thought how difficult it is for a newsagent to order just the right number of copies of any particular paper each week? You can make his task much easier if you place a regular order with him. You will not only help him to order correctly and avoid waste, but will make sure of getting your copy regularly each week.

The scraping of the insulation is best left till the coil is made. During the winding you simply make the loop at the 39th turn, and then carry on the winding in the same direction as before.

At the 60th turn another loop must be made, and then 90 more turns must be put on (still winding in the same direction) before the end is fastened off.

This fastening is done by cutting the wire and drawing it through small holes in the coil quit, exactly as at the start of the winding. And, as before, 8 in. or so should be left with which to make the connections to the coil.

(Continued on page 90.)

AUTHOR SPECIFIES SOVEREIGN

"P.V. STAR"

P. J. COILS

Sovereign's latest coils specified in the set of the year Sovereign prove superiority. Wound on special formers and exclusively protected.

P.J.2. - 1/6 P.J.3. - 2/-

OLYMPIA STAND No. 64.

INVARIABLY SPECIFIED

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Sensation! Superior Spaghetti Resistances now from 4d. to 1/3 each

Improved types—amazing new low-price level! There's one specified (600 ohms 4d.) for the "P.V. Star."

NOW BUY SOVEREIGN!

COIL QUIT

Another Sovereign triumph, the Coil Quit in the "P.V. Star" adds further tribute to the quality of these famous components. In moulded bakelite with that help to facilitate construction. Each 6d.

Empire Hall

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the latest addition to the Sovereign range is housed in a moulded bakelite case. Precision manufacture ensures greater volume and purer tone. Ratios 5:1 7 6 and 3:1 7 6

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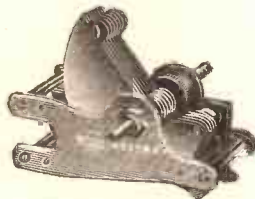
S.F.B.



Announcing the IGRANIC 1931-2 PROGRAMME

Sensational Price Reductions

Prices become effective on September 18th, 1931



IGRANIC "LOKVANE" CONDENSERS

·0005 mfd. .. Price 5/9
 ·0003 mfd. 5/6
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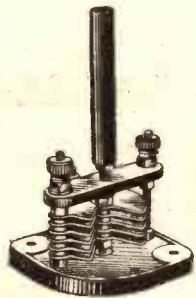
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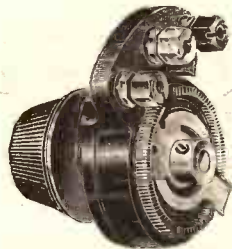
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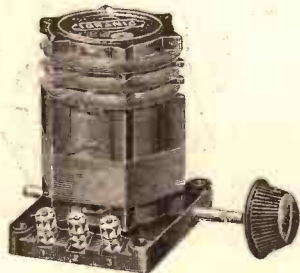
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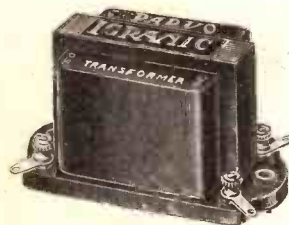
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Types A, S.G. and H.F.
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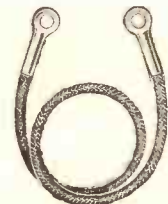
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The above are only a selection from the IGRANIC Programme.
 Write to Dept. No. R.178 for our complete catalogue.



Works BEDFORD

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 88.)

(So that these ends should not get in the way it is a good plan to wind them round and round a pencil, and then tuck the small coils so made inside the coil quoit, until they are wanted for the wiring.)

Carefully scrape off the insulation of the wire at the tapping points with a knife, and lay the coil aside till it is to be mounted. This is done by fastening it to the baseboard with a couple of screws through a shaped wooden block fitted inside the coil quoit.

(Another method is to lay a wooden strip across the top of the coil quoit, and drive a long screw through the centre of it into the baseboard below. Any such method will do, so long as the coil quoit is firmly held in place, and no unnecessary masses of metal are used to do this.)

The second coil quoit for the "P.V. Plus" is exactly like the one already described, except for its extra 50 reaction turns. It is made exactly as before but with this difference:

The 50 reaction turns must go on the coil quoit first, so the commencement of the winding is labelled "Reaction." When 50 turns have been wound on, don't break the wire, but bring out a long loop, and label it "Earth." The rest of the coil is then wound exactly as before, with extra tappings at its 30th and 60th turns.

All the winding must be done in the same direction, and provided that is done, your coil quois will be found to be highly efficient in action.

On most "P.W." diagrams in which coil quois figure the connections are marked (1), (2), (3) and (E). (E) or "Earth" we have already described; (1) is the connection to the 30 (or 60) tap, whichever gives better results

on your set; (2) is the point where you finish; and (3) is the beginning of the reaction winding. (You will remember we marked this "reaction" when commencing to wind the second coil quoit.)

MAKING THE SCREEN.

T. E. F. (Sevenoaks, Kent).—"Can I make the screen of plywood, covered with foil? I like the work entailed, and it comes cheaper, but I don't mind buying a proper screen if this is really better."

There is no reason why a good home-made screen should not be used, instead of the purchased article. It can be covered with "Conductite" paper, or thin copper foil, and this should preferably be in one piece, or if two are used, they must be well joined.

To construct a screen for the "P.V. Plus," for

"HULLO! WHAT'S WRONG WITH THE SET?"

Perhaps the switching doesn't work properly? Or some mysterious noise has appeared and is spoiling your radio reception?—or one of the batteries seems to run down much faster than formerly?

Whatever your radio problem may be, remember that the Technical Query Department is thoroughly equipped to assist our readers, and offers an unrivalled service.

Full details, including scale of charges, can be obtained direct from the Technical Query Dept., POPULAR WIRELESS, The Fleetway House, Farringdon Street, London, E.C.4.

A postcard will do. On receipt of this an Application Form will be sent to you post free immediately. This application will place you under no obligation whatever, but, having the form, you will know exactly what information we require to have before us in order to solve your problems.

LONDON READERS, PLEASE NOTE: Inquiries should NOT be made by phone or in person at Fleetway House or Tallis House.

instance, a piece of 3- or 5-ply wood, or even plain wood about $\frac{3}{4}$ in. thickness, may be used. It should be shaped before the foil is fixed to it.

In this instance, the dimensions are 10 in. from front to back. The foil is 6 in. wide, with a flange $\frac{3}{4}$ in. bent at right-angles.

The hole for the valve is 2 in. in diameter, or may be a little less, according to the size of the valve. In any case, the distance from the terminal-strip end of the screen to the centre of this hole is 5 $\frac{1}{2}$ in., and if a 2-in. diameter hole is employed its centre will be approximately 1 in. up from the baseboard itself.

The foil or Conductite should be spread smoothly and fixed secure with small tacks, screws, or any other convenient method that may be easier.

Such screens are perfectly satisfactory if care is taken not to split the wood, and to keep the foil smoothly fixed in place. Only one side of the screen need be covered, as the conductive surface attends to the screening, and the wood is there only to hold this securely in position.

Alternatively, copper or aluminium sheet may be bent and cut to the above specification instead, if desired.

FITTING AN EXTENSER.

"ALPHABETA" (Gloucester).—"My next set will have to wait till after Christmas, but in the meantime I am going to be quite happy with my 'Comet' Three if I can fit an Extenser to it. Can it be done?"

Certainly it can. All you have to do is to take out the present tuning condenser and the wave-change switch, and rewire to the Extenser.

So far as the "fixed" and "moving" connections are concerned you simply transfer these to the corresponding points on the Extenser. But the wave-change switch leads will now go to the self-changer contacts on the Extenser instead of to a switch.

They should be joined in exactly the same way as the present wiring is arranged: namely, S₁ of the coil and moving vanes to one self-changer contact; S₂ on the coil to another contact; and S₃ on the coil, P₂ on the reaction condenser, earth, etc., to the third self-changer contact on the Extenser.

Thus the main wiring is really not interfered with in any way, but the Extenser does both the tuning and the wave-band changing.

THE WINDINGS OF THE P.J.1.

E. M. (Shorncliffe).—"I understand a 2-in. diameter former is required for the P.J.1. How

(Continued on page 92.)

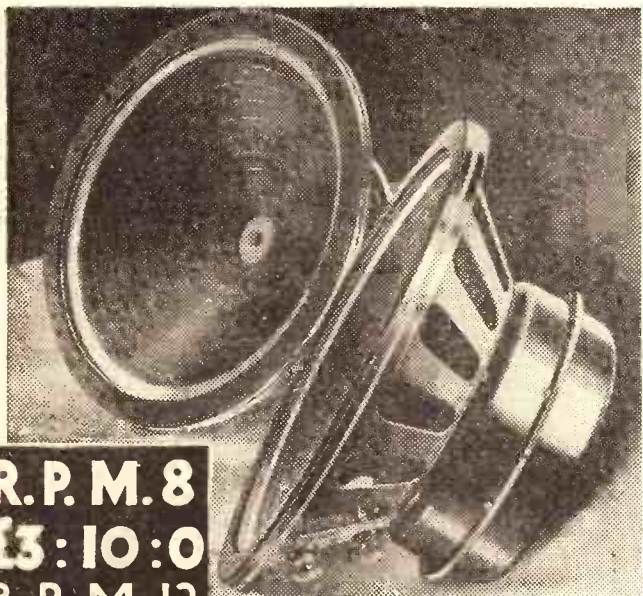
PERMANENT MAGNET

MOVING COIL



Gives true moving coil reproduction from any 2 or 3-valve set. Made by the PIONEERS in PERMANENT MAGNET Moving Coil Speakers—Write for "Speaking of Speakers"—FREE.

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SEPT
13-26

11 a.m. to 10 p.m. DANCING
ORGANISED BY THE RADIO MANUFACTURERS' ASSOCIATION.

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 90.)

should the windings go on this, how many turns, etc.?"

As stated the former should be 2 in. in diameter, and 3 in. long. The wire is No. 30 D.S.C.

Near one end put on the aerial winding of 9 turns, tapped at the 4th and 6th turns. The beginning (A) should be marked by red flex, and the end (X) by blue flex.

Three-eighths of an inch away the grid winding should be commenced. This is marked (G), and has a white flex connection.

TECHNICAL TWISTERS

No. 79. ELECTRIC CURRENTS CAN YOU FILL IN THE MISSING WORDS?

An electric current is a movement of

When these "drift" steadily in one direction along the wire (owing to one end of it being at lower potential than the other end) they form a current.

If the potentials across the ends of the wire change rapidly from moment to moment, the lower-potential end becoming the higher-potential end, and vice versa, the electron movement will periodically reverse, and the current is said to be

Last week's missing words (in order) were: Resistance. Strands. Lead-in.

The grid winding consists of 64 turns (same direction as before). The finish is marked (Y), and has a black flex connection.

At a distance of 1 in. from this the reaction winding commences with distinctive mark (Z). Its flex connection is coloured green.

The reaction winding consists of thirty-four turns, also in the same direction, of course and it ends at (R), with yellow flex.

AN EXTENSER FOR THE "SUPER QUAD."

J. B. (Chesterfield).—"Can you tell me whether an Extenser is suitable for the 'Super Quad' instead of the '0005-mfd. variable condenser with vernier drum-drive, and how to connect this if so. I have a Ferranti type A.F.4 transformer, and can this be used also?"

Yes, you can use an Extenser for the "Super Quad" but instead of trying to fit it in and possibly introducing some inefficiency somewhere on account of altered layout, we think you would be well advised to build a "Super Quad" which was specifically designed for the Extenser.

It so happens that a set of this kind is fully described and illustrated in the October number of "Modern Wireless," which is on sale this week at every bookstall. It uses virtually the same components as the "P.W." "Super Quad," and the Ferranti A.F.4 would be quite suitable for it. This would appear to be exactly the set you are looking for, and it is a wonder for distance.

WHO IS D G W?

"TINKLE" (West Wickham).—"Who is 'D G W,' very loud on about 15 metres?"

These call-letters are allotted to Nauen, the great German station. It works with Buenos Aires on 14.83 metres.

TESTING A CONDENSER.

N. J. (Deal).—"I was rather suspicious of my 2-mfd. output condenser causing a leak, and I was told to try it by charging with full H.T. I did this and put it carefully aside overnight, and in the morning tried it out with a screwdriver.

"When this was touched across the terminals I got a sharp click and spark. Does this prove the condenser is not faulty?"

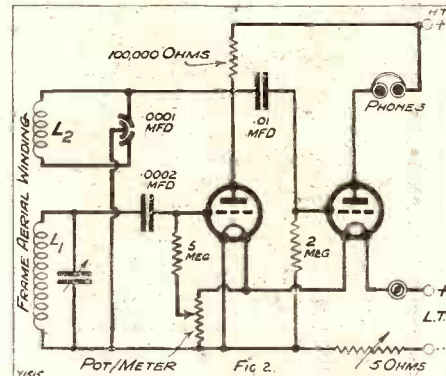
Yes, you would not have got a lively spark after 12 hours or so unless the insulation was really good. You can safely trust that condenser as being "not guilty!"

"DUAL-RANGE" DEFECTS.

S. R. T. (Brigg).—"What are the points to watch with dual-range coils which do not give the results expected?"

We have found that in the case of home-constructed coils, readers frequently use an inner ribbed former of

MISSING LINKS, No. 17



The two "components" that were purposely omitted last week are shown inserted above in this diagram of a circuit for frame aerial reception.

It will be seen that both were condensers—'0001' for the detector, and '01' in front of the L.F. valve.

too small a diameter, and, in consequence the reaction coupling is too weak, and, in addition, the long-wave secondary is too small. The former should have a diameter of approximately 2 1/2 in. over the ribs. It is essential to use the gauge of wire specified in the article. (See February 14th issue of POPULAR WIRELESS.)

When no reaction, or extremely erratic reaction is

(Continued on page 94.)

Reg. Des.

Super Slow Motion

•0005

•0003

6'-

Pro. Pat.

CONDENSERS AND DIALS FOR ACCURACY

SCREENED GANGED CONDENSERS

These fine "Astra" condensers are designed to comply fully and efficiently with the requirements of modern circuits in which ganged condensers of reliable design and construction are essential.

Accurate matching is assured and easily adjusted trimmers are embodied in their design. All brass throughout except for high grade steel spindles which add to their smoothness of action.

2 Gang 15/- 3 Gang 22/6 4 Gang 30/-
Drum Drive 6/9 Disc Drive 4/6

'ASTRA SUPER SLOW MOTION CONDENSER

This new Fast and Slow motion all-brass condenser is highly accurate and of rigid construction. Smooth movement and silent action are obtained by the Patented "Astra" ball-bearing control.

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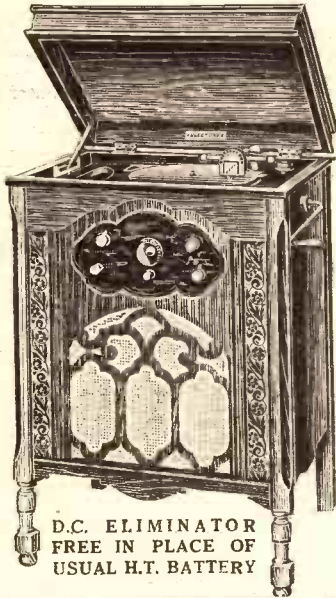
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Specification Model 203.—Exquisite Oak finished Cabinet, of modern design, 3 ft. high, complete with everything, 4-valve S.G. Circuit (B.V.A. valves) super-power battery, large accumulator, Daptacon pick-up, Cone speaker, powerful Motor, and Record Compartment, etc. Royalties paid. Delivered ready to play. Guaranteed for 12 months except valves.

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Run your Radio off the mains—it's cheaper, more reliable and improves any set! Fullotone are now able to offer a complete range of mains units at extremely reasonable prices from a D.C. Eliminator at 20/6 or A.C. Eliminator at 46/6.

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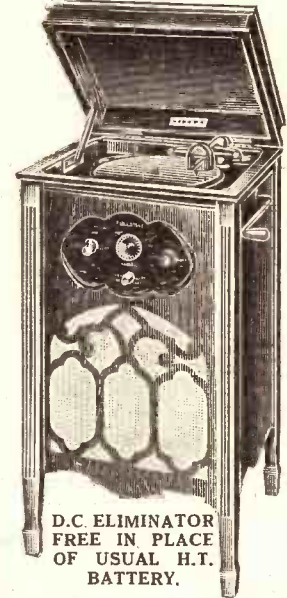
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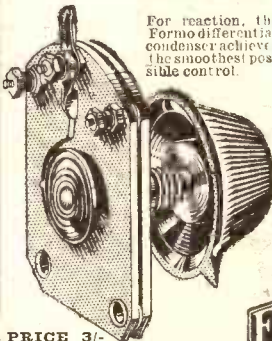
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DIFFERENTIAL CONDENSER



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PRICE 3/- complete with moulded knob.

THE FAMOUS FORMO-DENSOR

This product is the pioneer of small compression-type condensers, and for all purposes where some flexibility in capacity is required, the Formo-Densor is a product of assured reliability and precision.



Type F } 1/6 Type H 2/3
Type J }
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See also page 83.

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Melbourne
RADIO

JUNIOR COILS

With Coloured Flex Leads

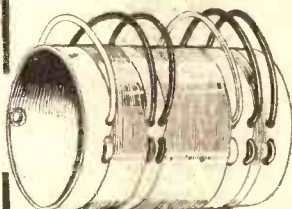
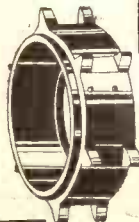
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COIL QUILTS

6d. Each

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THE CABINET THAT MAKES A GOOD SPEAKER BETTER!

Here is the Camco "Melodee" Speaker Cabinet—built to IMPROVE speaker performance. In Oak, Mahogany and Walnut finish, from 22/- See it and the new Camco range, at Olympia, Stand 51 (ground floor, Empire Hall).

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NAME.....
ADDRESS.....
P.W.13.

Every CAMCO Cabinet bears the CAMCO Seal

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 92.)

obtained, a reversed reaction winding should be suspected if the coil has been wound in all other respects to our published specification.

In sets which employ a stage of resistance-capacity L.F. amplification following a detector valve, the value of the anode resistance should be checked up, because too high a value of resistance will produce poor, or even complete absence of, reaction effects.

In addition, a freely oscillating valve of the H.F. or special detector type should be used in the detector valve holder.

Another possibility is a faulty long-wave coupling compression-type condenser. These coupling condensers should have a maximum value of .001 or .002. It is pointed out that the use of a condenser of too

In all cases, the value of H.T. which is applied to the valves should be carefully checked up, and the H.T. batteries, if of the dry cell or accumulator type, should be tested on load after the set has been working for a period.

H.T. mains units must be capable of giving the required current output, and it should be borne in mind that mains units having a rated output of 20 m.a. or under, are generally only suitable for receivers employing up to three valves, if one of them is of the power type. Sets which utilise super-power valves require mains units with an output of at least 30 m.a.

All receivers of our design must be built exactly to our published specification, if they are to give the results claimed. We are continually tracing causes of faults to bad wiring, failure to follow our instructions, and modifications of our published layouts, etc.

Another point concerns wave-change switches, and it is essential that these should be of the correct type. With all our published designs we give the names of approved makes of switches in the list of components,

There are numbers of little points that might be overlooked by a novice (especially loose paste and low gravity electrolyte) which might account for its refusal to hold its charge now. If, however, it was the charging station that undertook the job we should remind them that the cleaning was done on their recommendation, and ask them to check up the condition of the paste in the positive plates.

POOR RESULTS ON LONG WAVES.

G. B. S. (Goole).—"I have a three-valve set which I consider is very good on the medium waves but a washout on the long. I can get Daventry only medium strength and occasionally Radio-Paris very faint.

"I had the set in December, and on inquiring at the dealer's where it was bought I was advised to shorten my aerial. This did not make the slightest difference except to sharpen the tuning in the short waves.

"Would you please tell me how to alter this so as to be ready for a good winter?"

As you do not say what sort of circuit your set is using, and whether it has plug-in coils or a dual-range coil, we can only answer in generalities. The fact that the set is O.K. on medium waves indicates that the majority of its components, etc., are quite all right, but something faulty is brought into play when you plug in the new coil, or throw over the switch if the set is of the wave-change switching kind.

In the case of the plug-in coils the most likely trouble is a reaction coil with reversed windings, so if your two long-wave coils are not a true pair, but are of different makes, you should try the effect of a similar size of coil but of the same make as its fellow. Alternatively, if reversed reaction is the trouble you could right it by reversing the reaction coil-holder connections.

Another likely fault of the same nature sometimes occurs with a dual-range coil when by some mischance in manufacture the reaction winding is reversed and so helps to weaken instead of assisting the long-wave reaction. An expert friend might be able to change it over for you, but otherwise it is a job for the manufacturer of the coils.

Finally, there is the important question of switching, for if your long-wave switch is not operating properly, is either connected up wrongly or is an unsuitable type, or making faulty contacts, it would have just the effect you describe. Can you compare your set with another of similar make which gives good results?

If not, and if you do not know anyone skilled enough to tackle the tracing of a fault for you we are afraid the only thing is to write to the manufacturer.

"P.W." PANEL NO. 37.—"RINGING" VALVES.

When a valve "rings" every time it is tapped, or a gentle knock on the set causes a loud "pong" to sound from the loudspeaker, a "microphonic" valve is being used.

Generally, the detector valve is the cause of the trouble, but it can arise in another stage.

The remedy is to "cushion" the valve against external shock by the use of a sprung valve holder, or soft rubber feet on the set.

Sometimes wrapping the valve in cotton-wool helps to cure the tendency, but the remedy must depend for its success upon the protection it affords against external shock or vibration.

low a capacity rating, or one that is in any way defective, will very seriously affect the working of the set on the long waves.

The differential condenser must be of good make, and have a capacity of .0001-.0002. In many cases faults have been traced to this source, and it has been found that the maximum capacity of the differential reaction condenser has been below .0001, and in consequence it has not been possible to obtain sufficient reaction.

In more than one case in which readers have complained of not being able to obtain reaction on the long waves, we have traced the fault to a defective detector grid condenser, and in these instances it is interesting to note that the set has behaved normally on the medium wave-band.

Reaction troubles may also be caused by the use of a poor quality H.F. choke in sets where the H.F. choke is used for reaction purposes.

and when ordering readers should specify the particular receiver in which it is intended to use the switch.

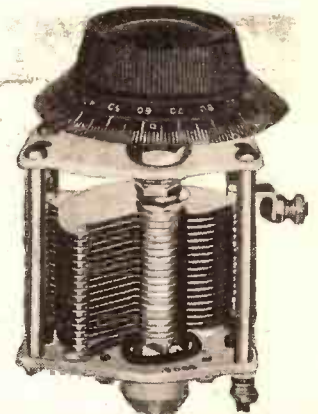
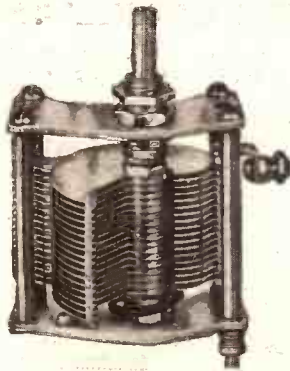
CLEANING OUT THE ACCUMULATOR.

W. C. (Dublin).—"Having been advised by the people at the charging station to get the low-tension battery cleaned out, I accordingly did so, with the result that whereas formerly it lasted on an average twenty-one days it now lasts barely seven days. Can you explain this?"

It is not clear whether the battery was cleaned out by the people at the charging station or not. As it is eminently a job for an expert, it is quite possible that if you placed it in unsuitable hands for the cleaning-out process, this has not been done satisfactorily.

Here you have it *both* ways!

LOW PRICE . . . yet
POLAR QUALITY



These two new condensers, popularly priced and maintaining the high efficiency of Polar design and construction, offer you the greatest condenser value obtainable.

Capacities for both models:
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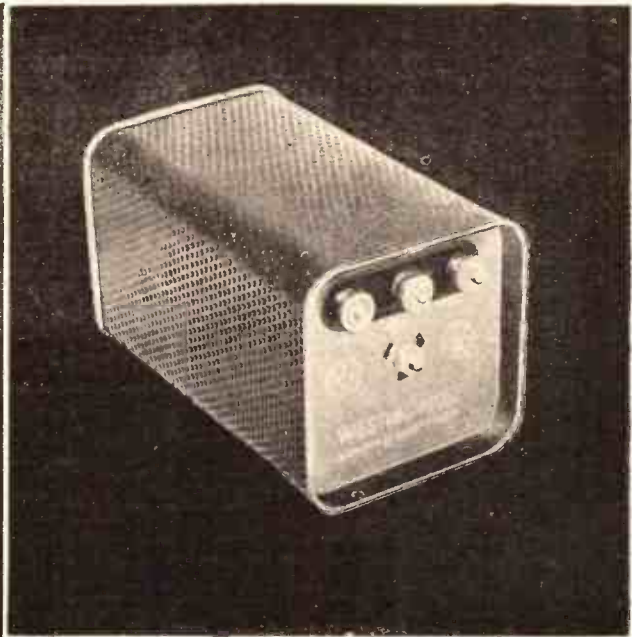
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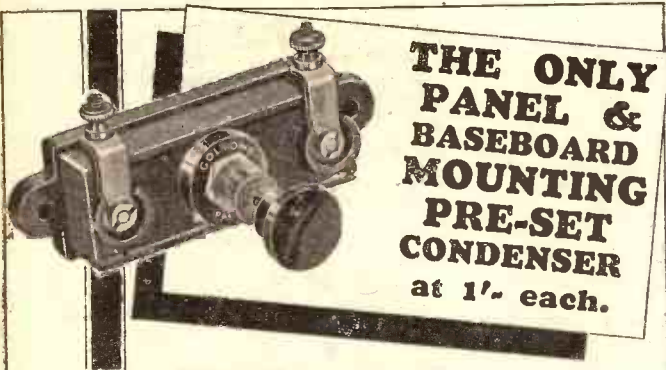


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**THE ONLY
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PRE-SET
CONDENSER
at 1/- each.**

**“GOLSTONE” COMPRESSION
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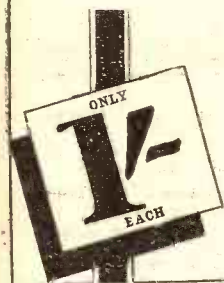
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A unique feature is that this Condenser can be mounted on the panel and adjusted from outside the set as with the ordinary controls. Constructed of finest Ruby Mica and Nickel Silver plate and enclosed in genuine Bakelite case, with extra strong back and non-strip terminal heads.

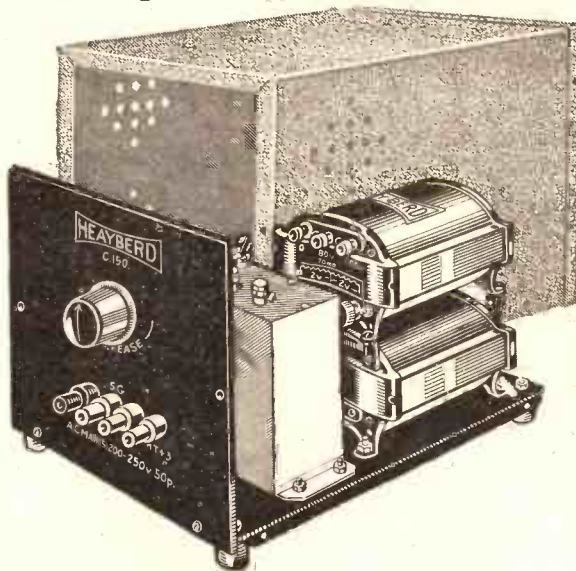
Type “F” (‘0001 to ‘000005) }
 ” “J” (‘0003 to ‘000025) } 1/- each
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Two of our 1932 Models: —

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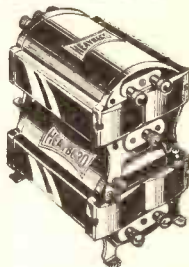
Output; 250 v. @ 60 ma. Four tappings:—60/80 Variable, 0/150 Variable, 100/200 Variable, 250 Fixed. Westinghouse rectification. Assembled in Case. Requires wiring up only. **137/6**

COMPLETE MAINS UNIT “D” MINOR.

Output: 120 v. @ 12 ma. Three tappings; 80 Fixed, 100 Fixed, 120 Fixed. Westinghouse rectification. Ready to plug-in for immediate use **57/6**

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MODEL W.30.

200 v. @ 60 ma. using tapping 175 v. with Rectifier H.T.8.
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 Price - - **20/-**
 L.T. 4 v. 6 amps for A.C. Valves 5/- extra.

MODEL W.32.

175 v. @ 25 ma. using tapping 110 v. with Rectifier H.T.6.
 200 v. @ 28 ma. using tapping 135 v. with Rectifier H.T.7.
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The **Lanchester**

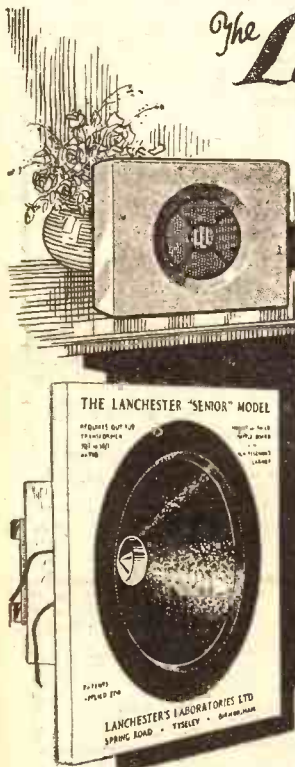
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MOVING-COIL SPEAKERS**

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It contains in addition a mine of useful information, and is FREE and POST FREE.

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NOTES FROM THE NORTH

(Continued from page 67.)

Aberdeen would have been settled in the same way.

How is the B.B.C. going to provide alternative programmes in such areas as these? Various possibilities are being considered, but next time the engineers wish to test a method they must do it privately.

The experimental synchronisation of Newcastle and North Regional should never have been attempted in programme hours. As a leading article in the Newcastle "Evening Chronicle" said:

"The price paid by everybody was a bad service, and by some the absence of any service at all. Now, that is a serious matter.

"Experiments may be excellent things in their way, but they ought not to be rashly undertaken at the price of public inconvenience and deprivation."

Transmission Defect.

A curious defect occurred at Moorside Edge recently. Hearing the National programme in the background of the Regional, listeners everywhere carried out searching investigations to see if their sets had suddenly become inselective. But the fault was at the transmitting end. Induction between the two transmitting systems caused the Regional to pick up the National programme, the two being broadcast together.

AN ALTERNATIVE PROGRAMME.

Absolutely the very finest number of "Modern Wireless" that has ever been published will be on sale everywhere this week. Price one shilling and sixpence. You will find it chock full of enjoyable reading—a magnificent "Alternative Programme" which will provide you with hours of worth-while entertainment. Just turn over the pages of a display copy on one of the bookstalls—we are sure you will then buy this October "M.W."

An extraordinary thing was that apparently the B.B.C. knew nothing of this for several days, until attention was drawn to it from outside. Then the engineers got down to it, and the induction was traced and stopped.

There has frequently been an annoying heterodyne on North National, apparently due to interference with Turin and Hilversum.

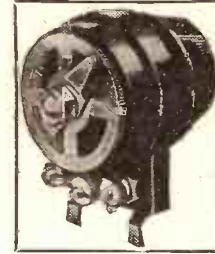
Summer-Time Scheme Success.

Apart from these points, the new station continues to give good service. The Regional programmes, too, continue to enjoy popularity, though on the vaudeville side they need a good deal of improvement, and as time goes on the studio "nonet" at Manchester becomes more obviously inadequate for its work.

The summer-time scheme of outside broadcasts can be definitely marked as a success, despite an occasional miss hit, and in working out their plans for the winter the North Regional officials are making arrangements for a considerable number of relays from Northern theatres. Famous Northern choirs and orchestras will also play a notable part in forthcoming programmes.

ROTOR-OHMS REDUCED PRICES

STANDARD MODEL—5/6
SUPER DE LUXE MODEL 7/6



Only the enormous sales of Rotor-ohms has made this price reduction possible—but remember, the quality and workmanship not only remains, but has definitely been improved upon. ROTOR-OHM potentiometers are now pure wire wound up to 50,000 ohms, and are truly dependable components. We are years ahead in the manufacture of Variable Resistances,

that is why the leading set manufacturers incorporate Rotor-ohms. Spaghetti Resistances and Anode Resistances also available. On sale at all good Radio Stores.

ROTOR ELECTRIC LTD.,
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Make it a profitable one.

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They're all going to hear—

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(OPPOSITE OLYMPIA)
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Solve all H.T. Troubles.
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JARS (waxed), 2" x 1" sq. 1/3 doz.
ZINCS, new type 10d. doz. Sacs 1/2 doz.
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Sample unit, 6d. Illus. booklet free.

Bargain list free.
AMPLIFIERS, 30/-, 3-valve set, £5.
P. TAYLOR, 57, Studley Road,
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As far as possible all advertisements appearing in "Popular Wireless" are subject to careful scrutiny before publication, but should any reader experience delay or difficulty in getting orders fulfilled, or should the goods supplied not be as advertised, information should be sent to the Advertisement Manager, "Popular Wireless", 4, Ludgate Circus, London, E.C.4

RAISE DAVENTRY'S POWER

(Continued from page 25.)

shown, quite properly, that this would entail a great deal of extra work for the staff. I suggested that the work might be put out to contract. It was replied that this would entail more work than ever!

Well, why bring that up? I know it would have been a superhuman task both to reconstruct Daventry and continue building the Regional stations, and I perfectly appreciate the logical impracticability of the suggestion. But, then, it is just these sort of things that should be done—because, in the end, it's the service which counts.

In the early days we may have done things rather hastily, the stations may not have been "just so," but they worked, and, by heavens, so did we! It was a wonderful time, too. I wish the power of 5XX had been raised. It could have been done fairly cheaply, too, according to a scheme I proposed.

Raise It NOW!

I ask, could we not raise Daventry's power now? After all, several German, a Polish, and a Czecho-Slovakian station are all more powerful than Daventry. Daventry is out of date to-day, and its quality is poor compared with that of the Regional stations.

And Daventry is our great National station. Money? Economy? Dear, dear! Wouldn't raising the power of Daventry give even a little employment? But this looks like politics. It isn't. It's just a desire to see our broadcasting perfect and ahead of all the world, a desire I held and still hold.

FOR THE LISTENER

(Continued from page 26.)

can well imagine that they were extremely entertaining. In both these cases the Big Name brought the Big Goods with it, and was amply justified.

Why, then, do I think it a mistake that Mr. Ainley should appear with members of the B.B.C. Repertory Company in Lord Dunsany's play *If*, and Mr. Grossmith similarly in Martinez Sierra's *Romantic Young Lady*?

The reason is that a play is not an individual performance, but a group performance. The B.B.C. was presenting a play; it was presenting several actors in that play; it was not presenting one of the actors by himself.

The Play—or the Player?

An outstanding individual performance may often ruin a play as a whole. The interest of the audience is transferred from the play to a personality.

If listeners said to one another, "Wasn't Mr. Ainley fine?" and it did not occur to them to say, "Wasn't that a fine play?" then Mr. Ainley succeeds, but the play fails. And Mr. Ainley, who is a great artist as well as a great actor, would himself agree that this would be an unhappy result.

A company of actors in a play is like a constellation of stars: they are not all of the same magnitude, but all must shine

(Continued on next page.)

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Profits Are Guaranteed!

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—all instructions are given FREE until you are proficient and you can make a start right away in your own Home! You can earn anything up to £300 a

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NO PREVIOUS EXPERIENCE REQUIRED

The work you are asked to do is to make Wireless Batteries, and even though you know nothing about Wireless or Electricity, you will find it QUITE EASY. In fact, it is so simple that every member of the family can help you! No expensive Plant or machinery is needed. You only require a few hand tools and presses which you can make yourself.



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You know when a proposition is genuine; and when we tell you that, if necessary, we GUARANTEE you a weekly profit by purchasing quantities of your stock, you will realise that you CAN'T FAIL to make money in this Live Business! The standard of efficiency we stipulate is quite easily attainable by our Simple Patented Process.

The Coupon below (see left) will bring you FREE Instructions how to start and ample Testimony from those who are already making money.

POST IT AT ONCE!

The batteries are acknowledged by experts to be superior in every way. There is no difficulty in disposing of stock. Large numbers of our Licensees are writing us every week to the effect that they can hardly cope with the demand. We will send you ample written testimony from those already making money.

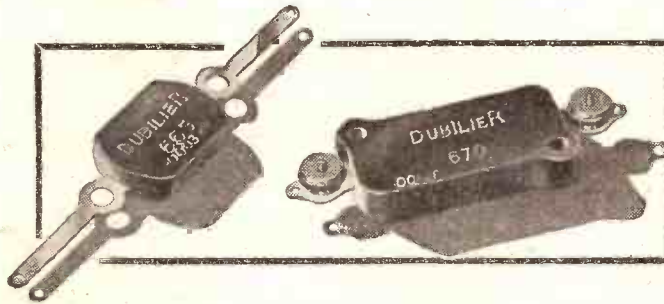
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To Mr. V. ENGLAND-RICHARDS,
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Sir,—Please send me at once, and FREE, full details as to how I can Make Money at Home in my spare time, and also Testimony from those already making money. I enclose 2d. stamp for postage.
Print your name and address boldly in capital letters on a plain sheet of paper and pin this coupon to it.
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NOW . . . DUBILIER CONDENSER

at a price to suit everybody . . .



PRICES

Type 665	Each
'0001, '0002, '0003	mfd. - 6d.
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This new range of Moulded Mica Condensers has been introduced in addition to our well-known Type 610 and 620 Condenser to fulfil the demand for a really high quality product at a price within the reach of everybody.

These Condensers are specially designed for use where high efficiency, compactness and lightness of weight are a consideration and are tested at 500 Volts A.C. suitable for 250 Volts D.C. working, and are entirely British Made.

DUBILIER CONDENSER CO. (1925) LTD., DUCON WORKS, VICTORIA ROAD, N. ACTON, LONDON, W.3.

FOR THE LISTENER

(Continued from previous page.)

at their fullest if the constellation as a whole is to be effective in the sky. If the light of one star should overpower and swamp the others that star would remain, but the constellation would be wiped out. Some actors may like the sky to themselves; but not the really great actors.

The only excuse, in my judgment, which the B.B.C. could have for bringing a distinguished outside actor into one of its plays would be that the play should be such a one that the principal part, upon which the whole play hung—as in "Hamlet," for example—requires an actor of exceptional strength and equipment.

Neither "If" nor "The Romantic Young Lady" are such plays. They are good plays, but they are not great plays. Both of them are well within the scope of our B.B.C. Repertory Company as it stands.

A previous performance of "If," without the presence of Mr. Ainley in the cast, was quite successful. I therefore think that to bring Mr. Ainley in was a mistake in artistic judgment. It was to succumb to the glamour of a distinguished name at the risk of the success of the play as a whole.

Better for Us.

Besides, the more experience our own group of actors can get, and in the "fat" parts as well as the "thin," the better for them and for us. It does not seem fair to them, when a particularly good part comes along, that an outsider should be brought in to play it.

They are probably quite glad to have Mr. Ainley among them and to play with him; but he goes, trailing away his glory with him, and they remain. It is inevitable that they should seem less competent than they really are while they are playing with him, and more dull than they really are after he has gone.

I am far from thinking poorly of them. On the contrary, I praise them. They do well. Sometimes they do surprisingly well.

They will do better, and the more chances they get, the more confidence that is placed in them, the higher they will rise. In any case, I personally would always rather listen to a play performed by a "level" company of actors of some ability than to a play in which one actor dwarfs all his fellows; for the play is the thing.

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CONSTRUCTOR'S KIT

Saves you time and money

This kit contains an assortment of nineteen Clix fittings specially selected for the set builder.

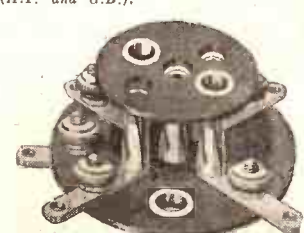
Buy a Clix Kit for your next set and save Five pence. Value 3/5. Price 3/-



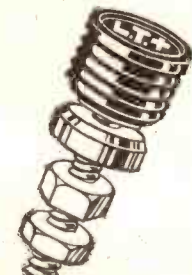
Contents—2 Spade Terminals engraved L.T.; 2 Plugs and Sockets (A. and B.); 7 Terminals (H.T., L.T., L.S.); 6 Wander Plugs (H.T. and G.B.). (Value 3/5). Price 3/-



"VICEGRIP" WANDER PLUG. 1 1/2d.



CLIX VALVEHOLDER. Type B for baseboard mounting. 1-pin Model with screw terminals 1-p. 5 pin Model without screw terminals 9d. 4 pin Model with screw terminals 10d. 4 pin Model without screw terminals 8d. Fully Illustrated Folder P. Free.



PANEL TERMINAL. 3d.

THAT SUPER-QUAD

The Finest He Ever Tried!

The Editor, POPULAR WIRELESS.

Dear Sir,—In connection with the "Super-Quad" receiver (which is the finest circuit I have ever hooked up), might I add a word to Mr. Briggs' excellent description concerning the operation of this set?

As regards the tuning of the two band-pass condensers, he says: "Tune in a fairly weak transmission, and then adjust each trimmer condenser for maximum signal strength."

May I point out that these trimmers should previously be set exactly at their half-way positions. One can then be assured of obtaining the utmost sensitivity when balancing up, which would not necessarily follow if the trimmers were, say, both at their minimum or maximum settings when tuning-in the aforementioned weak transmission.

This matter is often overlooked by constructors who have not had much experience in balancing ganged circuits.

Again thanking you for a "Star" receiver.

Yours faithfully,
H. F. PADMORE,
"Shirlbeath," Kingsland, Hereford.

See the full Clix range on Stand 202 Olympia.

Cheapest PERFECT Contact

TECHNICAL NOTES

Some diverse and informative jottings about interesting aspects of radio reception.

By Dr. J. H. T. ROBERTS, F. Inst.P.

Screened-Grid Mistakes.

FOLLOWING on my remarks last week about pentodes, I should like to say something about "screened-grids," because so many people nowadays go in for the screened-grid and pentode arrangement for distance and volume with the minimum of valves.

One of the commonest mistakes with a screened-grid set is to supply too large a signal energy into the S.G. valve, with the result that the energy, by the time it reaches the detector, causes indigestion both in that stage and in the subsequent stages. Bear in mind that the S.G. is in a totally different category from the previous types of H.F. amplifier.

A magnification of 50 for a three-electrode valve becomes to-day twenty times that amount for an S.G., or even more. You are, therefore, dealing with a very high degree of H.F. amplification, and whilst this enables you to do many things you couldn't do before at the same time it requires to be handled with care and discrimination.

Aerial Characteristics.

For instance, if you are still using the old-fashioned aerial, you will be well advised to cut this down very drastically for the S.G. receiver. Generally speaking, much better results will be obtained—particularly as regards selectivity—with a very short aerial, often almost no aerial at all.

With this arrangement for close-range or powerful stations, it is often convenient to have a standby aerial of somewhat larger pick-up sensitivity for use when receiving weak or distant stations. On the other hand, in order to avoid the inconvenience of the change-over, the receiver may be arranged for weak reception and some form of variable coupling employed, so that the coupling can be weakened for more powerful stations.

What I particularly want to impress upon you, however, is that the proper purpose of the S.G. is to bring weak signals up to adequate strength and not to bring already adequate signals up to a strength which is out of all proportion to what the ordinary grid-leak rectification can stand.

Overloading.

Going back to the question of the pentode, I have previously remarked that the pentode, as an L.F. amplifier, really resembles the S.G. as an H.F. amplifier in some respects. This is particularly so inasmuch as the pentode gives high amplification but must definitely not be overloaded.

The way to get the best out of the pentode is to supply it with an input which is well within its capacity to handle. Nothing can be worse than a badly overloaded pentode.

(Continued on next page.)

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COSSOR 2 3 4 EMPIRE MELODY MAKER
Screened-Grid, Detector and Power.
With valves and cabinet **10/-**
CASH PRICE £6 15s. 0d. WITH ORDER
Balance in 11 monthly payments of 12/6.
Finished Instrument. Royalties Paid, £7 10s. 0d. Cash only.

MULLARD 1932 TYPE
Screened-Grid, Detector and Pentode. With valves less cabinet **11/11**
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Plugs direct into battery or eliminator operated receiver. Receives short-wave stations from all over the world. Ready assembled. Complete with mahogany cabinet. Cash price 45/-.
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ATLAS A.C. ELIMINATOR TYPE A.C.244. 3 Tappings, S.G., Detector and Power. Output 120 volts at 20 m/a. Cash price or C.O.D., £2 19s. 6d.
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REGENTONE W.5 COMBINED H.T. ELIMINATOR AND TRICKLE CHARGER. One S.G., 1 variable, and 1 fixed tapping for H.T. L.T. charging for 2, 4, and 6 volts. For A.C. mains. Cash price £5 17s. 6d.
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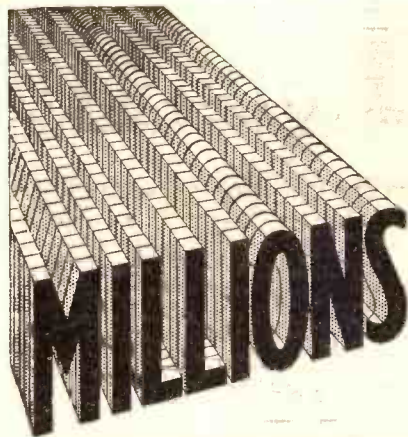
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Other famous Columbia Batteries :
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TECHNICAL NOTES

(Continued from previous page.)

I mention all this because many people fail to get the results they ought to get with both S.G.'s and pentodes, owing to a desire to push the valves beyond reasonable limits. The same sort of thing arose when dull-emitter valves were first introduced. Many people thought that if a dull-emitter filament gave enormously greater emission at a dull heat than an ordinary metal filament would give at the same temperature, therefore the dull-emitter was going to give thousands of times the emission *under bright emitter conditions*.

"Killing the Goose. . ."

The point, however, is not that the D.F. valve gives enormously greater emission than the bright emitter, but that it gives adequate emission at a much lower (and therefore more economical) temperature. But to attempt on that basis to operate the dull-emitter filament at bright-emitter temperature and expect enormously greater emission would simply be killing the goose that laid the golden eggs. And the same is true of using either an S.G. or a pentode valve with too large an input energy.

If you particularly want to use a large amount of H.F. amplification and deliver a large input to the detector, then you should change over to power-grid rectification and increase the detector-anode voltage—taking care that the transformer is not overloaded in the process. In these circumstances you are definitely coming into the "power" class on your L.F. side, and the ordinary small pentode will need to be replaced by a power pentode or by a stage or stages of ordinary power amplification.

A New Sound Record.

An interesting new kind of film is being tried out with a view to its adoption both for talking pictures and for sound-recording without pictures. Instead of using a continuous length of film, which passes through the machine only once, a broad sheet of film is employed, the sound record being imprinted upon this in zig-zag fashion, down from top to bottom, then from bottom to top at a position adjacent to the first track, and so on.

In the machine the film-sheet, as we may call it, moves forward for its entire length, then shifts laterally through a small fraction of an inch, then travels backwards, shifts laterally again, and so on. It is something like the way you read lines of print, only zig-zag instead of returning to the same end every time.

Claims are made that the sheet is much more manageable and convenient than the strip, and that a much greater amount of recorded matter can be placed upon a given area of film surface. The "break" when the film changes direction has apparently been got over.

Trickle Charging Without Mains.

A somewhat new idea in accumulator-charging, or perhaps an old idea brought up to date, is a set of Daniell's cells, sufficient to give the necessary charging voltage. These cells use copper and zinc electrodes, give a terminal voltage of about 1 volt each, and have a comparatively low internal resistance, so that they are able to supply quite a fair current for long periods.

(Continued on next page.)

THIS YEAR AT OLYMPIA

In addition to the well-known

TUNEWELL

Coils, Chokes,
L.F. Transformers,
Speakers,
Speaker Units,
Condensers,

we are showing

**MAINS ELIMINATORS,
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STAND No. 82

EMPIRE HALL,
NATIONAL RADIO EXHIBITION.

TURNER & CO., 54, Station Rd., New Southgate, N.11.

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PLEASE be sure to mention "Popular Wireless" when communicating with Advertisers. Thanks!

TECHNICAL NOTES

(Continued from previous page.)

Incidentally, they are fairly free from "polarisation," which is the bugbear of many primary cells, particularly of the ordinary type of Leclanché. Four Daniell's cells in series give about 4 volts, but this voltage will drop on load and in practice the four cells will be found suitable for trickle-charging a 2-volt accumulator.

This arrangement is useful for those who haven't any electric-light supply and prefer to charge their batteries at home. You might think it would be better to cut out the accumulator altogether and use the Daniell's direct on the set. This is not so, however, as you would have trouble owing to variations in the voltage of the cells.

Parallel Feed.

As I have had a number of queries from readers in connection with the parallel-feed transformer arrangement, which I mentioned in these Notes recently, perhaps it may be useful to deal with one or two of the points here, for the benefit of other readers.

By this arrangement—in which, as you know, an anode resistance and coupling condenser are used, with different connections to the transformer—it is possible to get much better results from a given transformer and, furthermore, to use a transformer of high or relatively high ratio, and so get large magnification with little or no distortion.

One side of the coupling condenser (the low potential side) goes to the primary of the transformer, and the important point is that no direct current passes through the primary. Consequently, we are, for practical purposes, entirely free from variations of the inductance of the primary.

A Practical Point.

Inasmuch as the primary of the transformer is free from D.C., the liability of the transformer to break-down is virtually eliminated which, although not bearing directly upon the question of quality or results, is an important practical point.

Finally, the absence of D.C. load renders it possible, as I have mentioned, to employ high step-up ratios and to get large magnification without distortion.

The special transformers which are now available for the various arrangements of the parallel-feed idea are provided with cores of special alloys and are a remarkable production in many ways, not the least of which are their very small size and their wonderfully uniform "response" over the range of frequencies from the lowest audible up to seven or eight thousand cycles.

Controlling the Volume.

There are all sorts of different ways of controlling volume, but the number of ways in which control can be effected without causing distortion are comparatively limited. It is the easiest thing in the world to reduce volume—practically all methods of volume control consist in cutting down of the volume at some part—but the important point is to avoid, as far as ever possible, reducing one part of the scale more than another; in other words, to reduce the volume *uniformly* and without altering the character of the reproduction.

(Continued on next page.)

YOU can help to solve unemployment

BUY A GROSVENOR BATTERY

IT'S BRITISH

If British people *insisted* on British goods now, at once, employment would increase, the dole would decrease, and life would be better for all of us.

Thousands of High Tension Batteries made of foreign materials, by foreign labour and capital, are being bought to-day in this country. And for no good reason.

So many wild claims are made for H.T. Batteries that we won't compete. We'll make one true statement, however.

● ● ● To the best of our belief no battery gives as consistently good results or has as consistently long a life as a Grosvenor.

Our factory at Watford, Hertfordshire, employs hundreds of British people. It will employ hundreds more if *you* go out and buy a Grosvenor Battery.

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99 V. ..	9 0	99 V. ..	20 0	99 V. ..	13 0
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It will be a great encouragement to us in this campaign to increase British trade if you will write to us assuring us of your support.

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No. 234. A remarkable advance of last season's model. Cash Price £6 15 0
Or 10/- with order and 10 monthly payments of 13/6.

NEW HEYBERD A.C. ELIMINATOR KIT C.150. Complete kit of parts for building an H.T. Eliminator, including steel case. Output 25 M.A. 150 volts. 3 H.T. tappings. One variable.
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Carriage charged on all orders from Scotland.
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NEW BLUE SPOT 66R UNIT. The finest balanced armature movement on the market, complete with large Cone and Chassis. Cash Price £2 10 0
Or 5/- with order and 10 monthly payments of 5/-.

NEW CELESTION MOVING-COIL L.S. UNIT (PERM. MAGNET), with Transformer. Cash Price £4 5 0
Or 13/6 with order and 10 monthly payments of 8/-.
Send list of requirements, and quotations will be sent by return.

LONDON RADIO SUPPLY COMPANY,
11, OAT LANE, NOBLE ST., LONDON, E.C.2
TELEPHONE: National 1977.

TECHNICAL NOTES

(Continued from previous page.)

Potentiometer Control.

Volume may be controlled either at the high-frequency or at the low-frequency part of the set. For example, in the case of a gramophone pick-up, a variable resistance may be shunted across the pick-up but this will almost certainly result in the upper notes being reduced unduly, with consequent distortion.

It is much better to arrange a potentiometer between the pick-up and the first amplifying valve. The two ends of the potentiometer should be connected across the pick-up, one end then going to the grid-bias whilst the slider goes to the grid of the valve.

With the slider in the centre position, half the voltage developed by the pick-up is passed on to the grid, but as the slider moves on towards the end remote from the grid itself a greater and greater proportion of the pick-up voltage is supplied to the grid. Conversely, of course, as the slider is moved towards the other end of the potentiometer the voltage is reduced.

Varying Transformer Voltage.

It is important to use a potentiometer which has a sufficiently high resistance; generally a value of not less than 50,000 ohms will be found suitable. If a potentiometer of much lower value than this is used there is a danger of throwing such a shunt load upon the pick-up that the high notes will be partly lost.

Turning to the low-frequency type of control, a potentiometer may be shunted across the L.F. transformer secondary, one end of the potentiometer going to grid-bias negative and the slider to the grid.

The action here is precisely similar to that in the case of a pick-up, if we regard the transformer secondary as taking the place of the pick-up. The position of the slider on the potentiometer determines the proportion of the total voltage developed in the transformer secondary which is handed on to the grid of the next valve.

Tapping Anode Voltage.

In a resistance-capacity-coupled amplifier, a fairly high resistance wire-wound potentiometer may be used as the anode resistance and the slider picks off an adjustable voltage from this, which is then passed via the coupling condenser to the grid of the succeeding valve.

In the case of an all-electric set, where it is not an easy matter to use a filament control, it is sometimes useful to introduce a condenser—a variable condenser—in series with the aerial; this has the effect of decreasing the capacity and so diminishing the voltage delivered into the set.

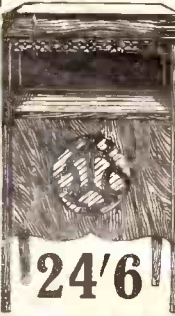
AN ADVERTISER'S CORRECTION.

In the Telsen Electric Advertisements in "P.W." dated Sept. 5th and Sept. 12th, there was an error in the descriptions of the capacities of the Bakelite Dielectric condensers.

- Below are the correct figures:—
Bakelite Dielectric Differential Condenser. ('0003, '00015, '0001.) Price 2/-.
Bakelite Dielectric Reaction Condenser. ('0003, '00015, '0001.) Price 2/-.
(.00075, '0005.) - - Price 2/6.
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Enclose your set in this BEAUTIFUL CABINET

Here is a Cabinet of outstanding beauty at a really remarkable price. It costs only 24/6 and enables you to enclose all batteries, etc., giving a neatness and beauty of appearance worthy of your set. Constructed mainly of oak finely



polished a rich nut-brown shade, this Cabinet stands 36 inches high. The panel space measures 18 x 7 ins. while the top is 21 ins. wide by 14 1/2 ins. deep. The loud speaker aperture is 20 ins. diameter and is covered with fine amber silk. There is a removable panel back giving free access to batteries and speaker. The deep-hinged lid enables the set to be removed bodily.

Decide now to have this fine Cabinet in your home. Money back if not entirely satisfied. Send to-day to

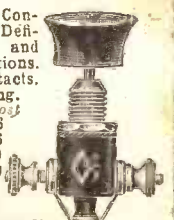
SOLOCA MFG. WORKS
(Dept. P.W.)
England & Wales. 38, STROUD GREEN RD., N.4
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RD40
2/-
By insured Post 2/3 or 2/9 with shield.
Can be mounted on brackets or through panel. Once set always ready. Not affected by vibration. Each one is tested on broadcast before despatch.



Of all high-class Radio Dealers or Sole Makers:
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THE IMPROVED "TONAX" CONE ADAPTOR

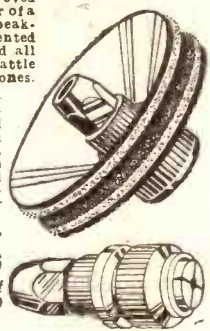
Greater value than ever is given in this vastly improved "Tonax." Every builder of a Single or Double Cone Speaker can, by using the Patented "Tonax" Chuck, avoid all distortion, chatter and rattle caused by badly fitting cones.

Of perfect precision construction. Practical, efficient design. Easily fitted to any unit. Two extra chucks, two linen washers, two felt washers, both deep and standard metal washers, and full instructions contained in every box.

Single Cone Type 1/-
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SCREEN GRID, DETECTOR and POWER TAPPINGS.
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OR COMPLETE WITH ACCUMULATOR CHARGER.
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Send for illustrations and prices of complete range also Mains Components for the Home Constructor.
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COMPACT ALL-ELECTRIC RECEIVER FOR A.C. MAINS

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NO LOUDSPEAKER TO BUY -
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PRICE includes OSRAM VALVES and Royalty.

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Low price. Extremely handsome design with inlaid walnut cabinet. Superb tone. Wide choice of stations. Simplicity of control. Complete radio equipment which only requires to be switched on.

HIRE PURCHASE

Deposit £2.0.0 and 12 monthly payments of 30/-.
Your dealer will give you full particulars.

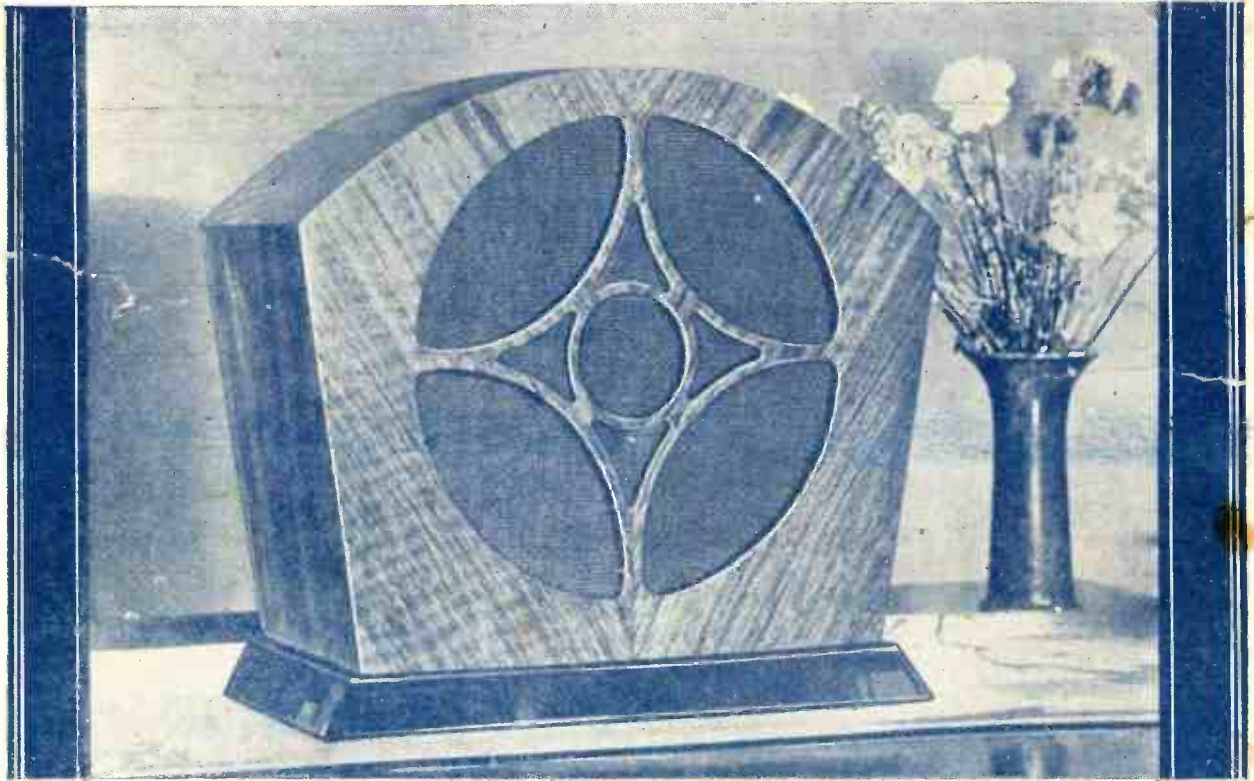
A striking and attractive advance in A.C. all-electric radio design and construction is made by this new GECOPHONE receiver. The points that will particularly appeal are the wide choice of stations received and its magnificent tone, made possible by the built-in GECOPHONE Inductor Dynamic Loud Speaker. Here is really economical radio, designed for the listener who insists upon perfect, effortless, trouble-free radio.

WRITE for folder BC5953 which fully describes and illustrates in colours the complete range of GECOPHONE Radio Receivers and Loud Speakers. SEND POST FREE.

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SUPREMACY IN RADIO - G.E.C. RADIO

Advt. of The General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.



The Speaker is all important

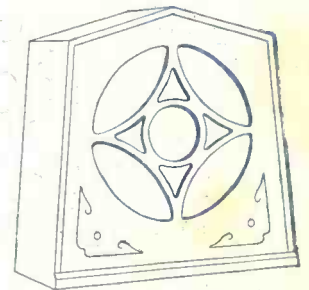
WHAT'S the use of having a receiver that brings in all Europe if you fail to get perfect reproduction? After all it is what you hear that matters; and it is your loud speaker that enables you to hear.

Whether your set be new or old, whether it be a "local station only" or reaches out all over Europe, be certain, for your enjoyment's sake, that your **speaker** is supreme.

All BLUE SPOT Speakers are **supreme**. BLUE SPOT Speakers give to speaking voices reality and sincerity, to singing a rich and resonant timbre, to music mellow, melodious charm. BLUE SPOT Speakers never add or subtract—they are perfect mirrors of the original.

Your dealer will be glad to let you hear a BLUE SPOT Speaker. You will find that, with all his experience to make him critical, he can find nothing but praise for it.

The model illustrated above is Blue Spot 70R. The cabinet is in fine quality walnut. Price 75/-



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The cabinet is in solid oak. The design distinctive—The workmanship excellent. Price **52/6**

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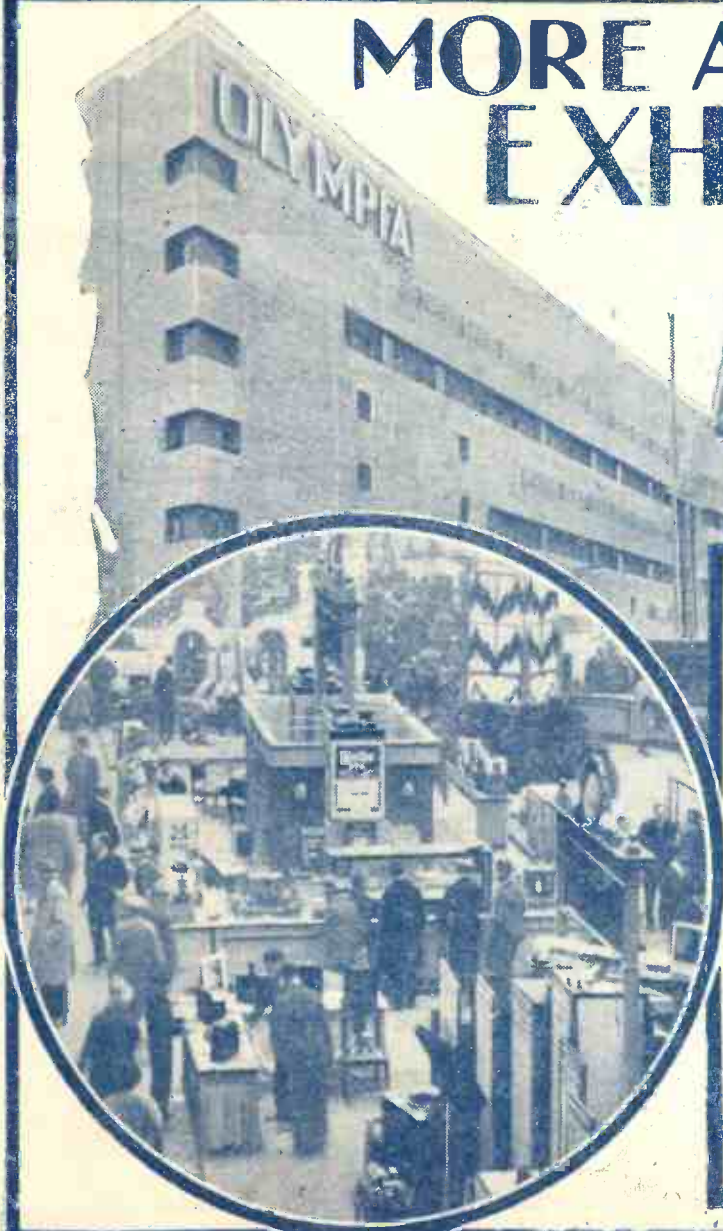
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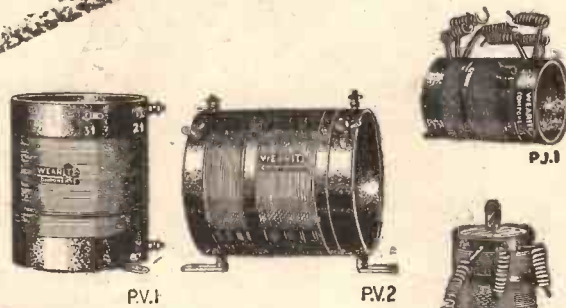
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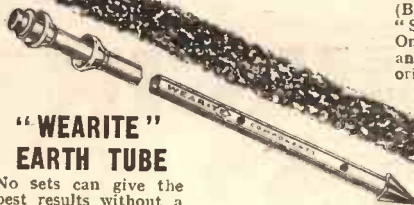


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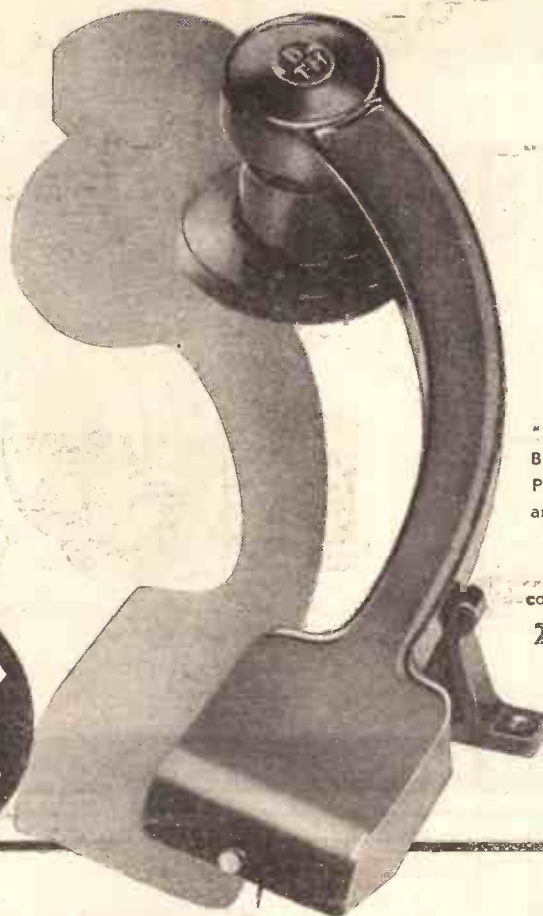
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PICK-UP
 and **Tone Arm**



PRICE

27/6



"Minor"
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A B.T.H. Pick-up and tone arm is the choice of leading radiogram experts—the choice of the enlightened home constructor—the pick-up that's chosen when a man "must have the best."

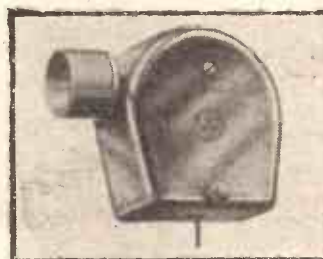
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The new Formo Slow-Motion Condenser permits perfect control to the finest limits of movement. Fit one to your set and notice how easily neighbouring stations are cut out and how the chosen broadcast comes through with perfect tone and clarity.

See also page 168.

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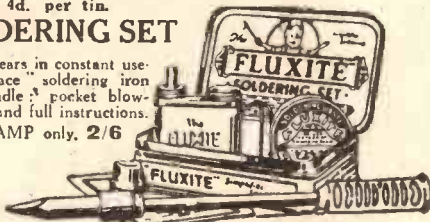
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Ask for Leaflet on improved method.

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TANNOY RADIO



MIDGET SUPER-HET RECEIVER
Comprising of a high-grade chassis which embodies pre-detector H.F. amplification multi band-pass tuning, with corrected L.F. amplifier.

Housed in an attractive walnut figured veneer domed cabinet with single dial tuning. Incorporating Radio and Gramo switching with independent volume control and moving-coil speaker. Price (complete) Mains Operated 28 gns. Battery Operated 25 gns.

SUPER-HET RADIO GRAMOPHONE (Junior Model)

This Radio receiver and Gramophone combined has a high-grade chassis which embodies a pre-detector H.F. multi band-pass tuning super-het receiver and corrected L.F. amplifier.

Radio and Gramo switching are provided. Automatic brake on Gramo Motor which works on any make or size of record without independent setting. Housed in a beautifully-figured polished walnut cabinet of Tudor design. This instrument is not mass produced, but is individually built for a discerning buyer. All models incorporate specially matched moving-coil speakers. Price - Mains Operated 45 gns. Battery Operated 43 gns.

SUPER-HET RADIO GRAMOPHONE (Senior Model)

Similar in appearance to the Junior Model but incorporating a considerably larger Radio and Gramophone output. Price - Mains Operated 55 gns.

TANNOY PRODUCTS,
Dalton Street :: West Norwood, S.E.27

Photo: Streatham 6731/2.

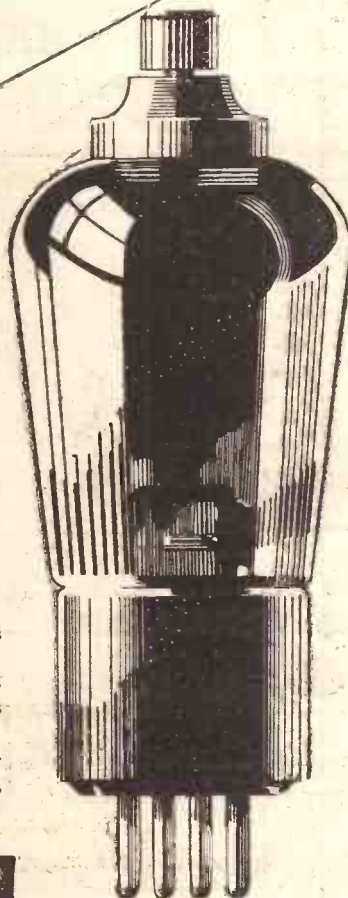
In the Mullard range of 2-volt valves there is a valve for every stage of every battery operated receiver, each giving that improved performance which is the basis of Mullard supremacy. The P.M.12 for example, is the Mullard 2-volt screened-grid H.F. amplifier. This highly efficient valve, in its new form, possesses greatly improved characteristics which means increased sensitivity. Fit a P.M. 12 now, and notice the increased range of your receiver.

PRICE 20/-

THE IDEAL
THREE VALVE
COMBINATION
THE P.M.12
P.M.I.H.L.A.N.D
P.M.22.

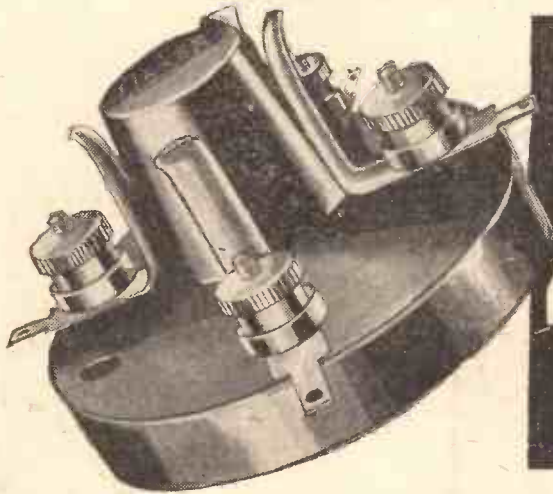
CHARACTERISTICS:

Max. Filament Voltage	- - -	2.0 volts
Filament Current	- - -	0.15 amp.
Max. Anode Voltage	- - -	150 volts
*Anode Impedance	- - -	180,000 ohms
*Amplification Factor	- - -	200
*Mutual Conductance	- - -	1.1 mA./volt
*At Anode Volts 150; Screen Volts 75; Grid Volts. Zero.		



Mullard
THE MASTER VALVE

Sets cost less to build with these new LISSEN parts



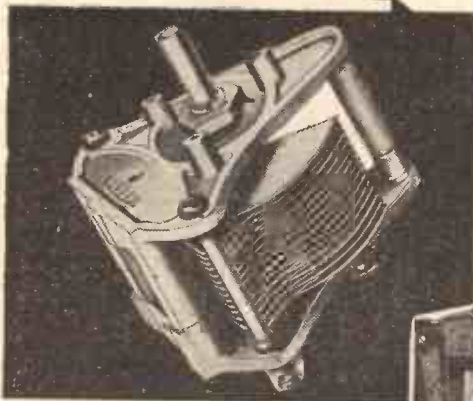
4^D₁ 2

NEW LISSEN ECONOMY VALVE-HOLDER

A new rigid valve-holder of simple and robust design. Firm and individual contact between springs and valve pins is assured by the curved surface of the springs. Suitable for high-frequency circuits and short-wave work. A really good valve-holder at an economy price, 4^D₁2.

YOU CANNOT BUY BETTER PARTS THAN LISSEN NO MATTER WHAT YOU PAY

Lissen components are the best value for money you can possibly buy. They form a huge family of parts built to identical standards of precision—built to pull together in any radio circuit. Replace anything that is specified with the equivalent Lissen component and you will find that you not only *save money every time* but *improve results as well*.



NEW LISSEN DIE-CAST VARIABLE CONDENSER

You have only to handle this new Lissen Variable Condenser to make you desire it. The die-cast frame—the one-piece spindles into which the vanes are solidly riveted—the unshakable rigidity of the whole construction, the clean-cut finish of the job—all these speak of new pleasure in building, new ease of tuning. And the new manufacturing methods used now for the first time by Lissen have enabled the Lissen Variable Condenser to be turned out to very fine standards of precision. You will not find anything like this new Lissen Condenser in anything but a luxury set. It enables you to GET A NEW STANDARD OF TUNING ACCURACY INTO EVERY SET YOU BUILD.

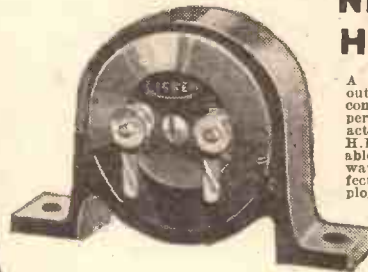
4/6
PRICE



NEW LISSEN ILLUMINATED DRUM DIAL

Fit this Lissen Illuminated Drum Dial to any set, and at once you give it a new distinction—the real "professional" appearance which every keen constructor aims at. The mechanism is robustly built, and the drive is by tension gut, sure and pleasantly easy. Can be fitted easily to all condensers singly or in gangs.

8/6
PRICE

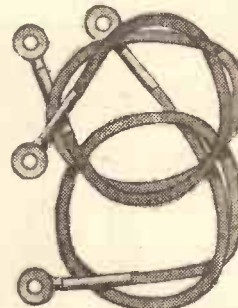


NEW LISSEN H.F. CHOKES

A disc type H.F. Choke of outstanding merit, in very compact form. Will operate perfectly in any capacity reaction circuit wherever an H.F. Choke is specified. Suitable for both long and medium wavelengths. Will give perfect results in receivers employing Dual Wave Coils.

PRICE

2/-



NEW LISSEN FLEXIBLE RESISTANCES

The Lissen Flexible Resistances are well-made components, built to stand up to heavy duty in a way no other type of flexible resistance can do. Special resistance wire is used, heavily covered in artificial silk. Values from 600 ohms to 200,000 ohms.

Prices from

to 2/6

7^D

ALL-MAINS RADIO FOR EVERY TYPE OF BATTERY SET

No alterations to either
set or valves - - -



3 MORE "ATLAS"
ALL-MAINS UNITS

£6·10

or 10/- DOWN and
9 monthly payments
of 15/- each.

Regd. No. 1
765,640.

"ATLAS" ALL-MAINS UNIT, MODEL A.C.290
H.T., L.T., & G.B.

This new Super 'ATLAS' All-Mains Unit makes any battery set up to 5 valves fully mains-operated, and endows it with a bigger range, greater volume and better quality reproduction. As with all 'ATLAS' Units, no alterations whatsoever are required to either set or valves, and operation is as safe and simple as with dry batteries.

'ATLAS' Model A.C. 290 provides 2 Variable H.T. Tappings of 0/100 and 0/120 Volts respectively, and one Fixed of 150 Volts. Output 25 m/A at 150 volts. 4 entirely independent G.B. Tappings of 1½, 3, 9, and 16 volts respectively with Electrolytic Condenser smoothing. Trickle Charger for 2, 4, and 6 volt L.T. Accumulators at 5 A. A tapped input ensures the highest efficiency on all mains voltages between 200 and 250. The exclusive "ATLAS" Switching arrangement isolates the Receiver while Trickle Charging.

A double adaptor is fitted for connecting the unit to either a lamp socket or 2-pin socket. Incorporating Westinghouse Rectifier. Without a doubt the finest All-Mains Unit ever produced at the price. Ask your dealer for a demonstration or write direct to the makers for full details of the 'ATLAS' range. There are models for all requirements.



MODEL
A.K. 22.

For sets up to 3 Valves. 1 Tapping 60/80 v., 1 Tapping 90/100 v., 1 Tapping 120/150 v. Output 12 m/A. Trickle Charger for 2 v., L.T. Accumulators at 3 Amps. 77/6 or 10/- down and 9 monthly payments of 8/6 each.



MODEL
A.K. 260.

For sets up to 4 valves. 1 Tapping 60/80 v. (Max. and Min.), 1 Tapping 50/90 v. (Max., Med., and Min.), 1 Tapping 120/150 v. Output 20 m/A. at 120 v. Trickle Charger for 2, 4, and 6 v. L.T. Accumulators at 3 amps. 90/- or 10/- down and 9 monthly payments of 10/- each.



MODEL
A.C. 188.

This amazingly successful unit was voted the finest Mains Unit at Olympia, 1930. For sets up to 5 valves. 2 Variable Tappings 0/100 and 0/120 v. 1 Fixed 150 v. Output 25 m/A at 150 v. Trickle Charger for 2, 4, and 6 v. L.T. Accumulators at 5 amps. £6 or 10/- down and 7 monthly payments of 15/6 each and one of 14/6.

"CLARKE'S" "ATLAS" MAINS UNITS

H. CLARKE & Co. (M/CR), LTD.,
EASTNOR ST., OLD TRAFFORD, MANCHESTER.

London Office: Bush House, W.C.2.



THE NEW STANDARD OF VALUE

LOTUS ALL-MAINS

LUXURY SET for £14.14.0

for A.C. or D.C. Mains

MAGNAVOX MOVING
COIL SPEAKER - - -

MAZDA VALVES - - -

IRRESISTIBLE H.P. TERMS

Never before have such outstanding features, such a luxurious cabinet, such magnificent reception been available at such a low price. The new Lotus Table Console is made for both A.C. and D.C. Mains. It is conceived and designed by J. Sieger, the famous radio engineer, who is now a member of the Lotus Research Laboratories.

One-Knob Tuning and All-Mains operation make for the acme of simplicity. The Magnavox Moving-Coil Speaker, Mazda Valves, S.G., Detector and Power, make for unequalled reproduction.

Guaranteed Full-strength, Perfect Reproduction of the leading European programmes.

The Lotus Table Console is entirely self-contained in a beautifully polished walnut cabinet of matchless proportions and finish.

TRULY THE RADIO OF THE FUTURE—
NOW!

The Hire Purchase Terms are irresistible. 27/9 deposit secures this marvellous set, the balance being paid in 11 monthly instalments of 27/9 each. Ask your dealer for a demonstration. CASH PRICE £14 14s. A.C. or D.C.



RADIO OF THE FUTURE — NOW!

TABLE CONSOLE

LOTUS

**THE WORLD'S KEENEST TUNING
KEENEST PRICED POWER SET**

**ALL
BRITISH
MADE**

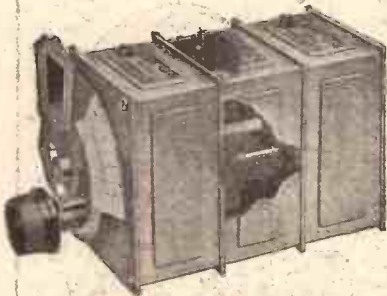


LOTUS

A complete range of new Components at keenly competitive prices, by J. Sieger, the famous radio designer

In addition to the new Lotus Components illustrated below, there are many new lines, including Gang Condensers, Transformers, Chokes, Switches, Slow-Motion Drives, etc. You will be interested in the complete range, write to-day for full descriptive list.

Famous from the earliest days of broadcasting, Lotus Components have always enjoyed the esteem of the radio constructor. This year many new lines have been born from the Lotus Research Laboratories. Designed by the genius of J. Sieger, and manufactured with the unequalled resources of the Lotus Works and experience, they are miracles of efficiency and value. In no case has quality been sacrificed for price. Nevertheless, through highly intensified production, they are within the reach of every pocket. All the leading set designers specify Lotus. They know that for reliability and efficiency they are absolutely dependable. Follow the experts' lead; insist on Lotus Components.



GANGED CONDENSERS.

Each unit is totally screened and precision matched, and sturdy construction ensures lasting accuracy. With Disc Drive 5/- extra. Or with Drum Drive 7/6 extra. 3-Gang (as illustrated) 30/-, 4-Gang 40/-.

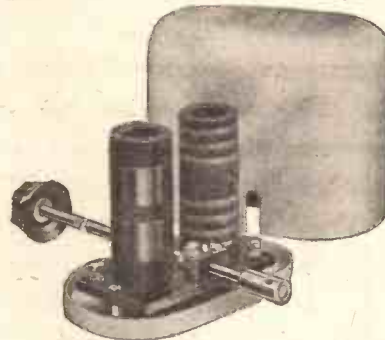
**2-GANG
20/-**



UNIVERSAL SWITCH.

A provisionally patented rotary switch with self-cleaning contacts. Easily ganged. For many types of switching arrangements.

1/6



BINOCULAR DUAL-WAVE COIL.

Long and short-wave windings on separate formers, silent wave-change switch. These coils are all matched and can be ganged. Completely and compactly screened. Designed by J. Sieger for Hair-line Selectivity.

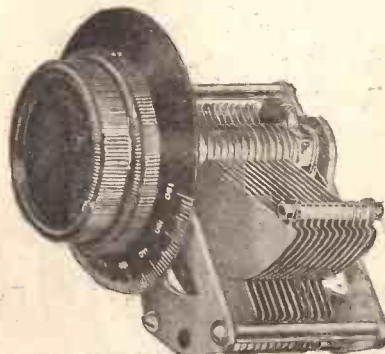
10/6



RIGID-DRIVE LOG CONDENSER.

An inexpensive but reliable component for the home constructor. With Knob-Dial, '0003 and '0005 capacity.

3/6



SLOW-MOTION CONDENSER.

Stout construction with integral ball-bearing slow-motion device. Complete with Knob-Dial. Capacity '0003 and '0005.

6/6



AUDIO TRANSFORMER No. 1.

An inexpensive instrument for the home constructor. It is remarkably efficient and has a good, straight-line amplification curve. Ratios 3-1 and 5-1

5/6

LOTUS RADIO LTD., MILL LANE, LIVERPOOL



"UP TO STANDARD"

THE first consideration of the T.C.C. is the protection of the buyer—it must be so, because condensers are bought "on trust." Without expensive instruments you cannot test a condenser for true capacity—for insulation or mechanical strength. T.C.C. however, make sure in their laboratories first. Long before a condenser can reach you it must be proved "up to standard"—and a high standard too—set as a result of 25 years specialised experience in condenser manufacture. The T.C.C. reputation is your safeguard, if we pass it "up to standard" it is so.

T.C.C. CONDENSERS

TELEGRAPH CONDENSER CO., LTD., N. ACTON, W.3.

♡ 8983



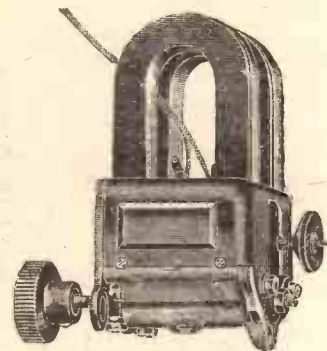
AIDS TO BETTER RADIO!

These are the world-famous Units more scientifically constructed than ever before. The laminated pole pieces working on V-slides are a huge advance on all Units hitherto made, and give a volume with clarity that is unequalled.

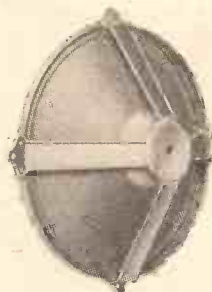
Compare the results which Elion gives with those of higher priced units and judge for yourself. The finest set in the world depends upon its speaker for results. Let your set give of its utmost by incorporating an Elion Unit in your speaker.



LOUDSPEAKER UNIT S.60.
Adjustable 4-pole Armature Unit with precision adjustment as in Type 50. Price 24/-



LOUDSPEAKER UNIT S.50.
Very powerful 4-pole balanced Armature Unit. Laminated pole pieces. Price 30/-



CHASSIS K.5.
Diameter 14½ in. Depth 4 in. Price 9/6.

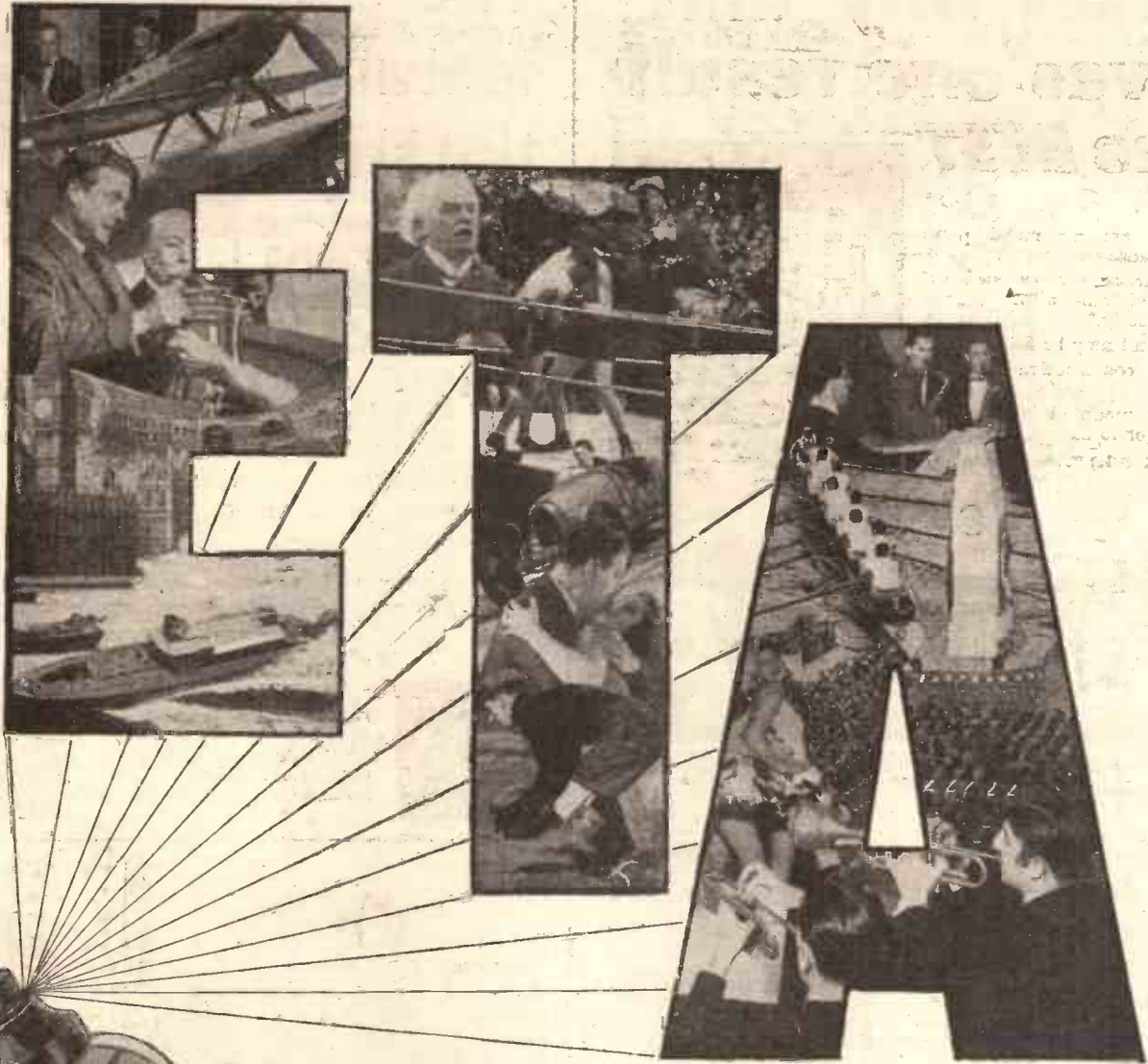
*Ask Your
Dealer for a
Demonstration!*

GEORGE ROBINSON & SON LTD
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RIVER PLATE HOUSE · SOUTH PLACE · LONDON EC2

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METROPOLITAN 5886-7-8.

Northern Office :
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**Radio
through ETA Valves
means better Selectivity
clearer reception**

THE ELECTRICAL TRADING ASSOCIATION LIMITED,
ALDWYCH HOUSE, ALDWYCH, LONDON, W.C.2.
Telegrams: Eltradax, Estrand, London. Telephone: Holborn 8139
IRISH & SCOTTISH AGENTS: W. J. Byrne, 21, Temple Lane, DUBLIN.
R. G. Jackson Nisbet, 132, Renfrew Street, GLASGOW.

Takes any unit-gives one result -the BEST

Because :

There are no metal parts to cause resonances.

The accurately designed 15" cone handles all frequencies perfectly.

Any unit may be fitted.

Rigid construction throughout.

Easily mounted in any cabinet or to baffle board.

ASK FOR THE WUFA

"UNIVERSAL" CHASSIS 12/6
which brings out the Best in every Unit.



VISIT THE "WUFA" EXHIBITION (Sept. 18-26) OPPOSITE OLYMPIA

M. Lichtenberg, 4, Gt. Queen St., London, W.C.2.

The Outstanding feature of the show



BRITISH GENERAL

BAND PASS 10K.C. TUNING UNIT

At last—a Tuning Unit which gives the separation of 10 Kilocycles as laid down by the International Radio Convention, and yet gives full strength throughout the entire wave-band between 230 and 550 and from 800 to 2,000 metres.

PRICE 14/6
INCLUDING COUPLING CONDENSER

From all dealers of repute or direct from the manufacturers :
BRITISH GENERAL MANUFACTURING Co. Ltd.,
Brockley Works, London, S.E.4

STAND 30 RADIO EXHIBITION

REDUCED PRICES! QUALITY MAINTAINED

BECOL LOW LOSS FORMERS

26 Types. Tested before despatch.

LOOK FOR TRADE MARK

PANELS CUT TO ANY SIZE

THE BRITISH EBONITE Co. Ltd., Hanwell, W.7

Melbourne
RADIO



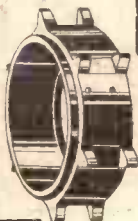
MELBOURNE RADIO
HOE ST.,
LONDON, E.17

JUNIOR COILS

With Coloured Flex Leads

- PJ1 - 2/9
- PJ2 - 2/-
- PJ3 - 2/9

COIL QUILTS 6d. Each
P.V. COILS 6/6 Pair



"Embassy" Cabinet only 35/-

The Cameco "Embassy" has just that severity and dignity so much sought after nowadays in modern furnishing. It accommodates 2, 3 or 4-valve sets and batteries if required, and takes a 10-in. speaker. Baseboard 18 in. by 10 in. supplied. Suitable for the V3 Kit. Finely finished, in Oak, 35/-; Mahogany, 40/-. Write now for the new 1932 24-page Radio Cabinet Catalogue.
VISIT OLYMPIA, Stand 51 (Ground Floor, Empire Hall.)

A MODERN SET REQUIRES A MODERN CABINET

Name _____
Address _____
P.W.14

CARRINGTON MFG. CO., LTD.,
24, Hatton Garden, London - E.C.1.
Phone: HOL. 8202.
Works: S. Croydon.

"I've got to study economy now old chap and stay at home in the evenings."

"Oh! well you've got your radio, although you are always grumbling about it."

"Not now! I've made my set all-electric with a Regentone Mains Unit and you wouldn't believe the difference it's made."

"In what way?"

"I never have to bother with batteries or accumulators—I just plug in to the electric light and I get tip-top reception every time I switch on. My set is far more powerful now and I've finished with all this battery expense and trouble."

"Would it be difficult to make my set All-Electric?"

"Not with Regentone—these people specialise in this Mains business and you can take it from me their units take some beating. Why don't you ask your Wireless Dealer about it, or write to Regentone for their latest catalogue."

GET THE BEST OUT OF RADIO

The B.B.C. transmissions are worthy of the best possible reproduction. You cannot obtain the best possible reproduction unless your receiver comprises a good circuit, incorporates the best possible components and operates a good speaker. Recognising this, FERRANTI from the outset produced the best possible components, and a receiver built on FERRANTI lines will give profound and lasting satisfaction.

Charts showing the construction of Receivers, Amplifiers, and Eliminators, free on request accompanied by 1½d. stamp to cover postage.

AUDIO-FREQUENCY TRANSFORMERS, OUTPUT TRANSFORMERS, and PUSH-PULL TRANSFORMERS; CHOKES, CONDENSERS, and RESISTANCES; MEASURING INSTRUMENTS, A.C. & D.C.; BATTERY ELIMINATORS FROM £3 10 6 TO £11 11 0. SPEAKERS: PERMANENT MAGNET MOVING-COIL, £5 15 0 TO £12 10 0. A.C. MAINS ENERGISED £9 10 0. D.C. MAINS ENERGISED £7 17 6. Also Available in Chassis form.



Fully descriptive pamphlets available on request.

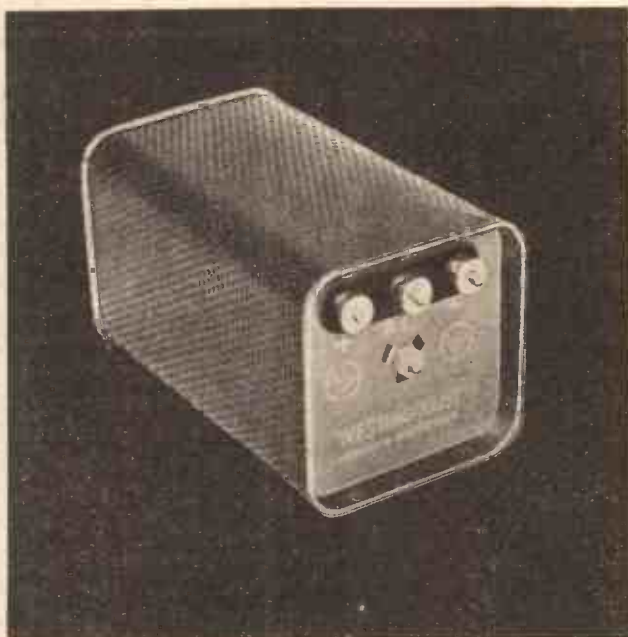
The third Edition of "The True Road to Radio" is now available, price 5/-, obtainable from any dealer.

FERRANTI FOR TRUE REPRODUCTION

FERRANTI LTD., Head Office & Works: HOLLINWOOD, LANCs.

LONDON: Bush House, Aldwych, W.C.2.

Instantly popular— THE NEW H.T.8



THE H.T.8 Metal Rectifier has become instantly popular for the conversion of three- and four-valve battery-run sets into mains-sets; and for incorporating in amateur-built sets of similar design. It will give an output of 250 volts, 60 milliamps (after smoothing), with an input of 200-210 volts A.C., using the voltage doubler circuit. (★ Described in "The All-Metal Way.") The price of the H.T.8 is 21/-.

Other metal rectifiers for amateurs' use are the H.T.5—D.C. output 120 v., 20 m.a.—price 12/6; H.T.6—D.C. output 175 v.; 25 m.a.—price 15/-; and H.T.7—D.C. output 200 v., 28 m.a.—price 17/6; and various low tension types.

★ The 1932 edition of "The All-Metal Way," which will be sent on receipt of the coupon below with 3d. in stamps, gives all the information required to build an H.T. eliminator or triodes charger, and also full details of running moving coil loud speakers from the A.C. mains. This well-known book has been completely revised, and many questions which were not fully dealt with in our 1931 issue are now discussed in detail. Westinghouse Metal Rectifiers are shown at Stand 44, Olympia, Sept. 18-26; and Stand 76, City Hall, Manchester, Oct. 7-17

WESTINGHOUSE METAL RECTIFIERS

The Westinghouse Brake & Saxby Signal Co., Ltd., York Rd., King's Cross, London, N.1. Phone: North 2415.

COUPON

PUBLICITY MANAGER,

W. B. & S. S. Co., York Rd., King's Cross, London, N.1.

I enclose 3d. in stamps, for which please send me a copy of "The All-Metal Way, 1932."

NAME.....

ADDRESS.....

P.W. 26/9/31

"WE CONGRATULATE Varley ON THEIR NOTABLE DEVELOPMENTS"

"We congratulate Varley on Their Notable Developments," says a leading Radio Weekly, in reviewing the new Varley Components illustrated on this page.

They are technically suitable products. To meet present-day requirements . . . and present-day pockets.

Build Varley quality into your set.

**STAND 58 . . . EMPIRE HALL
NATIONAL RADIO EXHIBITION**



NICHOKE II.

The latest addition to the range of Varley L.F. Chokes. Compact, highly efficient and suitable for all ordinary purposes — as Smoothing Choke, Output Filter Choke, etc.

Inductance, no D.C., 20 Henries. With 50 m/A D.C., 14 Henries. D.C. Resistance, 450 ohms.

List No. DP 23.

Price 10/6

WORTHY COMPANIONS OF THE "SQUARE PEAK" (REGD. TRADE MARK) COIL

JUNIOR MULTI-CELLULAR H.F. CHOKE

Chokes efficiently on both wave bands, either in Detector or H.F. stages. Inductance 120,000 microhenries. D.C. Resistance, 350 ohms.

List No. BP 2.

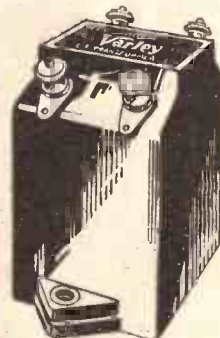
Price 3/6



"TAG RESISTANCE"

Spiral wire-wound. Compact. Can be soldered direct to receiver wiring. 22 different values from 100 to 100,000 ohms.

Prices 1/- to 2/-



NICLET L.F. TRANSFORMER

Primary inductance 45 henries with no D.C. Ratio 3½ to 1. Maximum primary D.C. current 3 m.a. When resistance fed, ratios of 2.5, 3.5 and 4.5 to 1 are obtainable.

List No. DP 21.

Price 7/6

Varley

Outstanding features of this remarkable Receiver:



COMPLETELY SCREENED COILS

The coils used in the Cossor Empire Melody Maker are completely screened in metal "pots" entirely eliminating direct pick-up, thus further improving selectivity.



EXTERNAL WAVE-CHANGE SWITCH

Wave Change Switching is effected by operating the switch at the end of the cabinet—"in" for long—"out" for short.



SERIES AERIAL CONDENSER

The variable Series Aerial Condenser permits adjustment of selectivity to give the fine tuning necessary to cut out powerful local stations.



COSSOR METALLISED SCREENED GRID VALVE

Even better performance is ensured by the use of a Cossor Metallised Screened Grid Valve with its record low inter-electrode capacity and its ability to eliminate stray coupling effect between anode and nearby components.



ALL-METAL BASEPLATE

Construction is simpler than ever, due to the Metal Baseplate, which is supplied with every hole drilled, thus automatically positioning every component.

£6.15 s.

Use this Coupon

To Messrs. A. C. Cossor, Ltd., Highbury Grove, London, N.5
 Please send me free of charge one of your Constructional Charts No. C. 12 which tells me how to build the
 Cossor Empire Melody Maker.
 Name.....
 Address.....
 P.W. 26/9/31.

More Powerful Longer Range Sharper Tuning

yet even lower in price!

For as little as £6. 15. 0 you can now buy an "All-Europe" Receiver—the Cossor Empire Melody Maker Model 234—a powerful 3 valve Screened Grid Wireless Set of outstanding performance.

Its range and selectivity are remarkable. It will cut out completely the powerful transmissions of nearby stations and bring in the programme you want to hear. All the main European Stations are within its reach. Due largely to the excep-

tional efficiency of its Cossor Valve's the Cossor Empire Melody Maker is equal in performance to the most costly factory-built 3-valve S.G. Receiver.

For all its efficiency the Cossor Empire Melody Maker is so simple that anyone can assemble it—no Wireless knowledge is necessary—in a very short time the veriest Radio novice can build it and get results equal to an expert. Send at once for large Constructional Chart—use the coupon.

Cossor EMPIRE Melody Maker

Model 234

HIRE PURCHASE TERMS

You can obtain the Cossor Empire Melody Maker for only 15/- down and nine monthly payments of 15/-.



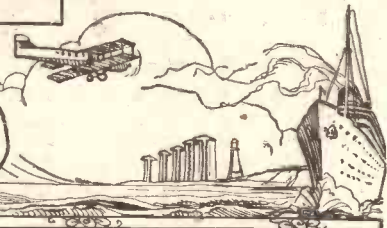
Price includes Cabinet, Valves and all the parts necessary for rapid assembly.

Popular Wireless

LARGEST NET SALES



Scientific Adviser:
 Sir OLIVER LODGE, F.R.S.
 Chief Radio Consultant:
 CAPT. P. P. ECKERSLEY, M.I.E.E.
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 K. D. ROGERS, P. R. BIRD,
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OLYMPIA CALLING
 VE9GW
 MOUNTAIN RELAY
 MY POST-BAG

PROSPECTOR'S DREAM
 INTEREST IN PORT
 SHORT-WAVE ITEMS
 THE NAUGHTY MOON

RADIO NOTES & NEWS

Olympia Calling.

HAVE you been to Olympia yet? There's still a chance, for the great radio eye-opener does not close till 10 p.m. on Saturday, September 26th.

Hours, 11 a.m. till 10 p.m. Price, one shilling and sixpence. General outlook, very toothsome indeed!

The Exhibition Habit.

WITHOUT a breathing space from their successes at Olympia, the radio manufacturers must hoist their hose again before Wednesday, October 7th. For on that day at 3 p.m., the Northern National Radio Exhibition opens at the City Hall, Manchester.

The proceedings will be broadcast from the North Regional station as usual. And this year the show will be backed by the Radio Manufacturers' Association, and linked much more closely with the National Radio Exhibition now running in London, with the result that it will be larger and better than ever.

VE9GW.

MANY thanks to those short-wave sleuths who replied to my query about the Bowmanville (Canada) station.

A Huntly (Aberdeenshire) reader took the biscuit with the first reply, reporting VE9GW on 49 and 25 metres. He was "very faint, and fading badly."

This reader, by the way, says he is using a home-made short-wave adapter with his four-valve set. A wily stunt, that, which I

commend to all who want easy and inexpensive short-wave results.

A Mountain-Top Relay.

SOME of the French stations recently arranged to broadcast a relay from a party of guides at the top of Mont Blanc. The idea was to present a thrill, and a touch of the adventurous unknown to we stay-at-homes down on the plains, but, alas, it didn't work out that way! Not a bit!

The guides' voices came through all

getting exactly that sort of weather. No need to go yodelling round Mont Blanc for it!

My Post-Bag.

IT'S always pleasing to have nice letters from you fellows, but some of you will be the death of me if you are not careful. That awful fellow with the bedstead that I have mentioned is only one of many!

One of the oldest offenders is a Scotch globe-trotter—I think he must be a wireless operator on a tramp steamer—who writes hieroglyphics to me from all the low-down ports in creation. His latest letter (absolutely unreadable, as usual) comes from Ilo-Ilo, Philippine Islands, and I'm blest if I can make head nor tail of the circuit enclosed, either.

It is marked "super-het," but it looks more like a super-kettle of fish.

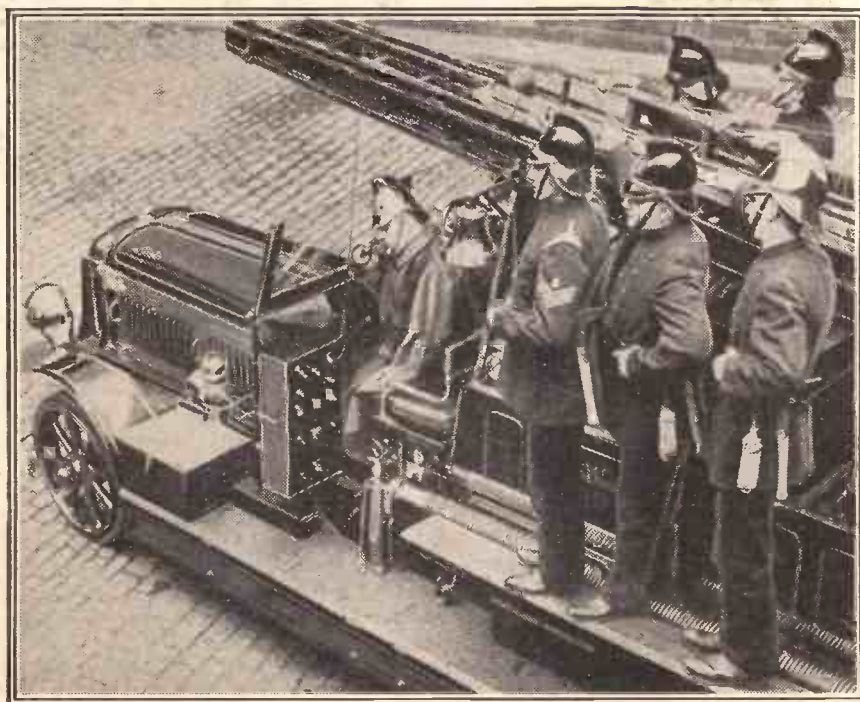
"Beaver."

THEN there is a Wembley reader of "P.W." who got annoyed because the "Times" recently published a tall story from Ottawa, about an escaped beaver. This beaver crept into an office in the dead of night, accidentally upset a vase of flowers, and when the water flowed away proceeded to improvise a dam by nibbling off the legs of tables and chairs!

That is what the "Times" said—and no sooner did C.S.P. of Wembley read that report than he cut it out and sent it to me with a letter that certainly makes confusion worse confounded.

(Continued on next page.)

THE FIRE-ESCAPE THAT'S FITTED WITH RADIO



The Rochdale Fire Brigade believes that one life saved is worth a lot of forethought, and so they have equipped the fire-escape shown here with a radio installation which keeps it in touch with the fire station when they are out on a call.

right—reporting "very low temperatures, fierce winds—bitter cold"—and so on. But none of the listeners were caring two hoots about the hardy mountaineers, for the very good reason that we were all

getting exactly that sort of weather. No need to go yodelling round Mont Blanc for it!

NEWS—VIEWS—AND INTERVIEWS (Continued)

A Wembley Wonder.

HERE is C.S.P.'s letter: "Dear Ariel,— While we are on the subject of super-heterodynes, I am taking the opportunity of sending you the above cutting from 'The Times.' It reminds me of a pet hippopotamus I once had who, in similar circumstances, upset a vase of flowers and, being sorry about it, he wept so much and so bitterly that his tears refilled the vase. After replacing the flowers carefully he gave me a pleasant smile and trotted contentedly back to his box where he used to sleep.

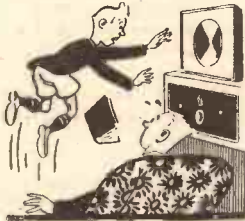
"(Please don't) Believe me,
"Yours very faithfully,
"C.S.P."

"P.S.—This has nothing to do with super-hets.!"

Phew! Whatever am I to do about that one?

En Passant.

I AM unable to resist the temptation to report that I recently heard a B.B.C. announcer say "authoritive." I could hardly believe my ears; but one arielite sprang up as though bitten by an asp and exclaimed, "How lovely! Did you hear that?" So I then knew that I was right, and that the announcer was wrong. "This is merely a cry of joy in passing"—a phrase of Stevenson's.



An Irish Appreciation.

IT is with pure delight that I turn to my next letter, which comes from a broth of a boy in Ireland.

Reluctantly laying aside his shillalah for a few moments, he writes: "I built the 'Economy' Three some days ago, and I can hardly say enough in its favour.

"All stations come in at full L.S. strength, including all Regional stations, Rome, Toulouse, Vienna, Barcelona, Stockholm, Berlin, Algiers, Mühlacker, Cassel, etc., etc., etc. A powerful set, cheap and efficient."

Spoke handsome, sorr!

The Prospector's Dream.

THE invention of a radio device for locating buried ore is such a well-defined type of "hardy annual" that Ariel, in his survey of the world's worst wangles, must be forgiven for introducing a vein of scepticism as each year's growth appears.

This time it is the report that G. Colborne, of Fort William (U.S.A.), has invented a radio gadget which will not only detect the presence of ore, but will



of ore it is, and the extent of it. Every kind of ore, says the report, in effect, makes a different noise.

That reminds me of the Scot who actually paid for a dog because it said "Oof, oof, oof!"

For the Blind.

A VERY unusual radio installation is being fitted at the Institution for the Blind in Tottenham Court Road, London, W.1. It provides alternative radio programmes in twelve different workshops, each loudspeaker being independently controllable for volume.

The set requires no tuning adjustment, and Mr. Burne-Jones, whose firm has secured the contract, tells me that it will be an all-from-the-mains outfit.

SHORT WAVES.

An Ohio man, it is stated, is incapable of feeling pain because his nerves don't function. What a pity he's so far away; my wireless set would cure him.—"Pictorial Weekly."

PATIENCE, PATIENCE.

"Nothing ever actually comes to an end," says a scientist.

This is a gloomy view. The drone of the fat stock prices will ultimately be succeeded by the vaudeville.—"Sunday Pictorial."

"Small Boy as Aerial," runs a headline. Some of those wireless licence dodgers will do anything to deceive the P.M.G.

"Under Danish law a bailiff cannot seize a radio set and speaker under a distraint warrant, as it is considered that such apparatus is essential to the maintenance of a household," we read in the "News of the World."

What queer ideas these foreigners get!

Extracts from a Letter TO MY POSTMASTER.

Yes, of course, I will tell you whether my apparatus and aerial have been dismantled. At least, I will do my best. But it will be difficult unless I report from day to day. You see, my son Tom is improving the set, and one never knows from one minute to the next whether the set is dismantled or not.

"The aerial is a different matter, and I can set your mind at rest about it now. The aerial has not been dismantled. I don't see why I shouldn't have an aerial on my house if I want one. I already have a flag-staff and a mortgage on it, and one more encumbrance makes very little difference."—"London Opinion."

FINALE.

A Kettering radio enthusiast is reported to have twenty different loudspeakers. That's nothing; look how many Solomon had.

Personal Note.

I THINK that I might spare a few lines to record with deep regret the untimely death under very distressing circumstances of Mr. R. C. Clinker, Chief Research Engineer of the British Thomson-Houston Co. Very profound on transformers and very sound on valves was he, and I remember him in the earlier days of organised amateur radio lecturing with lucidity, fertility of invention and modesty in his mien and style of imparting knowledge.

For the information of overseas readers, I may add that Mr. Clinker fell down a precipice whilst mountaineering in Wales.

The Broadcast Services.

READERS of "This Day"—the book of prayers used at the broadcast daily service—by Hugh Johnston, M.A., M.C., the senior curate of St. Martin's-in-the-Fields, London, will like to know of his latest volume, called "The Meaning and the Means." It has an introduction by the Rev. Pat McCormick, and is published by St. Martin's Review, 21, Chandos St., W.C.2. Price 2s. 6d.

Interest in Port.

NO doubt it is the interest in port which has bred the interest in C.T.I.A.A. I get lots of letters nowadays about this station, which transmits on 291 metres with 2 kw. power.

Transmissions occur on Mondays, Wednesdays and Saturdays from 10.20 p.m. to 12.20 a.m. On Thursdays on 42.9 metres there are transmissions announced in five languages.

I have no idea what the Portuguese broadcast and my knowledge of their culture goes no farther than that they had a poet called Camaens, whose memory lives mainly on the strength of his poem, "The Lusitadas." However, C.T.I.A.A. is a "bag."



Short-Wave Items.

MR. A. E. BEAR, in thanking us for calling attention to the "International Short-Wave Club," says that my Note was responsible for obtaining new members from all parts of the world, and adds the interesting news that of these members more were obtained from foreign countries than from England. (How "P.W." gets about!) Mr. Bear thinks that not nearly enough is done here to popularise short-wave reception, and appeals to the "trade" to do its fair share.

The Naughty Moon.

MANKIND has a mania for seeking scapegoats; when things go wrong our impulse is rather to find someone or something to blame than to find a

remedy. Radio is blamed for bad weather and now the moon is blamed for bad radio. Dr. H. T. Stetson, of the Perkins Observatory at Ohio Wesleyan University, tells the world (pronounced "woild" over there and "wurruld" by our Premier!) that radio reception is 100 per cent better when the moon is below the horizon. "With the moon overhead," says the doctor, "there appears to be a marked depression in the—Heavside Layer." And the depression is communicated to our new pup, I have noticed.



ARIEL.



"BEFORE the Second News Bulletin, here is an S.O.S. Will—"

Immediately everybody listens. S.O.S.'s may not rival Jack Payne's music in being the most popular broadcast items, but they certainly are the most listened to.

It was either "Alexander" or "Mose" who remarked on the large number of people who listen to the S.O.S.'s to see if they are lost! Not quite true, perhaps, but nearly!

When Everybody Listens.

Everybody listens to an S.O.S. because until the name is given out there is no telling that it may not concern some friend or relative. There's a general feeling of relief when it's over.

"Nobody I know," says the listener absent-mindedly to the loudspeaker; and yet somewhere, perhaps not even in England, is someone who is connected with the message—and then the 'phones start ringing!

S.O.S.'s come either by 'phone, telegram or police-information sheet to the Savoy Hill news room. Some are handed in at Manchester, and at other provincial headquarters, and they are then generally 'phoned through to London.

It all depends. If they are from the Chief Constable of a district in which there is a B.B.C. office, and if the messages concern people "wanted" in the area, then they will be given only with the Regional or Local broadcasts. If they have a National scope, then London has them.

Many Unsuitable Messages.

The B.B.C. man in the News Room decides if the messages are suitable for broadcasting. Many of them aren't.

In one of the offices at Savoy Hill is a chart showing, at a glance, all the details of the S.O.S. service. A surprising thing is that out of every five applications four do not fall within the B.B.C. rules and have to be refused. Many people do not know these rules.

The B.B.C. will broadcast messages requesting relatives to go to sick or injured people only when the hospital authorities certify that the patient is dangerously ill, and after all other means of communication have failed. In no case can an S.O.S. be broadcast after death has occurred.

You must give all details when 'phoning

When the announcer gives out an S.O.S. do you ever think of the romance of the rushed message to Savoy Hill and the work involved? Here our B.B.C. Special Correspondent describes what goes on behind the scenes.

or writing the B.B.C. for an S.O.S., and it also helps if you let the B.B.C. know, after a broadcast, whether it has been successful or not.

Do not forget that an S.O.S. cannot be broadcast regarding lost animals or property, and missing people are only asked for on the wireless when the B.B.C. is directly requested to do so by New Scotland Yard or by a Chief Constable.

Nearly one thousand S.O.S.'s were broadcast last year, and during the past two years the figures for successful and unsuccessful are about the same, there being 42 per cent successful S.O.S.'s, 53 per cent unsuccessful ones, and 5 per cent the results of which are not known.

Just about half these were needed to call relatives to the bedside of people dangerously ill. Under half were police messages asking for witnesses of accidents and so on. Unfortunately only 19 per cent of the messages used for tracing missing people are successful.

All kinds of curious things happen. A very strange case was that of a man who bought his first wireless set one day, and the following evening was astonished to hear an urgent microphone message addressed to him! Also this is one of the comparatively few cases where the S.O.S. message has been directly received by the person sought!

A strange thing is that even persistent haters of wireless are often helped by broadcast S.O.S. messages.

Converted to Radio.

Just recently the 'phone rang at Savoy Hill ten minutes after an S.O.S. had been broadcast, and the man at the other end of the 'phone asked for the S.O.S. to be repeated to him so that he could make sure of the details.

It transpired that the person sought was a neighbour living only two houses away, who had no wireless set and who, for various quaint reasons, had sworn that he never would be a listener. The end of the story is that the S.O.S. came just in time, and now he has been converted to a very keen radio-ite!

There was once a doctor who found that a prescription had been wrongly made up and it was very urgently necessary to get a warning to the patient to whom the medicine had been sent.

(Continued on next page).

"WHERE — IS LYING DANGEROUSLY ILL"



This is a typical scene in one of our large hospitals to which listeners are sometimes called by the B.B.C.'s urgent messages. In a large number of these institutions radio sets, provided by public subscription are installed for the entertainment of the patients. Headphones are used in nearly every case.

USING A PICK-UP

Some hints on the use of your set for record reproduction.

THE use of a pick-up with an ordinary wireless set or radio-gram is an extremely simple business provided one or two things are remembered when the pick-up is fitted. In the first place, grid bias on the valve into whose grid circuit the pick-up feeds is nearly always essential.

Bias Usually Necessary.

In certain cases (notably with A.C. mains valves) one appears to get better quality sometimes when no bias is employed, but, as a rule, one can take it that the bias is an essential part of the pick-up circuit. Consequently, then, if you fit a pick-up into your detector valve, which already probably has a grid leak going to the L.T.+, that grid leak must be disconnected either from the grid end or from the L.T.+ end in order that the pick-up can be placed between grid and filament in series with a grid-bias battery giving $1\frac{1}{2}$ -volts negative to the grid.

This is especially important nowadays when pick-ups are rapidly increasing in sensitivity, and we are getting many on the market having a peak output as much as 2 volts.

Use An Adaptor.

The inclusion of a pick-up switch in a set is not essential, as an adaptor can be used if desired, but it is very convenient provided it is well placed and does not affect the grid wiring of the detector to any great extent. If, however, it necessitates high-capacity wiring into the grid circuit when the detector is on radio, then a switch is a thing to be avoided.

So many sets have been spoilt on radio by a radio-gram switch, which greatly decreases the efficiency of the set on radio, though not making itself felt when the pick-up is employed. Volume controlling on the normal receiver is best done across the pick-up itself, regardless of whether the set already has a volume control on the L.F. side or not.

A pick-up which is of good manufacture

and is really efficient will quite easily overload the first valve straight away when it comes to a loud passage on the record, and, if you have no volume control in that circuit, obviously that overloading is going to be amplified, and the resultant distortion will get amplified in the latter stages with appalling results.

So whether or not you have an L.F. volume control in the set, provided it does not come in the first stage (where the pick-up is used), it is really advisable to have

using two single strands twisted or bound together in parallel, to form the leads.

This metal covering is earthed, and makes pretty sure that the leads will not cause trouble due to pick-up from mains, or loud-speaker leads.

Importance of Correct Tracking.

We must also say a word or two about tracking. The tracking of a pick-up is important if long life of the record is to be obtained, and if distortionless reproduction is expected, so if you get a pick-up make sure it has an offset arm and you have adequate room on the motor-board for tracking.

Incorrect tracking will often cause serious wear on the record, though perhaps the worst wear is caused when people insist on running a needle over more than one side of the record, unless that needle be of the tungstyle or semi-permanent variety.

If you want long life from the record and freedom from distortion it is essential when using steel needles to change them after one side and not expect them to last

for two sides or even more, as some people do.

THEIR SET IS A FIFTY-VALVER!



This photograph was taken in one of the 200 flats in a large West London building. It shows the occupants listening to a loudspeaker, fed from a central radio receiver employing a total of 50 valves.

another volume control across the pick-up, situated, of course, at the gramophone turntable.

A point which is often overlooked for pick-up working is the connection between the pick-up and set. This may be of long or short leads, dependent upon the set, and its relative disposition to the pick-up.

Metal-covered Pick-Up Leads.

A long pick-up lead is never to be preferred in a set, but it is very often much more convenient to have it long than short, and in this case it is advisable to use special twin metal-covered wire such as is obtainable from the London Electric Wire Co., or, better still, single-wire metal covered,

"...HERE IS AN S.O.S."

(Continued from previous page.)

It was almost a matter of life or death, so he rang up the B.B.C. and told them the whole story. A broadcast S.O.S. was given, and, fortunately, the poisonous medicine was stopped in time.

Naturally there are people who fail to realise the importance of the B.B.C.'s microphone time. More than one listener—generally women—have 'phoned, asking for a message to be broadcast for umbrellas left in trains and 'buses.

There was a strange shipping case some time ago.

Just In Time.

The son of a skipper on a drifter from Lowestoft was dangerously ill in hospital. The boat had a wireless set, but not the usual commercial kind that can receive cablegrams. The hospital therefore rang up Savoy Hill and begged for an S.O.S. hoping that this might be received when broadcast between 300 and 400 metres.

The S.O.S. was given, but as the nets were being hauled in on the boat, it was not received. Two Englishmen living in Antwerp, however, heard the message, and made a note of the number of the drifter.

Next morning, when walking along the quayside—there was the boat! Hastily they checked the number, and rushed on board to tell the skipper. He put back to England at once, and arrived in time!

A "GO-AHEAD" GANG OF EXPERIMENTERS



This mobile transmitter belongs to a "go-ahead" North London Radio Society. They are a very enthusiastic group and have done a great deal of very useful experimental work. On the occasion of this photograph they were sending out signals to enable a number of other experimenters with portable direction-finding sets to track them down.



MORE ABOUT The "P.V. PLUS"

How to adjust the coil tapings for best results, the accessories to choose and a few final words regarding the assembling of this excellent set.

THERE is one further wiring point concerning this receiver which I find I have not yet covered. This is the question of connection to the screen. In a sense the screen acts as a common lead and so tends to simplify the wiring.

Two small screw terminals are securely fitted to the metalwork, it being made certain that first-class metallic contact is constituted. The positions of these terminals were indicated in the wiring diagram, and in passing it should be noted that they should be placed towards the bottom of the screen an inch or two from the baseboard. The exact positioning is unimportant.

The Extenser Connections.

Only two of the self-changer terminals on each of the Extensers are brought into service. It does not matter a bit which of the two out of the three on a "Formo," J.B., or "Cylton," or out of the four on a "Wave-master," are employed. But make certain that where two wires are shown going to the one terminal (this happens in all but one instance) the two wires always keep together.

In our wiring diagram you see "Formo" Extensers. The terminals marked "M" and "F" correspond with the ordinary fixed and moving-plate terminals on an ordinary variable condenser. The others are "self-changer" terminals. In the case of the "Cylton" Extenser these are mounted in a neat row directly on the three contact springs.

Should you be intending to use normal variables and wave-change switches, take particular note that *three-point* switches are essential, one terminal point in each case being joined to the moving-plate terminal of the appropriate condenser (this is the lead the Extenser eliminates).

Valves to Use.

There is not much to be gained by using a metalised S.G. valve in "P.V. Plus." One of the normal varieties will do. A small-power valve is desirable for the L.F. stage, and I prefer a detector of moderate impedance—eighteen or twenty thousand ohms.

Don't go below 109 volts H.T., and have 120 if possible. Although "P.V. Plus" is not heavy on H.T. current, the double-capacity type of H.T. battery will prove an economy in the long run. And try to use a volt or two more grid bias on the power valve than is recommended by the makers. That will cut down the H.T. still further.

Using three modern valves, a small 20-ampere-hour accumulator will suffice for the L.T. Take care that you join up the S.G. valve grid bias the right way round with its negative terminal going to that side of the .01 mfd. fixed condenser which connects to the moving vanes of the Extenser, otherwise, instead of cutting down the H.T. current consumption, it will put it up!

Now, H.T. plus 3 serves the power valve, and this should be given the maximum H.T. at your command. H.T. plus 1 must always be fifteen or so volts less than H.T. plus 2, for which I suggest 90 volts or thereabouts. I will repeat the order. Maximum H.T.

for H.T. plus 3, a few volts for H.T. plus 2, and fifteen or so fewer volts still for H.T. plus 1. I hope that is quite clear.

A Word About Aerials.

An indoor aerial will be O.K., and with a dozen yards or less of ordinary cotton-covered wire slung up behind the pictures you will be able to pick up quite a few stations. But seventy or so feet of wire fairly high and out of doors is the sort of aerial you want for really thorough ether-combing.

There is a great deal to be said for the earth-pin or similar "direct ground," but a well-made contact with a water-pipe is certain to provide good efficiency.

When the outfit is joined up to all its accessories you can proceed to make the "fixture" adjustments. I style them such because they allow you to get absolutely the best results in your own particular locality. And once the various settings are decided upon you can leave them untouched for ever. Even the fitting of new valves or batteries will not render it necessary to refer to them again.

There are five of these "fixture" adjustments, but if you handle them methodically they are as simple as can be.

Easy To Tune.

They divide themselves into two distinct groups, viz., those which concern the medium waves and those which affect the long waves. Now you have no wave-change switches, but you are automatically on the medium waves when your Extenser dials (both of them) are turned to the 0-99 numbers, and on the long waves when the dial readings lay between 100 and 200 (two-figure numbers for medium waves, three-figure numbers for long waves).

Tackle the long waves first. What you want to aim at is the greatest volume with sufficient selectivity.

Screw that variable condenser which is mounted on the baseboard (.001 mfd.) right down so that it gives its maximum capacity, and clip the crocodile

(Continued on next page.)

SETTING LONG-WAVE SELECTIVITY



This baseboard-mounted variable condenser is operative only on the long waves, and once you have it adjusted for best results in your own local conditions you need never refer to it again.

MORE ABOUT THE "P.V. PLUS"

(Continued from previous page.)

clips haphazardly on to any of their appropriate tapping points, making sure that the tapping loops are cleanly bared wire.

All the clips must be in use before you can receive. Make sure that there is plenty of British broadcasting on (by referring to the printed programmes), and then set the Extensers at about 120. If the medium-wave broadcasters, or one of them, is tending seriously to "break through," vary the adjustment of the .001-mfd. condenser.

Then see if you are able to tune in 5 X X and Radio Paris.

Selectivity.

Vary the coil quoit crocodiles (or wire-twisted tapping connections if clips are not used) until you feel you have all the long-wave selectivity you require, always remembering that you do not want to increase the selectivity of any set more than is absolutely essential, for it always means some loss of sensitivity.

The maximum selectivity results when you use the tapping points on the coil quois that are nearest the earth (L.T. minus) ends of the windings, and when the .001-mfd. condenser control is screwed right out for minimum capacity.

When the long waves have been satisfac-

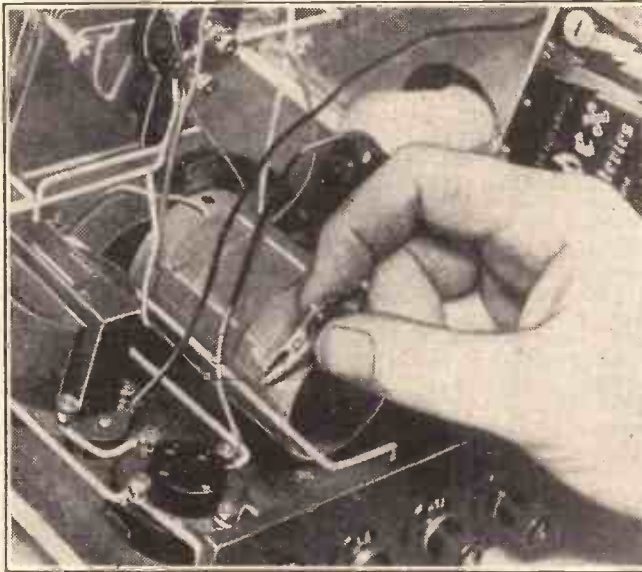
torily settled turn the Extensers to a two-figure dial reading. There are only two adjustments for the medium waves, and these are the tapping points of the P.J. coils.

Various Tappings.

When you use the red winding ends you have the condition of greatest sensitivity, least selectivity. You may find that one red can be employed and sufficient selectivity obtainable by "tapping down" on the other coil. It is not at all necessary that similar tapping points on both the P.J.'s (or the coil quois) should be used.

In fact, you can juggle about with them

ORDINARY WAVE SELECTIVITY ADJUSTMENT



By varying the tapping connections on the P.J. coils you can closely adjust for ordinary wave selectivity.

just as you wish. It is a very fascinating business, and I think you will thoroughly enjoy it, especially as you will appreciate

that you are enabled in this manner to get the very last ounce out of the set. It is just like tuning up a racing car, but with the difference that you need no skill at all and that your ear will give you an immediate indication of the effects of the adjustments.

If you want the very greatest S.G. amplification, you can connect the crocodile for the P.J. 3 coil to the white lead of this component; this is the winding end which is joined to the fixed vanes of the Extenser. Some of you may be so placed that you can still achieve adequate selectivity with this 100 per cent volume setting. Try it, anyway.

No Tuning Troubles.

In tuning "P.V. Plus" you have three controls to adjust, and these are very easy to handle, so long as you go about the operation in a methodical manner.

The primary rule to remember is that the two Extenser dials must be kept fairly closely in step. It is impossible to deal with each in turn by rotating the one dial, obtaining a setting and then tuning the other.

On the other hand, it is improbable that the readings on the dials will be exactly the same for any given station. One may, for example, show 35 and the other 40 for one of the programmes.

But the adjustments are not so critical that it is essential that the dials should be absolutely in step before you hear even distant stations. So long as they are moved round more or less together you will find the various transmissions are very easy to capture.

A Sterling Proposition.

I do not anticipate that any of you will meet with difficulties in such a sterling proposition as "P.V. Plus," providing you have taken reasonable precautions in the selection and wiring up of the components. Indeed, I feel quite confident that there will be a nearer approach to universal complete and entire satisfaction than with any previously described design.

THE COMPONENTS AND ACCESSORIES WE RECOMMEND FOR "P.V. PLUS."

- | | | |
|--|---|---|
| 1 Panel 18 in. x 7 in. (Red Seal, or Goltone, Parex, Permcot, Wearite). | 1 Lewcos, Peto-Scott, R.I., Parex, Varley, Dubilier, Lissen, Lotus, Wearite). | 2 Coil Quoits (Wearite, or Peto-Scott, Melbourne, Sovereign). |
| 1 Cabinet with baseboard 10 in. deep to fit (Cameo, or Pickett, Osborn, Gilbert, Ready Radio, Peto-Scott). | 1 600-ohm Sphaghetti resistance (Bulgin, or Telsen, Igranie, Varley, Ready Radio, Lewcos). | Flex, screws, 4 oz. of No. 30 D.S.C. wire, etc |
| 2 .0005-mfd. Extensers (Formo, or Cyldon, J.B., Wavemaster). | 1 2-meg. grid leak and holder (Dubilier, or Lissen, Telsen, Ferranti, Mullard, Ediswan, Ready Radio, Igranie, Graham Farish, Varley). | ACCESSORIES. |
| 1 Filament switch (Ready Radio, or Telsen, Bulgin, Junit, Wearite). | 1 L.F. Transformer (Igranie or Ferranti, R.I., Telsen, Lewcos, Mullard, Lotus). | LOUDSPEAKERS. —Celestion, Amplion, B.T.-H., Blue Spot, Undy, Mullard. |
| 1 .0001-.00012 or .00015-mfd. differential reaction condenser (Ready Radio, or Telsen, Lotus, Igranie, J.B., Dubilier, Formo, Cyldon). | 1 .001-mfd. compression condenser (Lewcos, or Telsen, Formo, Sovereign, Goltone). | VALVES. —1 S.G. (Osram S22, or Mazda, Cossor, Mullard, Six-Sixty, Eta, Dario). |
| 2 Valve holders (Lotus, or Telsen, Igranie, Lissen, Clix, Bulgin, Formo, Wearite, Dario). | 1 P.J.2 coil (R.I., or Ferranti, Ready Radio, Melbourne, Sovereign, Peto-Scott, Lewcos, Parex, Wearite, A.E.D.). | 1 H.L. type (Mazda, or Osram, Cossor, Mullard, Eta, Fotos, Lissen, Tungstram, Six-Sixty, Dario). |
| 1 Horizontal-mounting valve holder (Junit, or Bulgin, Parex). | 1 P.J.3 coil (Ready Radio, Melbourne, etc.). | 1 Power (Osram P2; or suitable output valve of other good make as above). |
| 1 1-mfd. fixed condenser (T.C.C., or Telsen, Dubilier, Lissen, Ferranti, Igranie, Formo). | 1 G.B. battery clip (Burton, or Bulgin, Wearite). | Four- or six-volt valves of similar characteristics can be used if desired. |
| 1 .01-mfd. fixed condenser (T.C.C., or Ready Radio, Telsen, Dubilier, Ediswan, Lissen, Ferranti, Mullard, Goltone, Igranie, Wamel). | 1 Terminal strip 18 in. x 2 in. | BATTERIES. —H.T. 120-150-volt double or triple capacity (Ever Ready, Drydex, Magnet, Lissen, Ediswan, Pertrix). |
| 1 .001-mfd. fixed condenser (Telsen, etc.). | 10 Indicating Terminals (Igranie, or Eelex, Belling & Lee, Clix, Goltone). | G.B., .9 or 1.5 volt (see above). |
| 1 .0003-mfd. fixed condenser (Telsen, etc.). | 2 Crocodile clips (Goltone). | G.B. 9- or 15-volt to suit output valve (see above). |
| 2 H.F. chokes (Ready Radio and Telsen, or | 1 Screen 10 in. x 6 in. (Parex, or Ready Radio, Wearite). | ACCUMULATORS. —Voltage to suit valves (Exide, Ediswan, G.E.C., Lissen, Pertrix). |
| | G.B., H.T., and L.T. plugs, etc. (Belling & Lee, or Clix, Eelex, Igranie). | MAINS UNITS. —Heayberd, Regentone, Atlas, R.I., Ekco, Tannoy, Lotus (state details of set, voltage and type of mains when ordering). |



Making your Microfarads

Have you ever wondered about the inside of a fixed condenser? What it's made of, and how it insulates? There is quite a romantic story behind it, as this article readably tells you.

By J. F. CORRIGAN, M.Sc., A.I.C.

HAVE you ever, I wonder, had the curiosity to pry into the internal arrangement of one of those small black fixed condensers which generally lie so blandly on the baseboard of the radio set?

Insulated with Mica.

Not, of course, those two-a-penny fixed condensers, but an article of really high-class design and reputable name. Such a condenser, if you have a spare one for the occasion, is really worth dissecting if only in view of the fact that it gives one an insight into the degree of thoroughness with which the tinfoil and mica plates of the condenser are put together.

In the cheap and shoddy condensers, mica is dispensed with, and waxed paper is employed in its stead. For the best possible functioning of a fixed condenser, however, mica must be used as the dielectric or insulator, and it is significant that the small plates of mica which are found in a fixed condenser of high-class make are composed of the highest grade of this material available.

Several Grades.

Mica is really a very curious substance. Chemically, it consists of a combination of aluminium, potash, and silica. It generally contains a small percentage of iron and other metals as well.

There are several varieties of mica, the material used for dielectric purposes being termed in the trade "Ruby Mica," or "Muscovite."

Ruby mica, which has its main source of supply in India, is divided up into "Clear"

and "Spotted" micas. Only the highest grades of the "clear" mica are used for radio purposes, the "spotted" micas being employed for the manufacture of articles requiring a lesser degree of insulative perfection, such as, for example, segment separators in motor commutators, mica washers, and so on.

Condenser mica, however, must be of the highest grade. It must be flawless, free from all impurities which might provide leakage paths for the current, and free, also, from any cracks and pinholes, or areas of lowered resistance.

Limited Sizes.

For this reason electrical condenser mica is not a very plentiful material. In the first place, condenser mica can only be obtained in maximum sizes of 8 in. by 8 in., or 6 in. by 12 in., and even these maximum sized mica sheets are scarce and expensive.

Mica, as is well known, very readily splits up into plates. It can be split up into films .001-in. thick, that is to say, considerably thinner than the paper you are handling at present, yet with good grades of mica the material does not crack; nor is its electrical resistance much diminished.

Good electrical mica will stand up against an electrical pressure of from 18,000 to 30,000 volts per millimetre. That, coupled with its remarkable property of readily splitting up into thin sheets and films, is why it is such a potent material in radio use.

Seated at benches in East End factories, deft women and girls sort out, measure, test, and grade the rough slabs of Indian mica which come to them from the docks near by.

Most of this raw mica reaches them in the form of thick and irregularly-shaped slabs. After being sorted and graded, these are carefully split up into thinner sheets, and each of these sheets is again subdivided, and so on until material of the required thickness is obtained.

The great trouble about dealing with the material is that you cannot get sheets of mica bigger than the rough slabs which are sent to the factory from India. Hence, as we have noted, a mica sheet having a greater area than 60 or 70 square inches is a rarity.

Much Waste Material.

Again, there is practically no method known of utilising the waste mica which is trimmed off the rough blocks. This has to be discarded, for it serves no purpose.

"Micanite" is the name of a material

STRAIGHT FROM INDIA



This is the crude mica after its first grading into sizes and qualities.

consisting of a number of sheets of mica cemented together. This material is not employed in condenser construction because the presence of the cement lowers the dielectric strength of the mica.

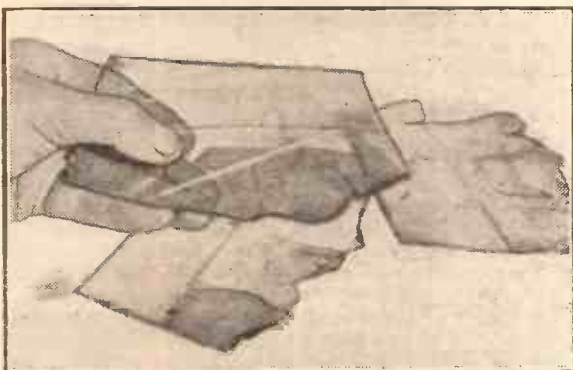
A small fixed condenser contains between three and thirty-six mica sheets, and if the condenser is of reputable make you may be quite sure that the insulative strength of these plates has been well tested before their incorporation into the condenser.

Buy The Best.

Should you ever have occasion to purchase mica for radio purposes, see to it that the material which you buy is as clear almost as good celluloid. It should contain no yellowish or brown streaks or hair-lines running through it. These are areas contaminated with iron, and, as such, they provide ready leakage paths for the current.

High-grade mica, even in thin sheets, is four or five times as good an insulator as ebonite, rubber, or paraffin wax. What is more, it will withstand relative high temperatures of the order of 500-600 degrees Centigrade without damage to its insulative properties.

FOR FIXED CONDENSERS



Here is the graded mica after it has been split into sheets. Eventually it will be divided into thin films for the dielectric of condensers.

CHAOS THIS WINTER?

Some notes on the present unsatisfactory wave-length situation.

By OUR SPECIAL CORRESPONDENT.

WHEN the Chief Engineer of the B.B.C. suddenly leaves London for Brussels on a mission which is more or less surrounded by secrecy, the radio prophets in Fleet Street usually sit up and take notice.

Mr. Ashbridge has been abroad for the express purpose of trying to prevent the equivalent of a financial typhoon in the ether. Our readers will remember that Mr. MacDonald recently likened the financial crisis to the approach of a typhoon. Well, there is a crisis brewing in the ether, and most of our readers can guess the reason for that crisis—too many stations, irresponsible increases in the power of those stations, and a general all-round congestion in the available wave-length bands.

The Micawbers of Madrid.

Mr. Ashbridge, among others at Savoy Hill, was one of the first to see the radio dangers which might engulf us this winter. He went to Brussels armed with authority from the B.B.C. to try and persuade other Continental broadcasting authorities to agree to some modification of the Prague Plan, in order to stave off radio chaos this winter.

Unfortunately, as we write these words we learn that Mr. Ashbridge has not been successful, for the attitude on the Continent is: "Oh, leave well alone, and let's wait until the International Broadcasting Union meets at the Madrid Conference in 1932."

In the opinion of Mr. Ashbridge and other experts that will be too late. The harm will have been done, and not only will British listeners suffer this winter, but Continental listeners will suffer likewise.

Amazing Apathy.

It seems, however, that the Continental authorities don't realise it. Their attitude is apathetic; and recently, in Germany, it was frankly stated to the Editor that German listeners are more or less resigned to a certain amount of interference and a lower quality of reception than is expected by British listeners.

It really is amazing that the broadcasting chiefs on the Continent should be so apathetic about the situation, and it must be rather disheartening for Mr. Ashbridge to find that he cannot stir people on the Continent into full realisation of what they are letting themselves in for this winter.

The B.B.C., for instance, is quite willing to give up the 261-metre London National wave-length, and also the spare 200-metre wave-length. As a result of this, however, we understand that the Scandinavian broadcasting authorities said: "All right, if you give up these wave-lengths we don't mind having them!"

Waiting for the Pickings.

It seems to be the impression among the smaller countries on the Continent that Great Britain in particular has been treated too generously in the matter of wave-lengths, and consequently any sacrifices made by the B.B.C. would result in a squabble as to who should have the pickings.

If conditions continue as they are at

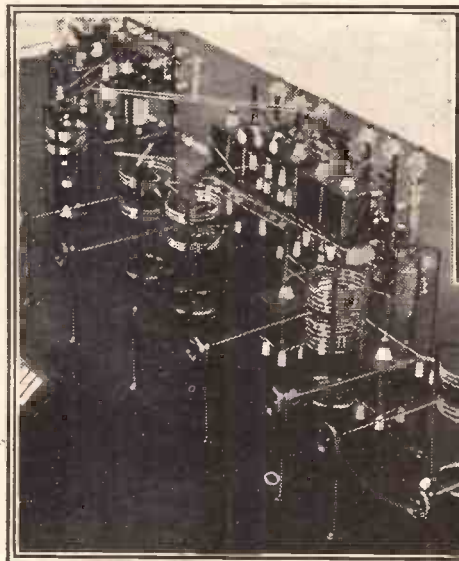
present, listeners can well realise that, when the winter months are here, interference is going to be worse than ever before. We forecast that the London Regional wave-length of 356.3 metres will be very badly heterodyned.

Get Your Set Ready.

We have already experienced interference troubles on the middle wave-band, which is devoted to broadcasting, but now—to make matters worse—several more high-power stations have been erected on the Continent, with the consequent result that the available broadcasting wave-bands are even more congested.

We understand that the B.B.C. has not given up hope that it will be able to exercise sufficient influence on Continental broadcasting authorities to make at least some temporary alteration in the Prague Plan to meet the bad conditions which the winter

MORE NEW STATIONS COMING



Nearly every country in Europe is planning new stations, or to increase the power of existing ones. This is a model of a big Telefunken transmitter shown at the Berlin Exhibition recently.

holds in store, but it is always best to be on the safe side, and consequently we urge readers to pay particular attention to their existing sets.

If your set is at all out of date, if it is not reasonably selective—in fact, it's got to be more than reasonably selective this winter!—then get busy now and bring it up to date. Otherwise, you will regret it.

Another rumour which has been flying round Fleet Street, and which is rather like smoke suggesting fire in the background, is to the effect that a new scheme has been worked out at the Treasury concerning B.B.C. finance.

It is said to be based on the idea that every penny of the 10s. licence fees paid by

listeners should go to the Treasury. Readers will at once say: "But how on earth will the B.B.C. carry on without any money?"

The scheme, however, suggests that by an Order in Council the B.B.C.'s Charter should be altered, permitting it to sub-let its stations and thus draw revenue from an advertising source.

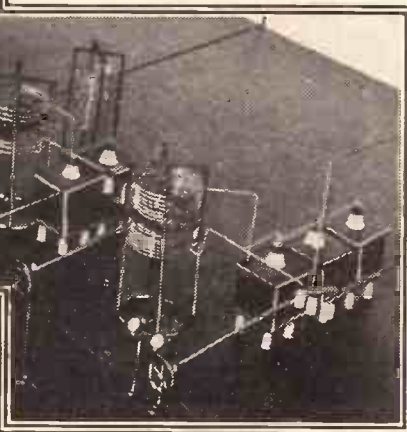
A good deal of argument has always centred round this sort of scheme. It is in force in America, and some critics say it works very well and some say it doesn't; some say a big advertiser can provide a better programme than a machine-like organisation, while others say that to have programmes which are foisted on us by advertisers is irritating and unsatisfactory.

Personally, we think that there is quite a possibility of such a scheme working well in this country, providing Sir John Reith and his Board of Governors had full control in the way of censorship.

Should They Advertise?

After all, if Messrs. So-and-So hired the London National transmitter for a week, and paid all the expenses for the programmes to be broadcast, surely there would be no objection to their concluding their programme by a reminder to the public that they had supplied the programme, and perhaps even throwing in a few references to some big sale they were holding at their Store. Properly organised, such a scheme could provide competition, and the revenue question would not worry the B.B.C.

Listeners might ask: "What is the idea of the 10s. going to the Treasury in its entirety?" Well, the idea is briefly that, owing to the economic crisis, it is suggested that wireless sets should be taxed, and that the 10s. licence fee should represent the tax.



As a temporary expedient such a scheme might be useful during present hard times, or at least in part it might be useful.

The Midland "Alternative."

There would certainly not be much harm in letting outsiders make an attempt at providing a decent programme for the Midland Regional transmitter. To-day it is farcical, for nine times out of ten Midland Regional simply relays London's programme.

Whether this Treasury scheme will come to anything is a moot point at the moment, but it would be interesting to gather an idea of what POPULAR WIRELESS readers think of such a scheme.



WHAT OLYMPIA WILL PROVE

BY

“P.W.’s” Radio Consultant-in-Chief

Capt. P. P. ECKERSLEY



I HAVE a letter before me. It says, “I hope when you visit the Wireless Exhibition you will, for the benefit of those of us who can’t go, keep your eyes open for some set or gadget that will enable us to separate out the overlapping of foreign stations—if such set or gadget exists. I am told that American super-hets can do this.”

The Interference Problem

My correspondent is stating what, to me, is the fundamental problem which must be faced and solved—how to overcome what he calls, vividly enough, the overlapping of stations.

To my mind there are two general solutions to the problem, the one fundamental, the other temporary and palliative but none the less necessary.

The fundamental solution is to increase the frequency separations between the carrier-waves of broadcasting stations, and to grant better wave-lengths to the broadcasting service.

The temporary palliative is to increase the selectivity of broadcast receivers. The latter solution leaves something to be desired in the way of quality, but it’s better to forget the upper side-bands if all they represent is interference from the neighbouring stations.

Get to the bottom of it

Let me deal with the fundamental problem first. I have said this before, but I will say it again. The Prague plan of wave-length allocations requires revision; it has shown itself to be inadequate, now that the power of stations has been so largely increased.

There is only one body in Europe to revise that plan and that body is The Union Internationale de Radiodiffusion. I have said this before, I will say it again—the Union is in danger of becoming a rigid nose-in-the-air stiff-necked organisation instead of a flexible quick-to-plan body of men ready to serve those whose interests they represent.

If there was less talk about “propagande inadmissible” and copyright, and exchange of programmes, and “rapprochement intellectuelle,” and resolutions about press publicity not

Are there sets which definitely prevent the overlapping of programmes, or are manufacturers still working on the old lines? Read this provocative article on the problems of selective listening, written by the man who made Britain’s Regional Scheme the model of the broadcasting world.

being given except in an emasculated bulletin, and more sheer work with pencils and kilocycles, the thing might be in danger of doing some good once again!

Make Sets more Selective

I know our delegates are working hard, but I feel that it’s a somewhat invidious distinction that the representatives of only a few countries should always have to shoulder the odium of proposing to do things instead of talking about doing them. I am particularly keen that home constructors, amateurs and all who can help, should give every kind of backing to those who are sincerely trying to produce evolution along sane lines. Whatever you can do to help, therefore, please do it!

But there’s the temporary palliative—to make our sets more selective. It will be extraordinarily interesting to see at the show if real efforts have been made by the manufacturer to meet the present situation.

Or are we to see the same old screened grid, detector and one note mag. in a polished cabinet? I wasn’t thrilled by the Paris Exhibition—there seemed to be little insistence upon performance, although I must say some of the radio-gramophones were splendid pieces of furniture. I say “seemed,” because no set was working and nothing advertised selectivity as such.

The interest, to me, will centre round any set designed for greater selectivity. We know very well that the super-heterodyne gives us a better chance to design a pre-low-frequency detector band-pass with a desirable performance, therefore we should perhaps expect to find our needs more nearly satisfied by this type of instrument.

My intention is not to suggest that selectivity cannot be obtained otherwise than with the super-het, I only say that no one seems to have thought, so far, how it can be done.

The Stenode Radiostat receiver should demand a considerable measure of our interest. There has been a lot of controversy about Dr. Robinson’s work.

A Good Attempt

It seems to me that the technical public need not debate the subtleties of side-band theory, what they want to know is whether or not the Stenode Radiostat does in fact give interference-free reception plus good quality. To my way of thinking the Stenode Radiostat is a definite attempt to meet the onerous conditions of transmission, and therefore deserves our help and our critical examination.

One point where it must score is that it combines both high- and low-frequency filters, and I personally do not think one can achieve full selectivity without incorporating both such circuits in the receiver. Inevitably the low-frequency filter introduces side-band cut, but how far that is serious, given typical loudspeakers, remains for the ear to decide.

I have heard rumours of other supers designed for selectivity. What I think our judgment must rest upon is whether they do in fact eliminate the side-band and heterodyne interference which bids fair to ruin our reception this winter. I doubt—I only say I

(Continued on page 192)

DEMANDED BY MODERN CONDITIONS



Many new stations and higher power demand a very high degree of selectivity to-day, and the older sets must be modernised or fail lamentably to separate the programmes.

THE MIRROR OF THE B.B.C.

BROADCASTING HOUSE

NO CHRISTMAS BONUS THIS YEAR—POLITICAL BROADCASTING—VERY SUCCESSFUL PROMS. Etc., Etc.

WHILE this is being read, the first part of the B.B.C. exodus from the Strand to Portland Place will be in full swing. On Sept 26th and 28th the Engineering Branch and most of the Publications Department, together with some other scattered units, will trek westwards.

Although, of course, the B.B.C. will soon settle down in their magnificent new quarters, there is not a little regret at the break with the Strand on sentimental grounds. This regret is shared by tradesmen, banks, and so on in the Savoy Hill area.

The Savoy Hotel itself will probably be the principal sufferer, although I understand it is not the intention of the B.B.C. to desert that hostelry for its major functions.

No Christmas Bonus This Year.

This will be the first Christmas since the B.B.C. was founded nine years ago, when there has been no special monetary recognition of the staff. The basis usually has been a week's pay extra.

Last year it was given specifically because of the enormous amount of overtime that the staff had put in on their own accord

"P.W." ALWAYS LEADS!

Our claim to the largest circulation of any wireless paper is once again justified by the net sales certificate which we have received from Messrs. Price, Waterhouse & Co.

It shows that even over the six months ending in mid-summer "P.W.'s" AVERAGE NET SALE WAS

129,806

copies per issue!

POPULAR WIRELESS
is the paper that made
WIRELESS POPULAR

and without payment. The same argument holds good this year, but I imagine that no one will grumble at the withdrawal of such an extra in view of the general state of affairs.

This is practically equivalent to a reduction of two per cent in the annual pay of B.B.C. staff of all grades.

Political Broadcasting.

The generous use which the National Government has been making of the microphone has not passed unnoticed in Opposition circles. The feeling I get in conversation with people at Savoy Hill is that there is a virtual state of emergency which justifies giving the Government of the day practically anything it asks for.

But there is also the feeling that there should be a limit to the duration of this extraordinary state of affairs. If there should be an early General Election, then no doubt the B.B.C. would revert to the now established manner of giving each of the recognised parties microphone opportunities on a plan agreed between the respective Party Whips.

If, on the other hand, there is no General Election for months or years, the B.B.C. will be faced with a difficult and dangerous situation. The danger is that if the Opposition gets a genuine sense of grievance against the B.B.C. for partiality to the Government, and then the new government after a General Election is largely controlled by the present Opposition, the B.B.C. will have to give to the new Government everything it wants.

This way would be bad for all concerned. I hope therefore that the B.B.C. retains a large measure of its independence even in the "emergency period."

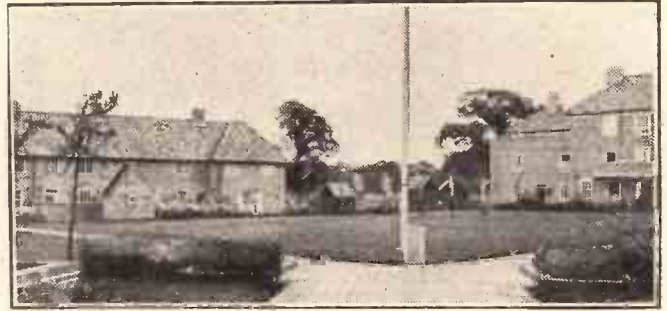
Very Successful Proms.

Unless something happens in the meanwhile, the present season of Queen's Hall "Proms," which ends on Saturday, October

3rd, will easily be the most successful since the B.B.C. undertook the responsibility of running them some years ago.

Some high officials I saw during a recent visit to Savoy Hill are delighted with the way things have turned out this year, because no one would have been very much surprised if the season, which had hardly opened when the national financial crisis

RADIO AT EARL HAIG'S HOMES



The aerials of the radio installation at Earl Haig's Homes at Morden, S.W., have been arranged out of sight to preserve the beauty of the homes.

burst in full force, had been rather a bad flop.

As I write, the attendance figures show a considerable increase over last year's record, so that everybody concerned is happy, and not thinking too much of the B.B.C.'s administrative cuts, which when fully worked out and applied will cause many an uneasy flutter in the dove-cots just off the Strand.

Undoubtedly the most popular of the "Prom" concerts, from the point of view of attracting the largest audiences, are those devoted to the programmes of music by Bach.

The hall is always crowded on Bach nights, whoever may be the soloists, although, no doubt, there is much to be said for the fine playing of the Orchestra, which this year is better than ever.

(Continued on page 186.)

FOR THE LISTENER

By "PHILEMON."

This week our popular contributor—who is at present in Italy—pays tribute to the B.B.C.'s news service to Britons abroad.

AS a rule, I have little use for the News Bulletin. It is dull pudding. Sometimes there is a toothsome currant or two, but the rest is stodgy enough in all conscience.

I suppose somebody is interested in the Opening of the Gasworks at Bumbleton; or in the resignation of the Prime Minister of Minorca; or in the arrival of Sir Philbert Nutt from Timbuctoo; but I confess that I am not. Most of it seems to me like padding; as if the authorities were saying: "We have got to fill up this quarter of an hour somehow."

"My Favourite Items."

I have wondered at the high-up place which has often been given to the "News" in lists of My Favourite Items, and in competitions to discover the most popular features in the programmes. "News" always stands pretty high.

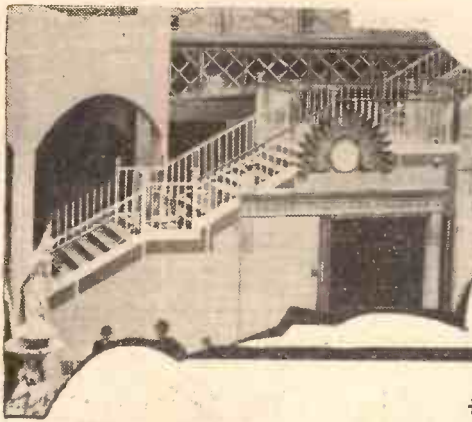
I imagine that it must have something to do with the racing results and the reports of cricket and football matches. I, too, am interested in these; but I always feel I have to wait through a dreary lot of stuff before I come to them.

Radio in a Crisis.

There are exceptions to every rule; and the exception in this case is a time of national crisis like that through which we are now passing. Six o'clock suddenly becomes the zero hour, the hour for which I wait on tip-toe of anxious excitement.

I come back home from wherever I may have been, or from whatever I may have been doing, and stand by at the wireless set, with my eye on my watch, impatiently asking myself whether the Children's Hour will never end, and why there are such a confounded lot of birthdays.

(Continued on page 187.)



ROUND the STANDS

EDISON SWAN ELECTRIC CO., LTD.

The "Ediswan" display includes some of the most important exhibits of the whole show, and among these are the new R.K. moving-coil loudspeakers, which are priced from the astonishingly low figure of 31s. 6d. for the D.C. "Minor" model, up to £7 15s. 0d. for the still attractive "Senior" A.C. model.

R.K. is an abbreviation for Rice-Kellog, the two names being those of the scientists responsible for the principles of construction of the R.K. speaker.

R.K.'s have for many years ranked as the aristocrats of the loudspeaker world, and now that they are available at prices within the reach of all their popularity should correspondingly increase.

One of the most attractive models of the whole range of B.T.-H. R.K. moving-coil loudspeakers is the Minor Permanent Magnet model, which is capable of handling up to 2 watts, and which is listed at £2 10s. 0d. for the chassis, or £3 17s. 6d. complete in a fumed oak cabinet.

It is said that its performance is comparable with that of the Senior R.K., in which case it does seem an immensely attractive proposition.

There is also a B.T.-H. pick-up and tone-arm now available at 27s. 6d., and this, too, should prove one of the radio best-sellers of the season. The B.T.-H. pick-up holds a position in its equivalent to that occupied by the R.K. speaker, and it is hard to call to mind a better combination of accessories.

The 27s. 6d. B.T.-H. pick-up is the "Minor" model, and there is a "Senior" complete with spring balance, ball-bearing tone-arm

at 45s. This same "Senior" can be obtained without the tone-arm and with four adaptors to fit any standard arm, at 27s. 6d.

Mazda valves figure on the "Ediswan" stand, and "P.W." readers will not need reminding that these are right in the front rank.

There are some exceptionally fine Mazda 2-volters, while the characteristics of the Mazda mains-type reach standards which would have made the constructor of three or four years ago gasp with astonishment. Of especial interest are the new Mazda D.C. types, of which four are available, including an S.G. and a Pentode.

Among the sets shown is the Edison Power Pentode Two, a particular novel all-mains design using a Mazda A.C./Pen. valve. In addition there are various other mains and battery sets suitable for all pockets.

Radio-gram enthusiasts are further catered for by various gramophone motors, and constructors in general have a wide range of components to examine.

Among these are transformers, grid leaks and condensers, etc.

Altogether the Ediswan show is very fine, and constitutes one of the strongest sections of Olympia for all-round radio interest. In view of the calibre of the individual organisations that have been welded together to form "Ediswan," it would have been surprising had this not been the case.

OLIVER-PELL CONTROL, LTD.

In view of the present condition of the ether large numbers of constructors will no doubt bend their way to this stand in order to examine the Varley Constant Square-Peak Band-Pass Coil. This is, of course, one of the year's most important components, and added interest attaches to it in that it is available in a form suitable for use with extensors.

A further selection of outstanding and interesting exhibits at the National Radio Exhibition at Olympia, which remains open until the 26th inst.

There is, too, an H.F. intervalve coil, specially designed for use with the "Constant Square-Peak," of intriguingly novel construction. It is completely screened and has a switch so fashioned that it will gang easily with that on the "Constant Square-Peak."

FRAME FOR SUPER-HETS.



A frame worth examining is the one made by "Lewcos."

The Square-Peak principle figures in the Varley "Square Peak" four-valve mains set, which is a particularly handsome instrument.

Varley's new range of components include the "Nictet" L.F. choke, former, the "Nicore," Two L.F. choke, Popular resistances, a universal holder for use with these Popular and other types of wire-wound resistances, the Varley Junior Multi-cellular H.F. choke, spaghetti resistances in no less than twenty-two values ranging from 100 to 100,000 ohms, and ordinary resistances covering a similar range.

A further notable item is the Varley thermal delay switch for use with the Osram G.U.1 rectifying valve.

THE ORMOND ENGINEERING CO., LTD.

On the Ormond stand there are various items that should not be missed by constructors. These include a new loudspeaker unit, a cabinet loudspeaker, and a twin-drum control for plain or slow-motion condensers.

A board chassis loudspeaker is available for fitting into portable receivers as a complete unit, or for mounting into cabinets.

And we must not omit finally, transmitter enthusiasts are catered for in a special variable condenser designed for low-power transmitters such as are used by amateurs.

A POLISHED SWITCH



A "Red Diamond" exhibit (Jewel Pen Co., Ltd.).

MULLARD WIRELESS SERVICE, LTD.

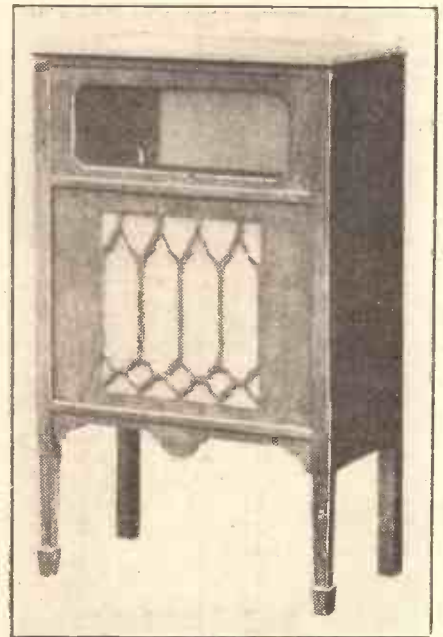
Mullards always seem to enter into the radio exhibition with the true "show time" spirit. No half-measures are theirs, and they appear to say to themselves, "we are going to make sure you know all about us, and we are going to enjoy doing it!"

This year they have a new kit set, an S.G.-Pentode Three, which embodies several ingenious and effective features. Also, the Mullard valve range is in itself a particularly fine display.

"P.W." readers should note the special S.G. valve on which for weak signals the G.B. is so adjusted that the valve works on the steep portion of the curve, while for strong signals the G.B. is adjusted for low-slope working.

And then there is an indirectly-heated valve having the remarkable mutual conductance of 5 milliamps per volt, its amplification being 85 and its A.C. impedance only 17,000 ohms. There are also some awe-inspiring super-power valves for really big outputs, and a revised range of rectifiers.

ONE OF LOCK'S CABINETS



Some excellent cabinet-work is to be seen on the W. & T. Lock stand.

CHAS. A. C. BORNE.

Here are radio cabinets to suit all conditions and at all prices (it is claimed that there is an Osborne cabinet for every set on the market), together with all the latest-type loudspeaker cabinets. And they are shown polished and finished, assembled but ready for the constructor to finish and polish himself, and also in easy-to-assemble kits.

OSRAM VALVES.

Osram valves have a stand to themselves, and they deserve it. "P.W." readers will probably be more interested in the 2-volters of the battery type, of which the L.P.2 is an outstanding example. This is a power valve with an amplification factor of 15, and impedance of 3,900 ohms, and a mutual conductance of 3.85. This is an outstanding figure.

The mutual conductance is a definite indication of

(Continued on next page.)

ROUND THE STANDS.

(Continued from previous page.)

the goodness of a valve, and when it is mentioned that I was a very good figure indeed, even for a 6-volter, a few years ago, it will be seen that the L.P.2 is indeed an achievement. There does not seem to be much room left for 4- or 6-volt battery valves.

Among the Osram mains valves you will find the M. S.4B., a screened-grid A.C. valve of indisputable merit, and the D.P.T., an indirectly-heated D.C. mains pentode which has an amplification factor of 90.

E. PAROUSSI.

Here is a display of those well-known "Parax" products, including POPULAR WIRELESS P.V. and P.J. coils, and the famous "P.W." Selector. An attractive differential reaction condenser is shown and a number of screens of various kinds. Paroussi's give an unconditional guarantee of satisfaction, and visitors will be able to gain some indication of the quality considered necessary to engender such a practical expression of confidence in one's products.

PERTRIX LTD.

Pertrix H.T. batteries are sound propositions inasmuch as they are of a non-salammoniac variety, and, of course, the same methods of manufacture are also applied to Pertrix G.B. batteries. In addition to dry batteries, Pertrix are this year showing a large number of accumulators.

PETO-SCOTT, LTD.

On the Peto-Scott stand a large number of popular "P.W." designs are on view. For instance, here will

SHOWN BY LISEN

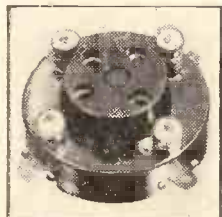


A representative component of a well-known brand.

be seen specimens of the first commercial "P.W." Coil Quoit, and one that has set a very high standard. It is a single moulding in high-class bakelite material, and, as we have mentioned in an earlier "P.W.," some six expensive moulds were made for this quoit before the present perfection was achieved.

Another important Peto-Scott item is the side-control gadget that figures in our "P.V. Star." Peto-Scott are producing the cabinet for this receiver; indeed, the complete kit is shown. A further item is the wave-change frame for super-hets.

A POPULAR "LOTUS" LINE



Additionally "Lotus" are displaying many other new and attractive components.

most attractive price. Even those who do not contemplate the immediate purchase of an L.F. transformer will no doubt admire the beautiful maroon bakelite case, the figuring on which is in white engraving.

But R.I.'s most spectacular exhibit is a seven-valve Stenode receiver. It is a complete all-mains set, and can be used with a normal type of aerial or with just a few feet of ordinary wire. Even on this latter it is

still capable of providing a large number of programmes. A patented system of controlled low-frequency reaction is incorporated, and this provides a keen control of quality.

Provision is made for a gramophone pick-up to be connected, and there is an illuminated tuning dial directly calibrated in wave-lengths. The only other controls on the panel are for volume and wave-change.

THE "TWO-O-TWO"



Here is one of the latest and best 2-volters of an outstanding range of valves.

not essential for the reception of the more powerful stations.

REGENTONE, LTD.

Regentone have an entirely new A.C. all-power unit specially designed for use with portables. This unit retails at a very low price, but it is not cheap in either performance nor appearance. There are other Regentone units fulfilling practically every requirement for A.C. and D.C. supplies.

Probably the most important exhibit is a two-valve A.C. all-electric receiver which sells at £15s. 0d. It is made on a pressed metal chassis, and has a beautiful walnut finish bakelite cabinet. A Westinghouse metal rectifier is used and the circuit comprises a detector and power stage.

READY-RADIO (R.R.), LTD.

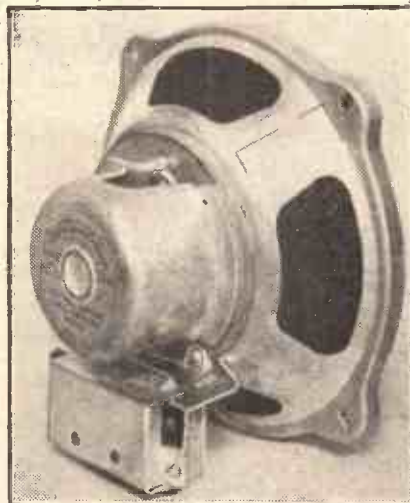
The new season's programme of this firm, as revealed at Olympia, is of a most enterprising character. Here are a few of the new Ready-Radio components to be seen. The "Instamat" Major Output Transformer for the instant matching of valve and loudspeaker.

It is claimed to be the first variable output transformer at a medium price capable of satisfactorily carrying the heavy anode current of a modern high-power output valve. Personally, we know of no other transformer at any price that has all the qualities of the "Instamat," but it should be noted that this particular model is for use with low-resistance moving-coil speakers only.

A standard H.F. choke having sectionalised windings almost entirely air-spaced and completely enclosed in a protective casing.

A super-het. H.F. choke which has been specially

THE "MAGNAVOX" MOVING-COIL



A well-established make of loudspeaker.

designed for use in the modern super-het for excluding intermediate frequency currents from the L.F. side. It will effectively block H.F. currents on wave-lengths even as high as 3,500 metres, and it has the low D.C. resistance of 550 ohms.

An L.F. volume control, available in two resistances, in which there is a special type of resistance element so arranged that there is no rubbing action on it.

An easy-to-fit panel light, equipped with a quick-release clip holder to the bulb, which shows the word "ON" in glowing red instead of being merely a red light. This is an item for which we predict considerable popularity.

A snap switch in two types, single-pole change-over for radio-gram, and an on-off which can be used for mains as well as for battery sets, as it will break up to three amperes at 250 volts.

It has an almost instantaneous action, so that in the case of a radio-gram change-over the open circuit condition is reduced to the merest fraction of a second.

SIX-SIXTY RADIO CO. LTD.

A complete range of valves for both battery and main sets, including some indirectly-heated types having most interesting characteristics are on show. A further attractive item is the Sixty-Sixty valve screen for adding just that finishing of stability to a "hot-stuff" set. Then there is, of course, the Six-Sixty cone speaker and cone paper to be seen.

VISIBLY CHARGED



One of the "Dagenite" accumulators presented by the National Accumulator Co., Ltd. It embodies a "self-indicator."

SOVEREIGN PRODUCTS, LTD.

A battery-driven transportable set with a built-in loudspeaker and a polished oak cabinet is the main feature. This receiver is retailing at £3 10s. 0d. exclusive of valves and batteries.

There is also exhibited a new L.F. transformer in two ratios and a Selector Tuner. The display is backed up by Sovereign fixed condensers in various values, a cabinet loudspeaker, and a range of plug-in coils.

STANDARD BATTERY CO.

The Wates synchronous gramophone motor which is on view at the Standard Battery Co.'s stand is bound to cause considerable interest and not a little wonder. It has no cog wheels, driving belts, governors, or anything else of a like nature; indeed, it looks as though it has hardly any "works" at all, but by the combination of the mains current frequency and a distribution of magnetic poles, a steady speed of exactly 78 revolutions per minute is given.

The Wates automatic gramophone stop at 3s. 6d., which is suitable for any type of mains gramophone motor, is well worth examining.

The Wates Star loudspeaker unit, and the Wates loudspeaker chassis, are, of course, on view and you may be sure that the Standard wet H.T. battery is not missing.

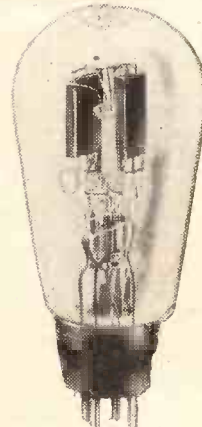
Constructors should take particular note of the fixed condensers and resistances, little items which retail at very low prices; and we must not forget to include in this review the Wates Three-in-One meter, a well-known and extremely useful instrument for testing H.T. and L.T. batteries and valve current.

TANNOY PRODUCTS, LTD.

There are many mains units styled "all-electric" which do in fact fall short of that description, in that

(Continued on page 135.)

ONE OF THE OSRAM'S



A famous mains rectifier—the U.S.

EVERYTHING **The S.E.C. your guarantee** ELECTRICAL

You are going to buy this set—



—because

MADE IN ENGLAND.

Sold by all Wireless Dealers.

WHEN YOU HAVE EXAMINED THE INSTRUCTION CHART (Post Free for Coupon Below) YOU WILL AGREE WITH US THAT IT IS THE BEST RADIO VALUE OBTAINABLE

Osram "FOUR"

NEW MUSIC MAGNET

Stations without limit... Amazing power and purity of tone... Reliable GECOPHONE components and OSRAM VALVES... Attractive design with handsome polished walnut cabinet... Ease of assembly... Simplicity of control... Low selling price of £10 15 0. These, as you will see by the Constructor's Instruction Chart, are a few of the special features of the OSRAM "FOUR"—the set that has introduced an entirely new and improved conception of home-assembled circuits.

You want a set that will give you limitless and effortless radio at low cost—a set that knows no bounds for sheer satisfying performance. Do what thousands have done, choose the OSRAM "FOUR."

The OSRAM "FOUR" can be built for A.C. All-mains operation by means of the new GECOPHONE A.C. All-Power Unit and Conversion parts. This Unit can also be used to convert last season's "Osram Music Magnet 4."

WRITE for OSRAM "FOUR" Constructor's Instruction Chart which will be sent you **POST FREE**. **FILL IN THE COUPON BELOW**. This chart gives simple and clear instructions how to assemble and wire the various parts, is crammed with useful hints and tips, and contains a rapid guide for getting, on the OSRAM "FOUR," practically all Home and Continental stations. Send for a copy **TO-DAY**.

PRICE
£10.15.0
Including OSRAM VALVES
GECOPHONE COMPONENTS
& POLISHED HEAVY WALNUT
CONSTRUCTOR'S CABINET



POST THIS COUPON
Please send me particulars of the OSRAM "FOUR" NEW MUSIC MAGNET
Name _____ Address _____
The General Electric Co. (M.)
Magnet House, Kingsway,
London, W.C.2
P.W.

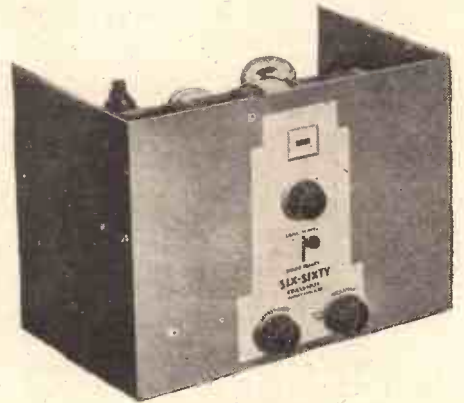
Cut out and paste on postcard, or enclose in unsealed envelope. Halfpenny postage in either case.

SUPREMACY IN RADIO - S.E.C. RADIO

Advt. of The General Electric Co. Ltd., Head Office & Public Showrooms, Magnet House, Kingsway, London, W.C.2
(Also at the National Radio Exhibition)

The NEWEST in RADIO

Have you examined yet the new Chassikit principle of construction? Write NOW for the big beautifully illustrated folder. Intensely interesting—telling you how simply and without possibility of error you can build the complete all-metal chassis of the most modern 3-Valve S.G. Pentode Receiver. With these:—“Pre-Selector” band-pass tuning (*the most successful solution of selectivity problems*) “Multistat” COMBINED Switch and radio and gramophone volume control (*also entirely new*) Triple ganged tuning with ONE KNOB latest metallised S.G. and Det. valves, and PENTODE output valve.



Examine also the wonderful scope it gives you to express your own individuality in housing it, your batteries or eliminator and loudspeaker. A simple table radio receiver may expand gradually, on small occasional outlay, up to a magnificent ALL-ELECTRIC Radio-Gramophone. There's the thrill of building without the risk! *All uncertainties eliminated.* The Six-Sixty Chassikit is “Radio-built”—really better than a completely factory-built four-valver. By all means SEND FOR THE FREE FOLDER—TO-DAY

The SIX-SIXTY Chassikit comprises three factory-built units—condenser assembly, coil assembly and the valve unit accommodating the remaining essentials. Screening is COMPLETE. Result, an all-metal Chassis of the most advanced type. Each unit factory-tested. A variety of beautiful cabinets from 10/6 to 12 gns. Or incorporate it in cabinet of your own design. There is great adaptability.

Made by the makers of the renowned SIX-SIXTY (B.V.A.) Valves which are included

OLYMPIA STAND NO. 20.

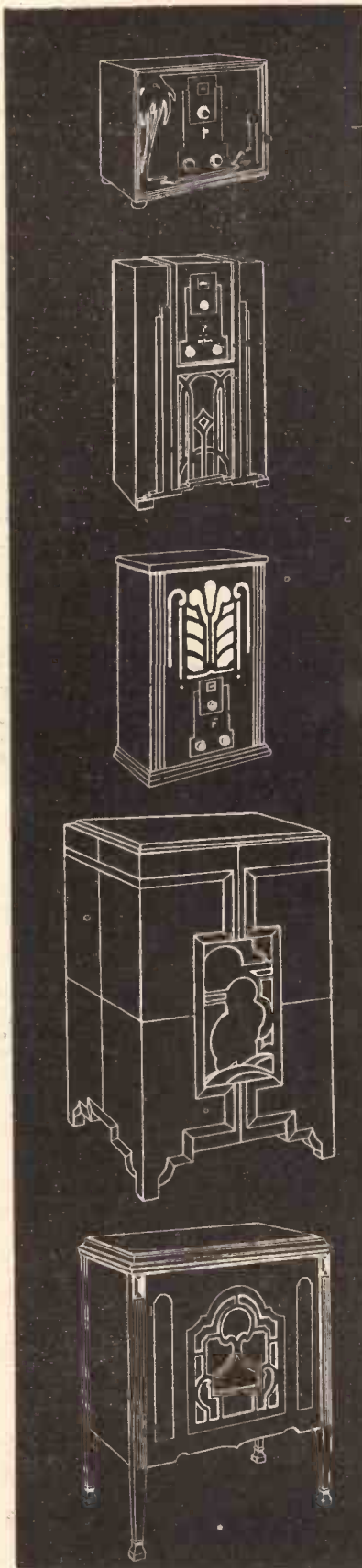
SIX-SIXTY CHASSIKIT

£6-17-6

Complete Chassikit, 3 gang band-pass tuning, with 2 volt battery valves, S.G.-Det.-PENTODE. If with A.C. Valves, £7. 6s. 6d. Ornamental Oak Cabinet, 10/6 extra.

Get the FREE folder—YOU WILL BE GLAD →

COUPON



To Six-Sixty Radio Co., Ltd.,
Six-Sixty House,
17/18 Rathbone Pl., Oxford St., London, W.1.
Please send me FREE and POST FREE the
Chassikit illustrated and descriptive Folder.
Name _____
Address _____

P.W.

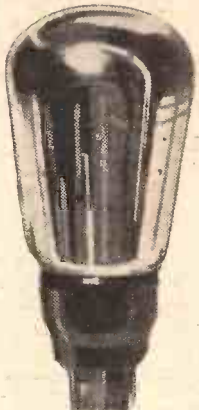
ROUND THE STANDS

(Continued from page 132.)

they do not make provision for grid bias from the mains. Mains grid bias constitutes a tricky problem, but Tannoy Products have solved this in a unit which gives H.T., L.T. and G.B.

The last is brought out to sockets on the front panel similarly to the H.T. You insert wander plugs for the G.B. into these sockets instead of into a grid-bias battery. We believe that Tannoy Products make patented use of the separate rectifier needed for the L.T. trickle charging in order to supply this grid bias.

A MAINS MAZDA

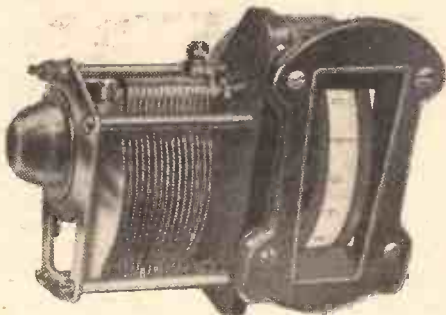


An example chosen from one of the most important valve displays.

trying to gain close views of the range of components that has caused such a considerable stir in trade and constructor circles.

The Telsen factory, at Birmingham, employs nearly 6,000 work-people who are engaged in producing

IN THE "POLAR" REGION



Messrs. Wingrove and Rogers have a fine show of first-class condenser gear.

about 3,000,000 components per week. That is mass production in the true sense of the word.

Of course, it is only by manufacturing methods on a gigantic scale like this that such competitive prices are possible; as, for example the Telsen

DEPENDABLE H.T.

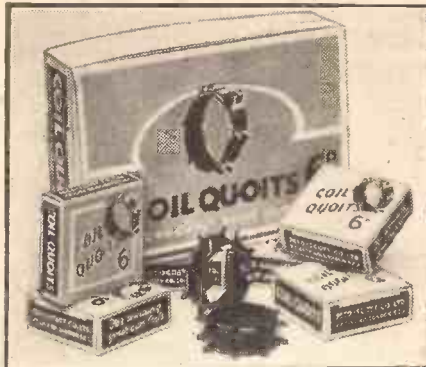


Pertrix are also exhibiting a fine range of accumulators for Radio L.T.

loudspeaker unit which sells at 5s. 6d., a figure that looks almost too small to be true!

A particularly attractive Telsen production is the slow-motion dial and in this, and, indeed, in all the Telsen products, a very high standard of machining is reached. The mouldings and pressings are first-

"COIL QUILTS" ARE THERE



"P.W." Coil Quilts figure on the Peto-Scott stand.

class throughout and indicate that some very modern and also very expensive plant is in use at the Birmingham factory.

ULTRA ELECTRIC, LTD.

Almost before moving coils came into general use, this firm were getting "moving-coil results" with their Ultra loudspeakers. These incorporate linen diaphragms, but they are specially treated so that true bass and not resonant-boominess results.

We believe that the excellent functioning of Ultra loudspeakers depends upon a peculiar molecular activity of their linen diaphragms. Anyway, whatever it is, it is certainly most satisfactory. The Ultra loudspeakers are made up in various cabinet designs of very pleasing appearance and fine finish.

WATMEL WIRELESS CO., LTD.

One of the tiniest but most attractive components to be seen at Olympia is the Watmel wire-wound power resistance, which is available in various values from 100 to 100,000 ohms. It has a non-inductive winding, is built into a moulded bakelite case and is extremely compact.

Another Watmel line of distinction is a wire-wound potentiometer having a smooth action and many other good qualities. It is suitable for voltage regulation in H.T. units, volume controlling, etc., etc. By the way, the Watmel wire-wound power resistance has a high current-carrying capacity for its size.

WESTINGHOUSE BRAKE AND SAXBY SIGNAL CO., LTD.

The "All-Metal Way" will be familiar to the majority of "P.W." readers. Practically every mains unit sold these days incorporates a Westinghouse metal rectifier.

At the radio show Westinghouse are giving special prominence to their new H.T.8 unit which has been designed specially for home constructors, and has an output of 250 volts at 60 milliamperes.

Additionally to all their other rectifier units, Westinghouse are displaying various battery chargers, one of which is being demonstrated daily.

WHITELEY ELECTRICAL RADIO CO., LTD.

The New W.B. permanent magnet moving-coil loudspeaker deserves particular attention in that it is a very sound proposition. It is sensitive and has an excellent response.

The W.B. cabinet, cone and bakelite cabinet speakers are shown. The latter is built into a cabinet comprising one bakelite moulding, and is one of the best pieces of this kind of work we have yet seen either in radio or in any other industry.

There are various W.B. valve holders, not forgetting the four- and five-pin universal screened-grid types which can be mounted either vertically or horizontally.

The W.B. push-pull double conical contact switches warrant close inspection for their ingenious and effective designs.

WILKINS & WRIGHT, LTD.

Some really fine gear is to be seen on the "Utility" stand, the new "Utility" ganged condensers, for instance. They are very rigidly constructed and

each unit is closely matched and supplied with a trimmer.

There is a new range also of bakelite condensers including a differential reaction type. Other "Utility" components of note are the Mite condensers, which are each fitted with one end plate only, the design being particularly ingenious.

Further items are a new pattern anti-capacity switch having solid silver contacts and anti-capacity change-over switches of a lever pattern available; in six models up to a six-pole change-over. Finally it is probable that a "Utility" Extensior will be shown.

WINGROVE & ROGERS, LTD.

There is an addition to the famous range of Polar condensers known as the Uniknob two-ganged condenser.

This has the unique addition of an air dielectric trimmer so arranged that perfect tuning is achieved by what is practically a single knob control. A compact, solid dielectric condenser, styled the Compax, makes its appearance, and there is an aperture slow-motion condenser which has a scale, instead of a dial, which fits behind the panel, the readings being visible through a moulded escutcheon.

Nevertheless, this component can be fixed by one panel hole and the refinement of a lamp-holder for illumination is fitted. There are many of the Polar condensers contributing to a most attractive assembly.



R.I.'s are showing four models of their Stenodo set in different and very artistic finishes.

WRIGHT & WEAIRE, LTD.

"P.W." designs are well represented here, for the Selector, Dual Range, P.V., and P.J., coils are to be seen as well as the super-hot coils which figure in the "P.W." "Super-Quad." There are two Wearite frame aerials both of which merit close inspection and an important range of switches for all radio purposes.

Among the many other Wearite components exhibited are power transformers, screens, chokes (both H.F. and L.F.) resistances, rheostats and potentiometers and jacks and valve holders.

Finally, there is the Wearite earth tube having an ingenious self-soldering scheme incorporated in its design.

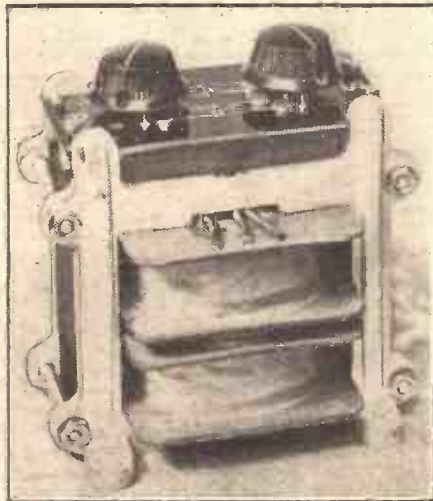
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FOR S.G. STAGES



A "Parox" valve holder for the horizontal mounting of S.G. valves.

ENTERPRISING READY RADIO



Ready Radio have many new components at Olympia, including the "Instamat" output transformer.

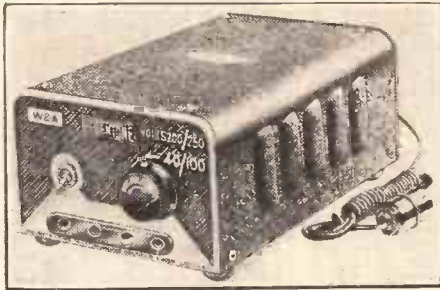
ROUND THE STANDS.

(Continued from previous page.)

OUTSIDE OLYMPIA.

Only British-made goods can be shown within Olympia, so many firms who handle gear of foreign origin have taken premises near the Exhibition Hall

NEW REGENTONE UNIT

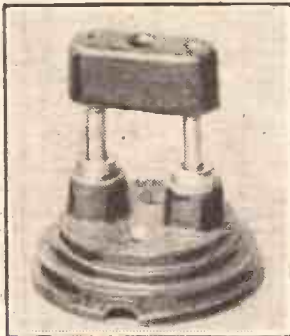


Regentone has some handsome and attractively priced mains units.

to display their wares. The radio enthusiast should endeavour to allow a fair amount of time in order to inspect these outside exhibits, for some very interesting gear is to be found among them.

But there are some absentees from Olympia whose products are one hundred per cent British. For example, the H.M.V. have luxuriously equipped a "Modern Hall of Music" exactly opposite Olympia.

A "SOVEREIGN" REMEDY



Instead of "hodge-up" connections, a safer and neater job is possible with this Sovereign two-way connector.

daily, and does not close until one hour after Olympia.

Much that is of particularly gramophone interest is being shown, including a film depicting all the processes concerned in the production of His Master's voice records. This film is being displayed continu-

SIX-SIXTY S.G. SCREENS



Besides their numerous high-grade valves, Six-Sixty are offering useful screens for S.G. valves.

ously. Then there are numerous records of unique historical interest to be seen, and these range from the early Berliner record of 1898 up to a recent recording of H.M. the King's voice.

Then there is a fascinating exhibit entitled "How Records Are Broadcast." This is created behind glass panels and comprises a twin turntable instrument and a microphone similar to those used at Savoy Hill. The records played on this equipment will be reproduced on various instruments and loudspeakers about the Hall.

Besides these spectacular exhibits there is the whole new range of H.M.V. sets and loudspeakers to be inspected.

Radio enthusiasts will undoubtedly be particularly intrigued by the automatic radio-gram drive. This consists of an electrically-driven turntable and H.M.V. pick-up and volume control, having an automatic record-changing device built in. This can accommodate eight, ten- or twelve-inch records, and once these are placed in position they are all automatically played through without the instrument being touched by human hand.

But if you get fed-up with a record half-way through, you have only to press a small button on the front of the instrument and the pick-up is slipped on to the beginning of the next record. The cost of this outfit, built into a compact and handsome case, is only eighteen guineas, and thus brings the all-electric automatic radio-gram within the reach of a large number of constructors. It can, of course, be used in conjunction with any ordinary radio receiver.

ONE OF THE STANDARD BATTERY'S SPEAKER CHASSIS



A Standard Battery loud-speaker chassis of novel and effective design.

For fifty-five guineas the H.M.V. can now supply an all-electric radio-gram which incorporates the above automatic gear.

Another model H.M.V. Radio-Gram is a magnificent affair which comprises a completely all-electric automatic record-changing gramophone and modern super-het receiver.

It is capable of providing five watts of undistorted output and can fill a small hall with music if desired. The quality of production is superb, and at the list price of seventy-guineas it does seem a most attractive proposition.

LAST MINUTE REVIEW DETAILS.

EPOCH RADIO MANUFACTURING CO., LTD.

These people are pioneers in the manufacture of moving-coil loudspeakers, and it is, therefore, fitting that they are able to show at Olympia very efficient examples of these instruments at extremely attractive prices.

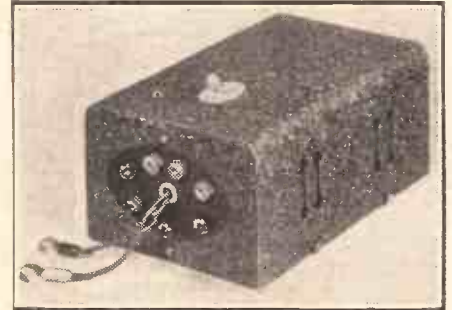
For example, there is an Epoch Permanent Magnet Moving-Coil loudspeaker fitted with an input transformer at £2 2s., and a mains-driven type, also with input transformer, at £1 11s. 6d.

Epoch are also showing new models of "public address" types of speakers for cinemas and dealers.

IMPORTANT "P.W." EXHIBIT.

Just before going to press with this issue, the final tests were successfully concluded with the Kelsey 7-Metre Adaptor.

IT PROVIDES G.B.



You can plug into this Tannoy mains unit for both H.T. and G.B.

COMPLETELY NEW.

This remarkable device will, therefore, be exhibited on "P.W.'s" stand at Olympia and every visitor should make a special point of examining it.

It is the very first device of its kind ever constructed. It will be remembered that some four or five years ago Mr. G. T. Kelsey, of the POPULAR WIRELESS technical staff, invented the "Antipodes," Adaptor, and for the very first time showed that any ordinary broadcasting set could easily be transformed into a short-wave receiver without in any way interfering with its internal construction.

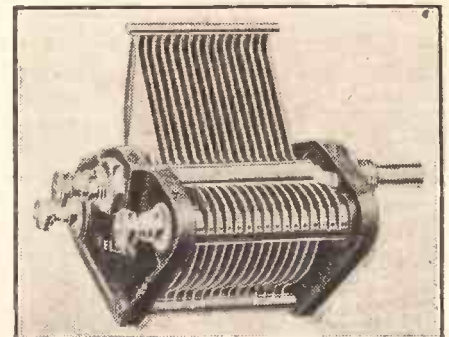
The "Antipodes" Adaptor at once achieved great popularity, and since its description in POPULAR WIRELESS the design has been copied all over the world. To-day, short-wave adaptors are

FIXED CONDENSER SPECIALISTS



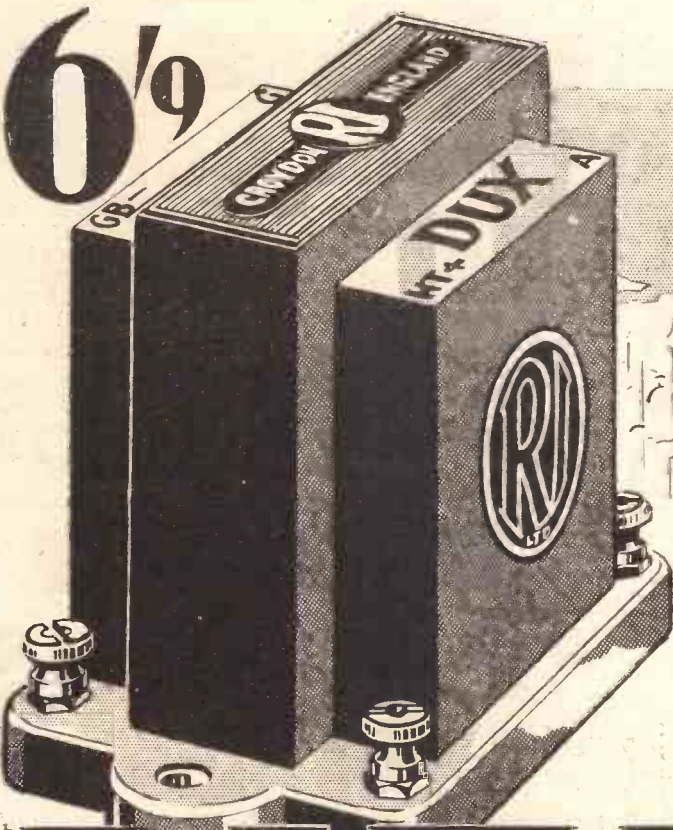
Just one of the large collection of T.C.C. condensers that are displayed.

TELSEN TUNING CONDENSER



A component that deserves the extensive advertising that it has already received.

(Continued on page 139.)



See "DUX"
at the
Radio Exhibition
STAND 29
National Hall,
OLYMPIA



DUX

WINS SUCCESS AFTER SUCCESS

*in the British fight for supremacy
in Radio*

Efficiency gains the day on the battlefield of price competition.

The public appreciation of the remarkable value and performance of this new low-priced transformer is amply demonstrated by the enormous demand and the stream of letters testifying to the excellent results obtainable by the use of this splendid British component.

The fact that full technical information is available with "Dux," as with highest-priced transformers, enables every purchaser to know exactly, before he buys, what "Dux" will do for his set. There is no uncertainty as with cheap, foreign transformers and other unreliable makes.

The test reports of the Technical Press are unanimous in their praise—"Dux" is the safe transformer consistent with economy.

TECHNICAL DATA:

PRIMARY INDUCTANCE 30 HENRIES

Ratio 1: 3½ (standard) or 1: 4½ (auto-connection). Weight 11½ ozs. Dimensions 2 x 3½ x 2½ ins. List No. D.Y.29.

Get a copy of the "Dux" Technical Information Leaflet and the R.I. 1931-32 Catalogue—the finest component reference obtainable.

Let the AUTHOR be your Surety and the PILOT your Guide

CONSTRUCTORS!
Build Authors' Sets with
100% SUCCESS

PILOT AUTHORS' KITS decision dictated by Peto-Scott and announced in our advertisement last week is universally approved. Constructors welcome policy that removes all possible doubt from set building! ! !

**PILOT AUTHORS' KITS
FOR NEW "P.W." SETS**

C.O.D CASH H.P.

• P.V. STAR • P.V. PLUS

	£	s.	d.
1 Panel, 10" x 8", drilled and slotted	4	0	
1 Baseboard and panel supports	2	0	
2 Cydon .0005 mfd. drum drive Extenser type Ex. 275	1	17	6
1 Ready Radio .0001-.00013 or .00015-mfd. differential reaction condenser	2	6	
1 Ready Radio .0005-mfd. solid dielectric condenser	3	6	
1 Lewcos and 1 Telsen H.F. chokes	9	9	
1 Graham-Farish 2-meg. grid leak and holder	1	6	
1 Bulgin 600-ohm Spaghetti resistance	9		
1 Bulgin 25,000-ohm Spaghetti resistance	1	6	
1 Lotus L.F. transformer	5	6	
1 Telsen output choke	8	0	
1 Bulgin filament switch	1	0	
1 T.C.C. .01-mfd. fixed condenser	3	0	
1 Dubilier .001 mfd. fixed condenser	2	0	
1 Goltone .0003 mfd. fixed condenser	1	0	
1 Formo 1-mfd. fixed condenser	2	2	
1 Igranic 2-mfd. fixed condenser	6	0	
1 Bulgin fuse and holder	1	3	
1 Sovereign P.J.2 coil	1	6	
1 Sovereign P.J.3 coil	2	0	
2 Peto-Scott coil quito (lb. No. 30 D.S.C. wire)	1	0	
1 Parex screen, 13" x 8"	2	9	
2 Peto-Scott control discs	3	0	
3 Goltone crocodile clips	4		
Flex. screws, wire, etc.	2	6	
1 Pair Peto-Scott swivel-jointed collapsible brackets	3	6	
KIT "A." Cash	£5.11.11		
or C.O.D.			

Any parts supplied separately. If value over 10/- sent carriage paid or C.O.D.—post charges paid.
For C.O.D. Parts for this set, see our second advertisement on page 181.

KIT "A"	£5:11:11
Authors' Kit less valves and cabinet. CASH or C.O.D. or 12 monthly payments of 10/3.	
KIT "B"	£7:10:11
Authors' Kit with valves but less cabinet. CASH or C.O.D. or 12 monthly payments of 13/10.	
KIT "C"	£8:18: 5
Authors' Kit complete with valves and cabinet. CASH or C.O.D. or 12 monthly payments of 16/4. Any parts supplied separately. If value over 10/- sent carriage paid or C.O.D. post charges paid.	

KIT "A"	£4: 7: 8
Authors' Kit less valves and cabinet. CASH or C.O.D. or 12 monthly payments of 8/-.	
KIT "B"	£6: 6: 8
Authors' Kit with valves but less cabinet. CASH or C.O.D. or 12 monthly payments of 11/7.	
KIT "C"	£7: 6: 8
Authors' Kit with valves and cabinet. CASH or C.O.D. or 12 monthly payments of 13/5. Any parts supplied separately. If value over 10/- sent carriage paid or C.O.D. post charges paid.	

WE SCORE AGAIN with P.V. STAR CABINET



This is the Cabinet designed by Peto-Scott himself in co-operation with "P.W." Staff. **27/6 CASH**

	£	s.	d.
1 Panel, 18" x 7" ...	6	0	
1 Baseboard, 10" deep ...	1	6	
2 Formo .0005-mfd. Extensers	1	9	0
1 Ready Radio filament switch	10		
1 Ready Radio .0001-.00012 or .00015-mfd. differential reaction condenser	2	6	
1 T.C.C. 1-mfd. fixed condenser	2	10	
1 T.C.C. .01-mfd. fixed condenser	3	0	
1 Telsen .001-mfd. fixed condenser	6		
1 Telsen .0003-mfd. fixed condenser	6		
1 Ready Radio and 1 Telsen H.F. choke	6	6	
1 Bulgin 600-ohm Spaghetti resistance	9		
1 Dubilier 2-meg. grid leak and holder	2	9	
1 Igranic L.F. transformer	10	6	
1 E.I. P.J.2 coil	1	6	
1 Ready Radio P.J.3 coil	2	0	
1 G.B. battery clip	6		
1 Terminal strip, 18" x 2", ready drilled to specification	2	0	
1 Lewcos .0001-mfd. compression condenser	2	6	
10 Indicating terminals	2	6	
2 Goltone crocodile clips	3		
1 Parex screen, 10" x 8"	2	0	
2 Belling-Lee G.B. 4 H.T. and 2 L.T. plugs	1	4	
2 Coil Quits	1	0	
Flex. screws, wire, etc.	2	6	
4 oz. No. 30 D.S.C.	2	5	
KIT "A." Cash or C.O.D.	£4.7.8		

Any parts supplied separately. If value over 10/- sent carriage paid or C.O.D.—post charges paid.
For C.O.D. Parts for this set, see our second advertisement on page 181.

We cannot do better than refer you to Mr. G. V. Dowding's remarks on the attractive design of this Peto-Scott Cabinet appearing in pages 866 and 867 "Popular Wireless," September 12, 1931. Hand Polished Oak with Ebonised Side Wings and Base.

PETO-SCOTT

PETO-SCOTT CO. LTD. Head Office: 77, CITY ROAD, LONDON, E.C.1. Clerkenwell 9406. 62, HIGH HOLBORN, LONDON, W.C.1. Chancery 8266. MANCHESTER: 33, WHITELOW ROAD, CHORLTON-CUM-HARDY. Phone: Chorlton-Cum-Hardy 2028. NEWCASTLE, STAFFS: 7, ALBANY ROAD. Phone: 67190.

EXPRESS ORDER FORM

To PETO-SCOTT CO. LTD.
Please send me C.O.D., CASH/H.P.

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.....

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for which I enclose
Cash/H.P. Deposit £ s. d.

Name.....

Address.....

.....

P.W. 26/9/31

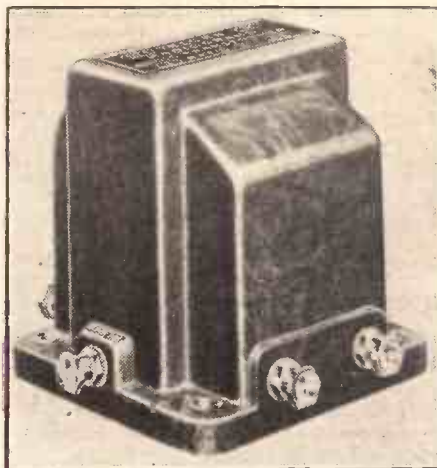
ROUND THE STANDS

(Continued from page 136.)

made and sold by the thousand in every country.

Recently the B.B.C. has been experimenting with 7-metre transmissions with a view

THE TELSEN "SUPER RATIO"



The 1-7 ratio transformer that figured in the famous "P.W." "Super-Quad."

to overcoming to some extent the present overcrowding in the ether.

A HIGH GRADE COMPONENT

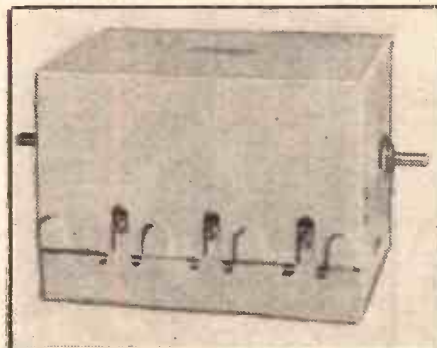


The Varley Ni-Core L.F. transformer is not one of Varley's new lines, but it still enjoys a merited and enviable success.

It is an extremely compact, easily made little article (it costs about five shillings to

It is probable that the B.B.C. engineers have been rather worried as to the practicability of making reception apparatus capable of picking up these transmissions that could be handled by any listener. Be that as it may, all such fears are now rendered groundless, for Mr. Kelsey's 7-metre Adaptor is as inexpensive and easy to operate as his famous ordinary short-wave adaptor.

AN ENGAGING "GANG"



Note the new "Utility" gang condenser. You will probably meet it again in a future "P.W." set design.

construct) and it uses a normal three-electrode valve. There is a plug which you slip into the detector valve socket of any ordinary set. You can then ignore the set's ordinary tuning and reaction controls and tune-in 7-metre programmes merely by operating two simple controls on the adaptor itself. Nothing could be more elementary or trouble-free. Indeed, 7-metre transmissions are tunable on the device with the facility of ordinary local programme reception on the ordinary set.

Visitors, will, we are sure, be amazed at the ingenuity of design displayed in

"P.J.'s" MADE BY WEARITE

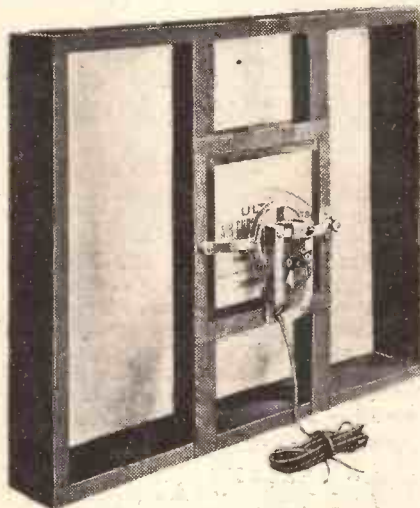


Messrs. Wright and Weare are showing several "P.W." coil designs, including the above "P.J.'s"

the Kelsey 7-metre Adaptor. And when they have seen the little object, they will know that a solution to the successful reception of the new transmissions is at hand even before, officially, the transmissions themselves are there.

Very shortly full details of this wonderful unit will be given in "P.W."

AN "ULTRA" CHASSIS



One of the "Air-Chrome" chassis speakers shown by the Ultra people.

S. G. BROWN, LTD.

The radio-gram enthusiast should make a special effort to go to the S. G. Brown, Ltd. stand, for here

NEW WESTINGHOUSE UNIT



A Westinghouse metal rectifier (the H.T.S) that has been designed especially for constructors.

CAMCO "MELODEE" CABINET



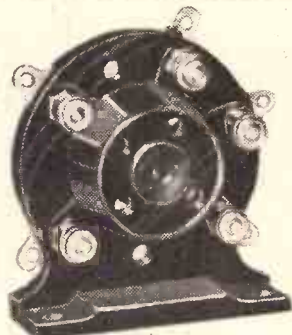
A special line exhibited by the Carrington Mfg. Co., Ltd.

he will find the "Microbox." This is an invention of Mr. S. G. Brown, F.R.S., himself, and is a device that enables gramophone records to be reproduced electrically without using valves.

It is like an ordinary pick-up in general appearance, but after applying 10 volts to it either by a battery or mains unit there is sufficient output for the direct and full operation of a large loudspeaker.

The "Microbox" is also available in the form of a complete set comprising turntable, volume control and an S.G. Brown Duplex speaker. This assembly is styled the "Microset."

VERSATILE VALVE HOLDER



The W.B. valve holder can be mounted either horizontally or vertically.

GROSVENOR ELECTRIC BATTERIES, LTD.

The Grosvenor Batteries are well worth examining, not only on account of their original and effective construction, but also for the distinctive colour classification which they are given.

There are three classes in the standard capacity category, and these are the Red Line, Brown Line, and Blue Line.

For supplying super-power valves there is the Triple Blue Line, while the Triple Red and Double Blue are those to cope with medium-power demands. The Grosvenor G.B. batteries are available in Blue, Brown and Red Line types, too.

Perhaps this all sounds rather confusing, but you will see, if you examine the Grosvenor display, that the classifications are quite logical.

Grosvenor are showing a very fine range of dry batteries for all purposes from those for torchlights up to special H.T.'s for different makes of portables. Their stand is a miniature battery exhibition in itself and as such is well worthy of quite a prolonged examination by visitors to the show.

A WIRE-WOUND POTENTIOMETER



A new Watmel component having very attractive features.

FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found—?



THE "UTILITY" TWO-GANG.

ONE of the most specialised branches of the radio industry is that which is concerned with the manufacture of variable condensers.

And this is hardly surprising, for the making of such components is totally beyond the capacity of an ill-equipped factory or workshop.

Such places can—and, unfortunately, do—turn out some types of radio gear, but before up-to-date condensers can be produced, modern machines and skilled designers and engineers are needed.

Thus it is that variable condensers are among the best products of the industry. Indeed, second-rate productions could hardly survive against the general high standard that is being maintained.

The pace is set by such people as Wilkins and Wright, Ltd., whose "Utility" condensers are among the best examples of present-day radio engineering.

I have recently received one of their two-gang variables, and find it an excellent piece of work in every respect.

AN ATTRACTIVE SPEAKER



Two of the Graham Farish Chassis Speakers.

As a matter of fact, this particular sample has already been earmarked by the Research and Construction Department for a rather special "P.W." set design, and that will afford a clear indication as to our opinions regarding it.

It is to be used in conjunction with a special band-pass unit. The design and construction of this "Utility" "gang" are excellent in every way, and I particularly like the neat and effective "trimming" devices which are incorporated in it. They

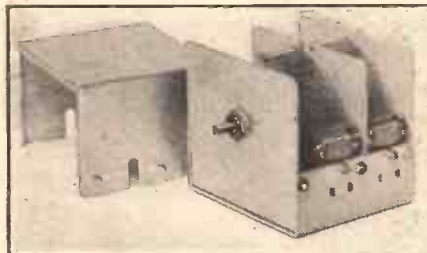
are very easy to set, and can be rigidly locked into position when finally adjusted.

A GOOD SPEAKER

If you are contemplating the construction of a portable or cabinet set, I commend the new Graham Farish A.C.4 loudspeaker to your attention. It costs only 21s. and gives very pleasing results.

It is sold, at the above-mentioned price, in chassis form, that is, it wants only a cabinet or plain baffleboard to turn it into a complete instrument.

IT'S A GANG



The "Utility" Two-Gang becomes a completely screened model when the cover is slipped on.

There are several points of interest in its design. The cone is made of a new kind of material and is suspended by a patent method which enables it to retain an excellent freedom of lateral movement. The unit is of the four-pole variety.

A high degree of sensitivity has been achieved together with a capacity to handle moderately heavy inputs.

Altogether it is an attractive proposition and I would advise you to make a point of hearing a model in operation should you get the chance.

THE NEW R.I. "DUX."

An R.I. general-purpose transformer at 6s. 9d. is an innovation of considerable importance, and it cannot fail in assisting largely to give the death-blow to cheap and shoddy foreign products.

Also, it should be noted that Messrs. Radio Instruments are publishing a full technical specification of this, their latest and most inexpensive transformer, and the implication of this need not be stressed.

Here are the actual details, in case they should not have come to your notice: Primary inductance, 30 henries; primary resistance, 1,200 ohms; secondary resistance, 7,000 ohms, ratio 1 to 3½. Weight, 11 oz.; maximum D.C. current, 5 milliamps.

From this you will see that, despite its extraordinary low price, it has distinctly favourable characteristics. The comparatively low primary resistance is particularly commendable. (In parenthesis it should

be pointed out that it is not a desideratum that the secondary winding should have an equally low resistance.)

The "Dux"—Dux, by the way, means leader—is built into an exceptionally pleasing bakelite moulding with an iron base

PLEASE NOTE

Manufacturers and traders are invited to submit radio apparatus of any kind for review purposes. All examinations and tests are carried out in the "P.W." Technical Department, with the strictest of impartiality, under the personal supervision of the Technical Editor.

We should like to point out that we prefer to receive production samples picked from stock, and that we cannot in any circumstances undertake to return them, as it is our practice thoroughly to dissect much of the gear in the course of our investigations!

And readers should note that the subsequent reports appearing on this page are intended as guides to buyers, and are, therefore, framed up in a readily readable manner free from technicalities unnecessary for that immediate purpose.

plate. In fact, its appearance gives no more indication of its low price than does its performance. Both are definitely of good standard.

We have used the "Dux" singly and in pairs, and find it an adequate substitute for many transformers costing much more. The "Dux" does not incorporate a nickel-iron core, but has a normal, although very low-loss, iron.

And it can be connected directly in the anode circuit of a valve and handle, as mentioned above, up to 5 milliamps of D.C. current without saturation. That means to say that it can follow any detector or ordinary L.F. valve and function at its full efficiency.


BELLING-LEE TERMINALS.

In our September 12th issue the Belling-Lee type "R" terminal was incorrectly advertised at 6d. The price of this very useful device is, of course, only 3d.

ONE OF THE "DUX"



An inexpensive but efficient component due to one of our best-known manufacturers of high-quality radio sets and components.



The perfect dry battery machine - made by entirely new methods

If you could visit the famous old Fuller factory and see for yourself the new machinery that is revolutionising battery manufacture you would immediately understand how and why the Fuller 'Super' is the world's most perfect dry battery. Every process is controlled automatically. Variations in size, shape and power of the individual cells are no longer possible. This photograph shows the zinc cans ready for filling. These cans are made from purest zinc of standard gauge, tested for weight, diameter and height. They cannot leak and therefore remain alive for the maximum length of time. Fit a FULLER 'Super' and your wireless will gain a new lease of life.

See us at National Radio Exhibition,
Olympia, Stand 36

FULLER
SUPER DRY BATTERY

EMISSION UP TO 20 MILLIAMPS
TYPE F1, 60 VOLTS, PRICE 7/5. TYPE F4, 108 VOLTS, PRICE 13/9

Full list of other sizes and names of local depots on application.
FULLER ACCUMULATOR CO. LTD., Chadwell Heath, Essex.
Telephone: Seven Kings 1200. Telegrams: Fuller, Chadwell Heath.
Contractors to British and Overseas Government Departments,
Railways, etc.

THESE wretched depressions over Iceland, Ireland, and other places still bring us unpleasant crops of atmospherics which are cramping the style of the long-distance man, particularly on the long waves. Very sad this, for if it were not for the ear-splitting crackles and fizzes that accompany them, the long-wavers would be providing magnificent reception just now.

Europe's Hefty "Pole."

The best of them is Warsaw No. 2, which is now using more than twice as much power as any other station in Europe. So powerfully is he received that there is no need, as a rule, for the set to be in a very sensitive condition, and his volume is often great enough to drown all but the worst atmospheric noises. In fact, despite his position in Central Europe, Warsaw is now almost a local station in this country!

With a view to making a further test of present conditions on the medium wave-band I tuned my big multi-valve set for a search over the wave-lengths from just below 300 metres up to the top of the band. The result was a bag of forty-seven stations on the loud speaker, or every one with an individual wave-length that was working at the time.

This shows that there are plenty of stations to be had provided that the high-frequency



Some practical distant-programme notes compiled by a special contributor who nightly searches the ether in order to obtain really up-to-the-minute information for "P.W." readers.

amplification and the selectivity are there. A big set at this time of year is something like a month ahead of smaller apparatus.

I don't know whether you quite follow that last sentence. What I mean is that any of the smaller stations which it receives well now should be receivable with sets including less amplification in about a month's time, owing to the normal improvement in conditions. It acts, therefore, as a useful automatic prophet and as an indicator of stations which, though weak or almost inaudible with smaller sets at the moment, are well worth attention since they may strengthen up at any time.

The Lesser Fry.

Amongst such stations are several of considerable interest to the long-distance enthusiast. One of them is Kosice, a 2.5-kilowatt Czecho-Slovakian station, which is very promising.

Next, I would refer you to Zagreb, in Yugo-Slavia. Though rated at only .7 kilowatt, this station has evenings when he shows remarkable strength, but you require

good selectivity to pick him out from Cardiff on the one side and Bordeaux on the other. Don't bother to try for Marseilles for a week or two. I could not think why it was that no efforts of mine would bring him in the other night, until I remembered having read that he

was out of action owing to the effects of a fire. Brno is a station that you ought to be able to pick up, for he is now coming through with fine strength. Naples also is worth attention. Barcelona has not been too good for some while, but recently I have found him a very strong transmission.

Plenty of Programmes.

Before I forget I want to mention Trieste in the lower part of the wave-band. He is working on a wave-length of 247.7 metres and he shares with Nuremberg and Heilsberg the honour of being amongst the strongest of the shorter-wave stations. On most evenings Trieste's transmissions are quite outstanding.

Bucharest is another station in the upper part of the medium band, of which quite literally more will be heard presently. Katowice is waiting for you if you have enough selectivity to combat the spread of Sottens.

Other stations particularly worth attention are Berlin Witzleben, Madrid Union Radio, Belgrade, Prague, Riga and Sundsvall.

WITH the Show nearly over, we can reasonably feel that we have started on another "season," although the true radio enthusiast knows no season. There is a feeling, however, that at this time of the year one can sit back in one's chair and decide (a) whether one is going to make another set for the long winter evenings, and (b) if so, what is it going to be.

Unfortunately, last winter was a very dull one for us short-wave fans, and I, personally, do not mind admitting that I did far more than my fair share of ordinary broadcast-band work.

Better Days To Come!

Perhaps we are entitled to expect that we have been sufficiently punished already this time by the absence of summer, and to live in hopes of a genuine "DX" winter.

In view of an analysis of my "mail" for the last three months, I have come to the conclusion that readers appreciate a "lead" from me in the way of a short forecast, week by week, of what to listen for, and which broadcast stations, on the short waves, are likely to be the best.

Although this forecasting business is no easy task, I do propose to give, in all modesty, my own personal opinion on what is likely to happen, together with my own loggings for the previous few weeks. If I do this about every three weeks throughout the winter season there is a reasonable chance that I shall be able to keep my

SHORT-WAVE NOTES



News and views regarding an exciting and fascinating wave-band.

By W. L. S.

readers abreast with the various changes in conditions.

If, for instance, I find at the end of November that I have been logging Rome at excellent strength for the previous three weeks, except for the last two or three days, when some other station has been improving, while Rome has been diminishing, then we shall have a fair basis for a "forecast" of some kind.

The 20's Fading Fast.

Suiting the action to the word, I can say that for the past month, with the exception of about the last six days, W 2 X A D has been definitely good. His behaviour just prior to writing is, however, definitely such as to suggest that we can say "good-bye" to him for a long time. American amateurs on 20 metres have likewise disappeared after a long spell of good

conditions, and even W 2 X A F is dropping off slightly.

Now for some correspondence. "D. A. D.," of Cardiff, has just started some explorations "down below" for the first time, using a set similar to my late receiver, which I described not long ago.

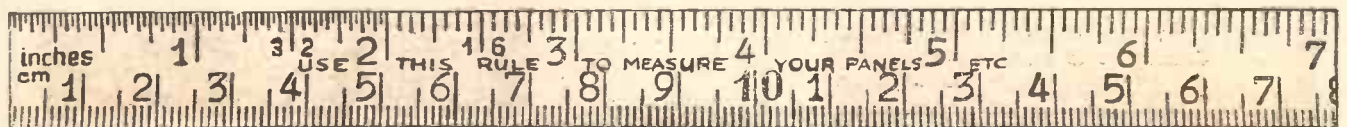
A Real Enthusiast.

He reports all well, and particularly mentions the "Radio Espanol, Madrid" transmission that has already been commented on. His wave is between 30 and 31, and the call-sign is announced as "A. R. Co.," phonetically. Otherwise speaking, it is E A Q, which is now a recognised short-wave transmission.

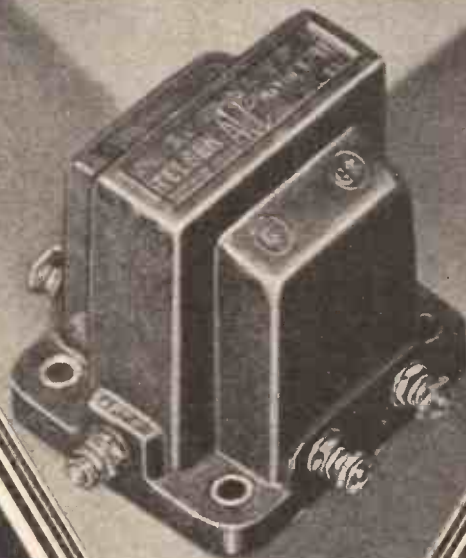
"D. A. D." enquires why a lot of French amateurs work right up as high as 47 metres, chiefly on bad telephony. The answer to that is, of course, that they have no respect whatever for the licensing authorities, and, being "pirates," have no objection to getting the amateur fraternity into hot water at the next Conference. Lastly, "Does anyone use telephony on the 20-metre band?"

Certainly they do, but they appear to be mostly Americans and a number of Londoners, who would probably not be audible in Cardiff. Twenty-metre "fone" to the States is quite a craze in London, and I confess to being a perpetrator of it myself.

"Yes," "D. A. D.," your H.A.C. membership is duly inscribed on the rolls.



Telsen L.F. Transformers



TELSEN

L.F. TRANSFORMERS

Telsen transformers have achieved fame in the radio world on account of their high standard of their quality and performance. Designed and built on the soundest of engineering principles, these robust, full-size transformers give not only efficient but enduring service.

TELSEN

L.F. TRANSFORMERS

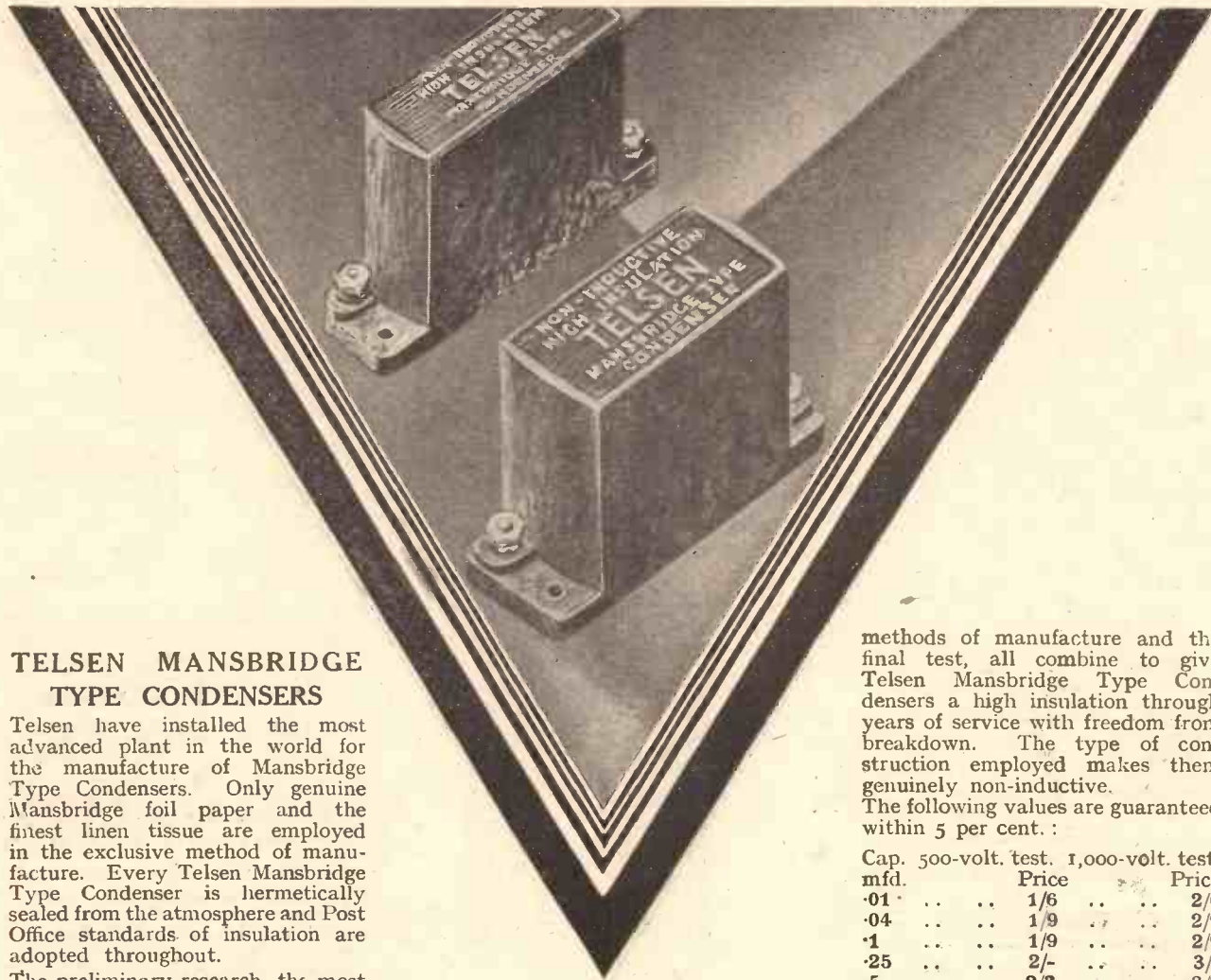
- Telsen "Ace" Transformer, Ratios 3-1, 5-1. Price .. 5/6
- Telsen "Radiogrand" Transformer, Ratios 3-1, 5-1. Price 8/6
- Telsen "Radiogrand" 7-1 Super-Ratio Transformer. Price .. 12/6
- Telsen Intervalve Transformer, Ratio 1.75-1. Price 12/6

TELSEN

THE SECRET OF PERFECT RADIO RECEPTION

OLYMPIA
NATIONAL HALL
GROUND FLOOR
STAND 19

Telsen Mansbridge Condensers



TELSEN MANSBRIDGE TYPE CONDENSERS

Telsen have installed the most advanced plant in the world for the manufacture of Mansbridge Type Condensers. Only genuine Mansbridge foil paper and the finest linen tissue are employed in the exclusive method of manufacture. Every Telsen Mansbridge Type Condenser is hermetically sealed from the atmosphere and Post Office standards of insulation are adopted throughout.

The preliminary research, the most modern plant in the world, the finest raw materials, the latest

methods of manufacture and the final test, all combine to give Telsen Mansbridge Type Condensers a high insulation through years of service with freedom from breakdown. The type of construction employed makes them genuinely non-inductive.

The following values are guaranteed within 5 per cent. :

Cap. mfd.	500-volt. test.	Price	1,000-volt. test.	Price
.01	1/6	2/6
.04	1/9	2/9
.1	1/9	2/9
.25	2/-	3/-
.5	2/3	3/3
1.0	2/3	3/6
2.0	3/-	5/-

TELSEN

THE SECRET OF PERFECT RADIO RECEPTION

SEE YOU ON STAND 19

Telsen Aerial Coils



TELSEN DUAL-RANGE AERIAL COIL

The Telsen Aerial Coil is the very latest development in dual-range aerial coil design. It incorporates a variable series condenser which can be set to give any desired degree of selectivity, making the coil suitable for all districts, whatever reception conditions may be. It has been tested in various parts of the country, and down to distances of five miles from Regional stations, a single tuned circuit will definitely separate the Regional programmes. This adjustment also acts as an excellent volume control and is equally effective on long and short waves. The waveband change is effected by means of a three-point switch. A reaction winding is provided and the primary and secondary windings are separated so that the aerial circuit can be isolated in mains driven or screened grid receivers.

Telsen Aerial Coil with Variable Series Condenser incorporated .. Price 7/6

TELSEN H.F. TRANSFORMER AND AERIAL COIL

This Coil is primarily designed for H.F. amplification in conjunction with screened-grid valves. It is arranged so that it can be connected as a tuned-grid or tuned-anode coil, or alternatively as an H.F. Transformer.

It also makes a highly efficient aerial coil where the adjustable selectivity feature is not required. A reaction winding is incorporated. When used as an H.F. Transformer the wave-change is effected by means of a two-pole (four-point) switch. When connected otherwise a three-point switch should be used.

Telsen H.F. Transformer and Aerial Coil. Price 5/6

TELSEN

ALL BRITISH RADIO COMPONENTS

OUR REPUTATION
STANDS ON
STAND 19

Telsen H.F. Chokes



TELSEN BINOCULAR H.F. CHOKE

An inductance of 180,000 microhenrys—a self-capacity of .000002 microfarad—figures which prove that the Telsen Binocular H.F. Choke fulfils its purpose to the utmost and meets the demand of modern set designers and builders. Owing to the binocular formation the external field, and therefore unwanted reaction effects, are reduced to an absolute minimum. It covers the whole broadcast band and it is free from parasitic resonances. Resistance 750 ohms.

Telsen Binocular H.F. Choke,
Price 5/-

TELSEN STANDARD H.F. CHOKE

The Telsen Standard H.F. Choke utilises the minimum of baseboard space. It is designed to cover the whole broadcast band and has an extremely low self capacity. The inductance is 150,000 microhenrys and the resistance 400 ohms.

It has proved very popular, and has been incorporated by set designers in many of the leading circuits.

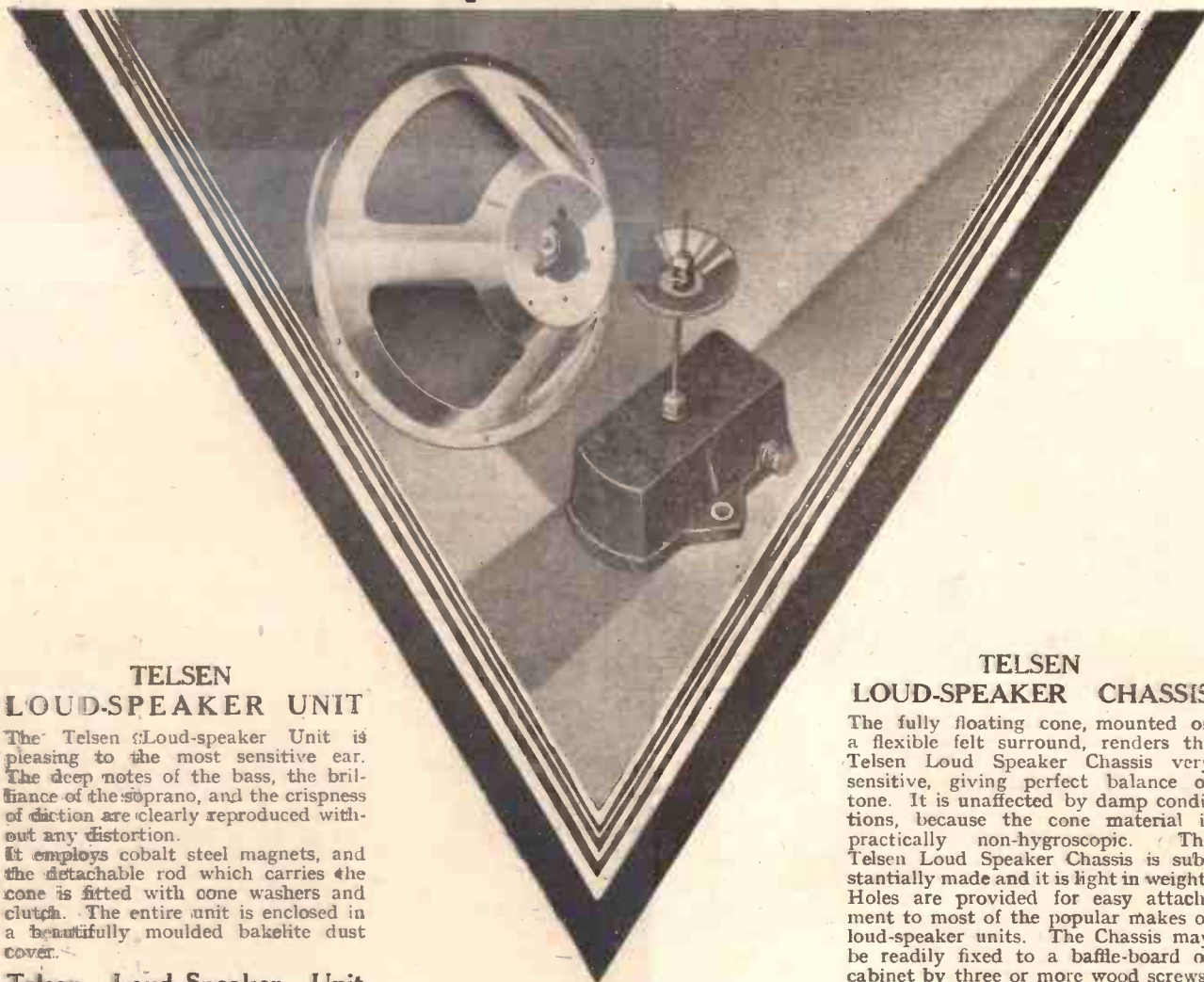
Telsen Standard H.F. Choke,
Price 2/-

TELSEN

THE SECRET OF PERFECT
RADIO RECEPTION

YOU'VE AN
APPOINTMENT ON
STAND 19

Telsen Loud-speaker Unit & Chassis



TELSEN LOUD-SPEAKER UNIT

The Telsen Loud-speaker Unit is pleasing to the most sensitive ear. The deep notes of the bass, the brilliance of the soprano, and the crispness of diction are clearly reproduced without any distortion.

It employs cobalt steel magnets, and the detachable rod which carries the cone is fitted with cone washers and clutch. The entire unit is enclosed in a beautifully moulded bakelite dust cover.

Telsen Loud-Speaker Unit
Price 5/6

TELSEN LOUD-SPEAKER CHASSIS

The fully floating cone, mounted on a flexible felt surround, renders the Telsen Loud Speaker Chassis very sensitive, giving perfect balance of tone. It is unaffected by damp conditions, because the cone material is practically non-hygroscopic. The Telsen Loud Speaker Chassis is substantially made and it is light in weight. Holes are provided for easy attachment to most of the popular makes of loud-speaker units. The Chassis may be readily fixed to a baffle-board or cabinet by three or more wood screws.

Telsen Loud-Speaker Chassis
Price 5/6

TELSEN

ALL BRITISH
RADIO COMPONENTS

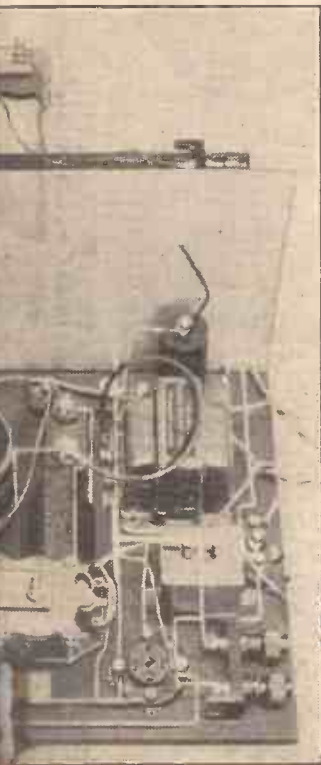
REMEMBER THE
NUMBER
STAND 19



By G. V. DOWDING, Associate I.E.E.

wiring diagram. This is drawn exactly to scale. Naturally, other makes of components than those embodied in the original model will have slightly different shapes and sizes, and should you happen to secure something in the way of an outsize, the set's efficiency will not be impaired by a slight moving of the other parts to make room for the "big 'un."

S.G. THREE



tuning, "P.W." differential reaction, newly designed cabinet, and novel side pinnacle of achievement in home- or designs.

The vital necessity is to keep the relative position of the various items. Don't change things over or twist them round. This particularly applies to the coils.

Wiring Up.

And now for the wiring. The "P.J." coils almost wire themselves up. All you have to do is to straighten out the connecting leads that are already on them, and run these to the points marked in the wiring diagram. When they are too long you should not coil up the surplus, but cut it off.

There is one lead which appears to go through the screen via a small screw in this. Actually, this is a two-purpose lead. It joins one terminal of the fuse and one terminal of the 1-mfd. fixed condenser together,

and also serves to earth the screen. Therefore, the nuts and screw must make good contact with the screen as well as with both leads.

There are three other leads which do, in fact, pass through the screen, and it is very

important that none of these should short-circuit on the metal of the screen. (The one is a lead that connects two valve-holder terminals, the second goes to the cap of the S.G. valve, and the third is an H.T. plus lead.)

A Screen Tip.

If you are using Glazite, or a similar well-protected wire for the connections, no further protection will be needed. But ordinary fabric-covered wires need a little sleeving of insulating material, or a wrapping of insulating tape, at the points where they pass through the screen. And make sure that the screen holes are clean and not sharp or jagged-edged.

By the way, it is an excellent feature of this design that so few wires go through the screen, and that the S.G. valve does not need to lay through it.

Wire the two side control condensers with flexible wire so that the supports can be bent over after the connections have been made.

Use a stranded, rubber-covered wire for the battery leads or, alternatively, one of those excellent multi-way battery leads,

such as are made by Belling Lee and other "P.W." advertisers.

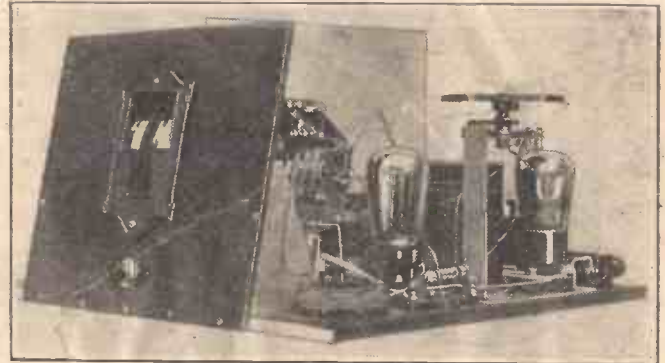
The Selectivity Condenser.

But do not forget to anchor that end of the H.T. plus 1 lead that is joined to a Spaghetti resistance to the baseboard with a small screw so that any strain on the lead is not communicated to the "Spag."

I do not think that there is much more that need be said about the construction of "P.V. Star," for it is a perfectly straightforward job.

And in regard to the accessories and the adjustment of the set, I must again refer you to the article on "P.V. Plus" which appears on other pages in this issue, for the

ECONOMICAL USE OF MATERIALS

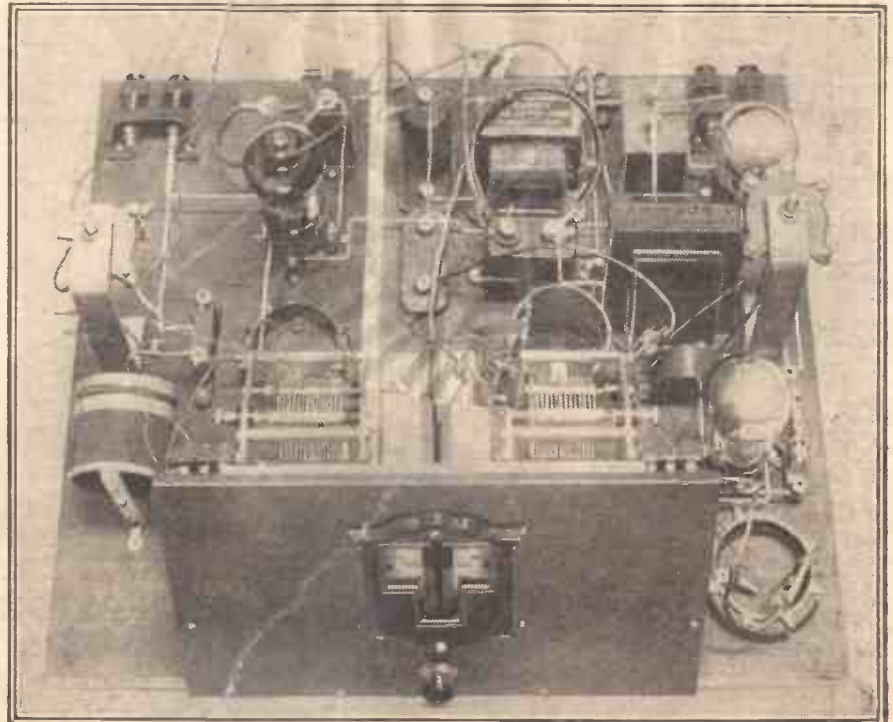


Quite a small ebonite panel is used in "P.V. Star," for this is vignitted by the front of the cabinet, as shown in the heading photograph.

information given in that article applies practically in its entirety to "P.V. Star" as well.

The only difference is that there is no (Continued on page 154.)

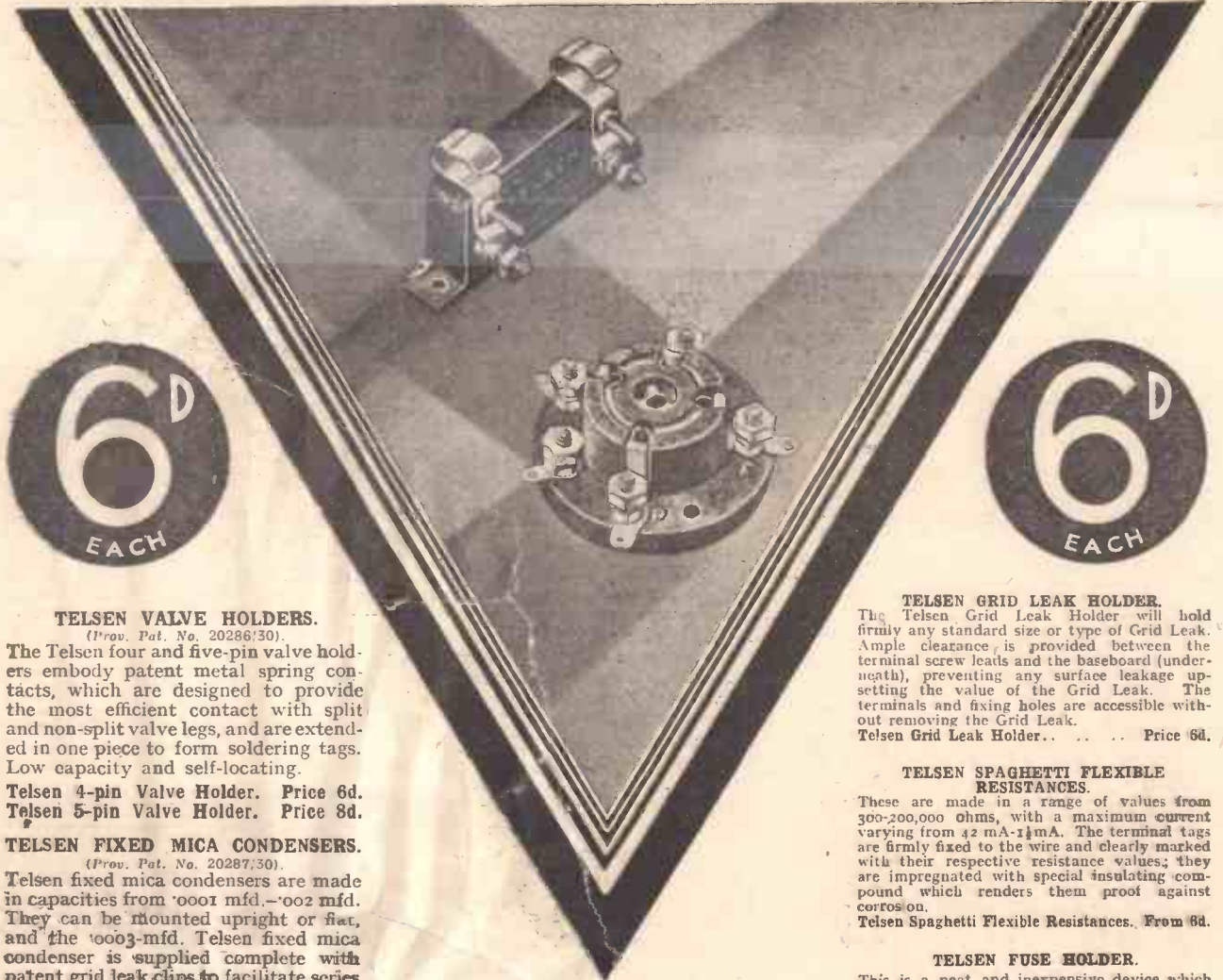
NO (H.F.) CONNECTION WITH NEXT DOOR!



There is only the one simple metal screen, but complete stability has been obtained by a careful disposition and layout of components.

THE SEASON

Typical of Telsen Value



TELSEN VALVE HOLDERS.

(Prov. Pat. No. 20286130).
 The Telsen four and five-pin valve holders embody patent metal spring contacts, which are designed to provide the most efficient contact with split and non-split valve legs, and are extended in one piece to form soldering tags. Low capacity and self-locating.

Telsen 4-pin Valve Holder. Price 6d.
 Telsen 5-pin Valve Holder. Price 8d.

TELSEN FIXED MICA CONDENSERS.

(Prov. Pat. No. 20287130).
 Telsen fixed mica condensers are made in capacities from .0001 mfd. to .002 mfd. They can be mounted upright or flat, and the .0003-mfd. Telsen fixed mica condenser is supplied complete with patent grid leak clips to facilitate series or parallel connections. All Telsen fixed mica condensers are tested at 500 volts.

Telsen Fixed Mica Condensers. Price 6d.

TELSEN GRID LEAK HOLDER.

The Telsen Grid Leak Holder will hold firmly any standard size or type of Grid Leak. Ample clearance is provided between the terminal screw leads and the baseboard (underneath), preventing any surface leakage upsetting the value of the Grid Leak. The terminals and fixing holes are accessible without removing the Grid Leak.

Telsen Grid Leak Holder. Price 6d.

TELSEN SPAGHETTI FLEXIBLE RESISTANCES.

These are made in a range of values from 300-200,000 ohms, with a maximum current varying from 42 mA-1½A. The terminal tags are firmly fixed to the wire and clearly marked with their respective resistance values; they are impregnated with special insulating compound which renders them proof against corrosion.

Telsen Spaghetti Flexible Resistances. From 6d.

TELSEN FUSE HOLDER.

This is a neat and inexpensive device which should be incorporated in every set as a precaution against burnt-out valves. The Telsen Fuse Holder firmly grips the standard radio fuse, giving a perfect contact.

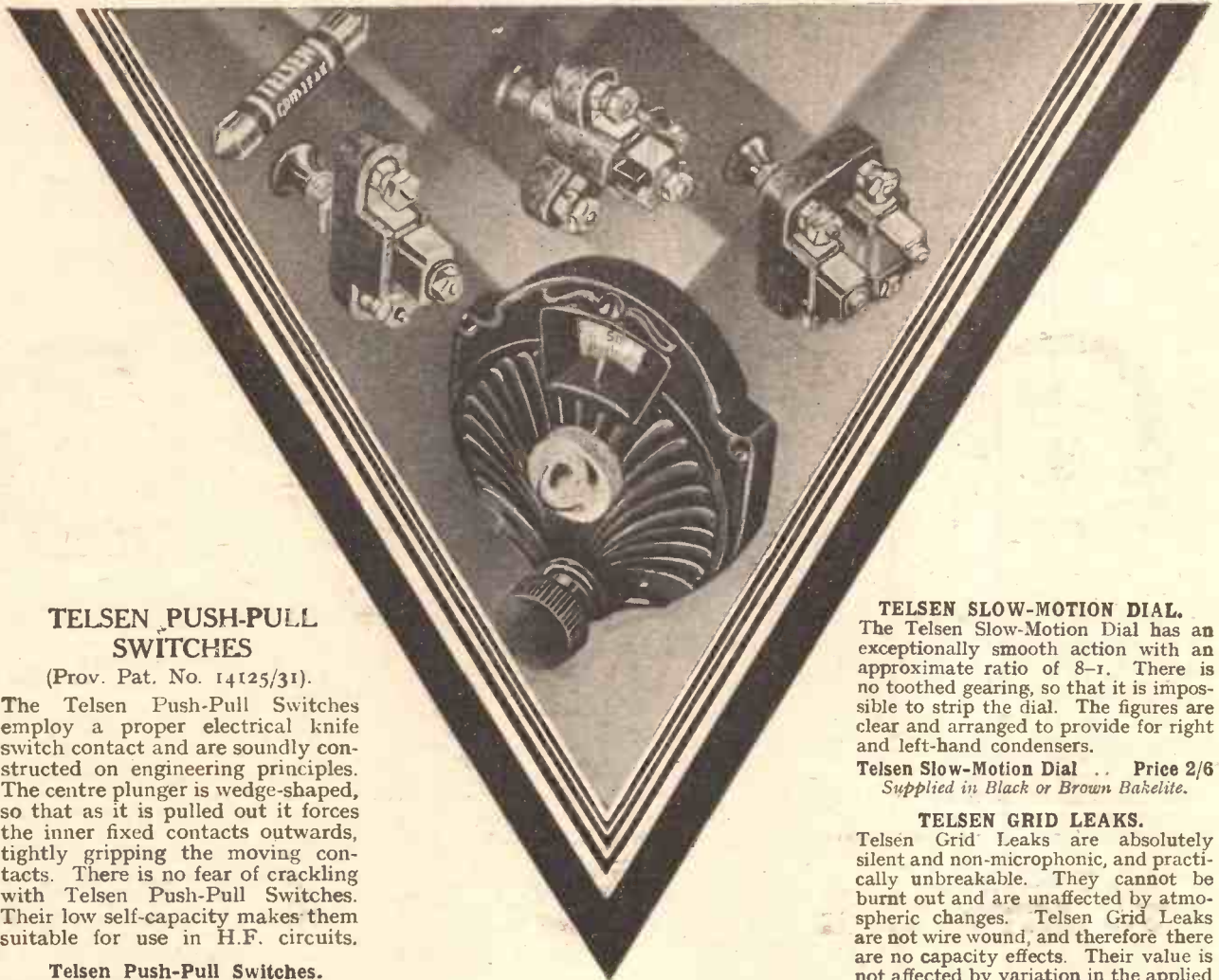
Telsen Radio Fuse Holder Price 6d

TELSEN

THE SECRET OF PERFECT RADIO RECEPTION

YOU CAN'T AFFORD TO MISS STAND 19

Switch over to Telsen



TELSEN PUSH-PULL SWITCHES

(Prov. Pat. No. 14125/31).

The Telsen Push-Pull Switches employ a proper electrical knife switch contact and are soundly constructed on engineering principles. The centre plunger is wedge-shaped, so that as it is pulled out it forces the inner fixed contacts outwards, tightly gripping the moving contacts. There is no fear of crackling with Telsen Push-Pull Switches. Their low self-capacity makes them suitable for use in H.F. circuits.

Telsen Push-Pull Switches.

- Two-point Price 1/-
- Three-point Price 1/3
- Four-point (2-pole) Price 1/6

TELSEN SLOW-MOTION DIAL.

The Telsen Slow-Motion Dial has an exceptionally smooth action with an approximate ratio of 8-1. There is no toothed gearing, so that it is impossible to strip the dial. The figures are clear and arranged to provide for right and left-hand condensers.

Telsen Slow-Motion Dial . . Price 2/6
Supplied in Black or Brown Bakelite.

TELSEN GRID LEAKS.

Telsen Grid Leaks are absolutely silent and non-microphonic, and practically unbreakable. They cannot be burnt out and are unaffected by atmospheric changes. Telsen Grid Leaks are not wire wound, and therefore there are no capacity effects. Their value is not affected by variation in the applied voltage. Made in capacities ranging from 1-5 megohms.

Telsen Grid Leak Price 9d.

TELSEN

ALL BRITISH RADIO COMPONENTS

YOU'LL FIND IT
ON
STAND 19

Telsen Variable Condensers

TELSEN BAKELITE DIELECTRIC CONDENSERS.

These Condensers are of a new and improved type and of exceptionally compact dimensions. The moving vanes, which are interleaved with finest quality bakelite, are keyed on to the spindle, so that they cannot be pushed out of line, and there is a definite stop at each end of the travel. The connection to rotor is made by means of a phosphor bronze pigtail so that there is no crackling due to rubbing contacts. The connection to the stator vanes is absolutely positive—a very important point.

Telsen Bakelite Dielectric Differential Condenser. Made in capacities of .0003, .00015, .0001. Price 2/-

Telsen Bakelite Dielectric Reaction Condenser. Made in capacities of .0003, .00015, .0001. Price .. 2/-

Ditto .00075, .0005. Price .. 2,6

Telsen Bakelite Dielectric Tuning Condenser. Made in capacities of .0005, .0003. Price 2/-

TELSEN PRE-SET CONDENSER.

These Condensers have been carefully designed to give proper separation of vanes when the adjustment is unscrewed, which results in a very low minimum capacity, giving a wide range of selectivity adjustment when used in the aerial circuit.

Telsen Pre-Set Condensers. Made in capacities of:

Max. Cap.	Min. Cap.
.002	.00025
.001	.00004
.0003	.000005
.0001	.000001

Price 1/6.

TELSEN LOGARITHMIC VARIABLE CONDENSERS.

The Telsen Logarithmic Variable Condenser is of robust construction and high insulation. The H.F. losses are very low and the frame is braced at three points, so that the possibility of distortion and short-circuiting is negligible. Substantial terminals are provided with alternative connection to the stator.

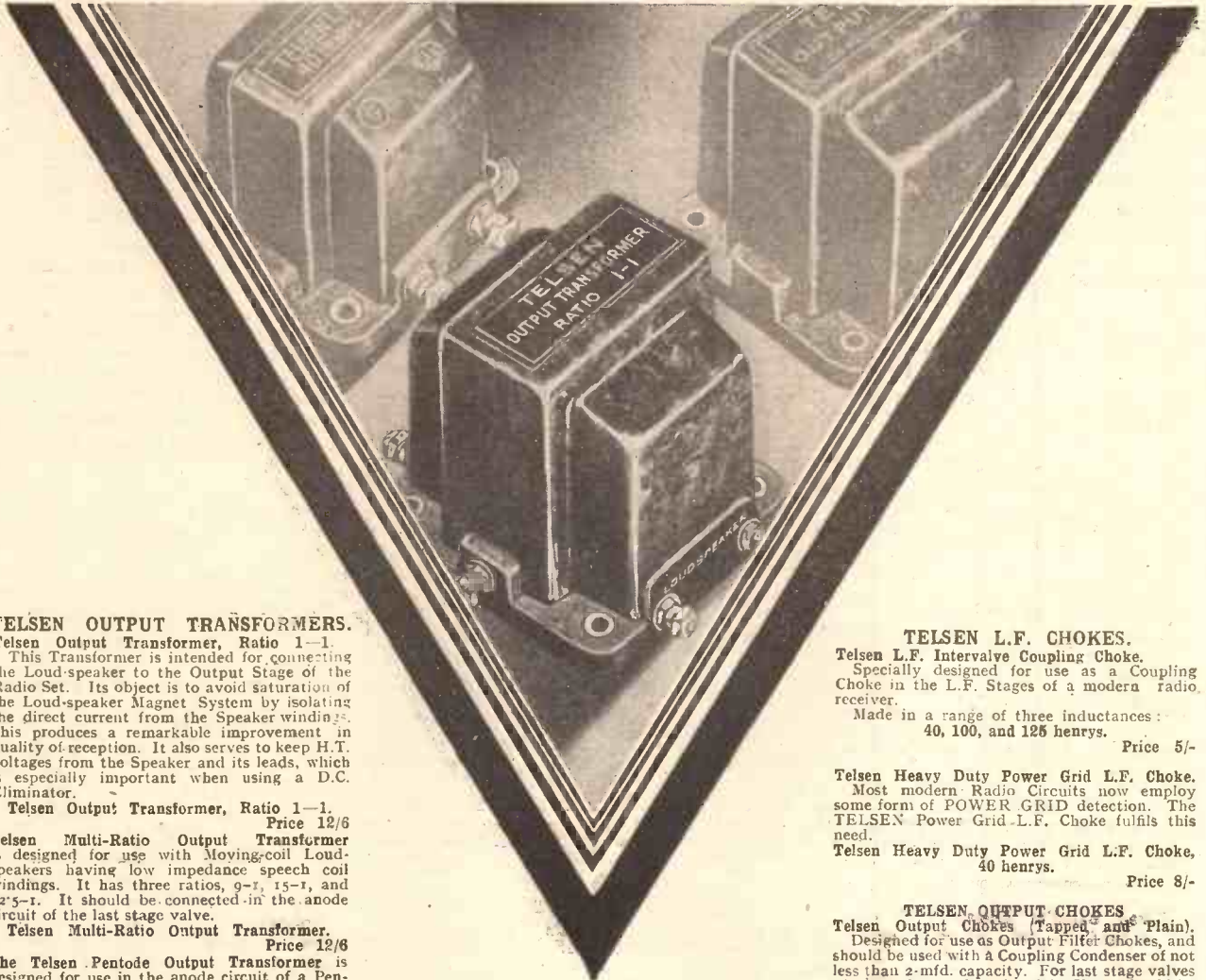
Telsen Logarithmic Variable Condenser. Made in capacities of .0005, .00035, .00025. Price .. 4/6

TELSEN

THE SECRET OF PERFECT
RADIO RECEPTION

DON'T FORGET
STAND 19

Telsen Output & L.F. Chokes



TELSEN OUTPUT TRANSFORMERS.

Telsen Output Transformer, Ratio 1-1.
 This Transformer is intended for connecting the Loud-speaker to the Output Stage of the Radio Set. Its object is to avoid saturation of the Loud-speaker Magnet System by isolating the direct current from the Speaker windings. This produces a remarkable improvement in quality of reception. It also serves to keep H.T. voltages from the Speaker and its leads, which is especially important when using a D.C. Eliminator.

Telsen Output Transformer, Ratio 1-1.
 Price 12/6

Telsen Multi-Ratio Output Transformer is designed for use with Moving-coil Loud-speakers having low impedance speech coil windings. It has three ratios, 9-1, 15-1, and 22.5-1. It should be connected in the anode circuit of the last stage valve.

Telsen Multi-Ratio Output Transformer.
 Price 12/6

The Telsen Pentode Output Transformer is designed for use in the anode circuit of a Pentode Valve used as the Output Valve of a receiver or amplifier. Its purpose is to prevent direct current from passing through the Loud-speaker, and also to match the Speaker to the Pentode Valve, which is essential for good quality reproduction.

Telsen Pentode Output Transformer. Price 12/6

TELSEN L.F. CHOKES.

Telsen L.F. Intervalve Coupling Choke.
 Specially designed for use as a Coupling Choke in the L.F. Stages of a modern radio receiver.

Made in a range of three inductances:
 40, 100, and 125 henrys. Price 5/-

Telsen Heavy Duty Power Grid L.F. Choke.

Most modern Radio Circuits now employ some form of POWER GRID detection. The TELSEN Power Grid L.F. Choke fulfils this need.

Telsen Heavy Duty Power Grid L.F. Choke,
 40 henrys. Price 8/-

TELSEN OUTPUT CHOKES

Telsen Output Chokes (Tapped and Plain).
 Designed for use as Output Filter Chokes, and should be used with a Coupling Condenser of not less than 2-mfd. capacity. For last stage valves of 3,000 ohms or less the plain Choke should be used with all Loud-speakers having impedances of about 3,000 ohms.

Telsen Output Choke, 20 henrys.
 Price 8/-

Telsen Tapped Output Choke, 20 henrys.
 Price 8/6

TELSEN

ALL BRITISH
 RADIO COMPONENTS

OLYMPIA
 NATIONAL HALL
 GROUND FLOOR
 STAND 19

BUILDING THE "P.V. STAR"

(Continued from page 149.)

baseboard-mounting selectivity condenser in "P.V. Star," as in "P.V. Plus." Instead, there is an aerial series condenser which is operative on both wave-bands, and which forms one of the side-controls.

You do not need constantly to readjust this as you run round the stations—just give it a gentle readjustment at intervals as may be found to be necessary, or leave it at an intermediate setting.

Two Vital Adjustments.

"P.V. Star" is an exceptionally simple set to tune, and even if you have had little or no previous experience in radio receiver operation you will meet with no trouble in picking up the more powerful transmissions.

But in order to tackle the very distant programmes, it is necessary to grasp and remember certain fundamental tuning facts. The "knack," as I suppose it can be called, of wheeling the very last ounce out of a set can quickly be acquired.

Never adjust the controls haphazardly and hope for the best. By so doing you might strike your desired stations, but it would be sheer luck, and, in any case, you would probably find it difficult to recapture similar stations on a future occasion.

There are two vital tuning controls, and these are the Extenser

drums. These can be rotated together during the initial stages of set searching, and the two sets of readings ought to be kept fairly coincident as the drums are rotated.

It is improbable that they will match absolutely, but it is easy to obtain an approximation of the discrepancy. Set the reaction control at minimum by turning it as far as possible in an anti-clockwise direction.

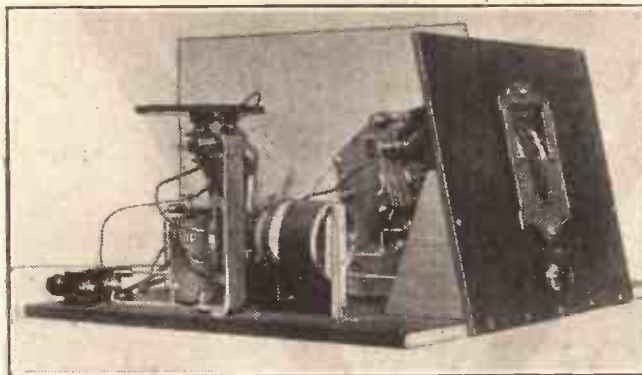
Dial Readings.

See that all the batteries are connected up, and then switch on. Now turn the Extensers until you hear a local transmission. The readings ought to be two-figure ones for this (except in the case of 5 X X). Move the drums until the peak of greatest volume is obtained and note the two readings.

If the one drum shows five degrees more than the other, then that relation will obtain over all the other stations' settings within close proximity to those readings.

There will be a slight difference at the other end of the scale, but you'll soon

WHEREVER YOU ARE YOU WILL LIKE OUR "STAR"



You can obtain just the right balance of selectivity and sensitivity with "P.V. Star" to give first-class loudspeaker results free from interference whatever your local conditions.

discover exactly what it is. Of course, the reading difference is apt to be different on the other (long) wave-length. In this case, the one which was formerly the higher might be the lower, or it may happen that the readings will now coincide.

The Guiding Control.

Over the two-figure readings the adjustments of the left-hand side control are bound

"P.V. STAR" IS EXHIBITED ON OUR STAND (67) AT OLYMPIA

to have some slight effect. However, you can regard the *right-hand drum-dial* as the key and *guiding tuning* adjustment.

It is this one which needs to be adjusted closely in conjunction with the reaction condenser settings. During the final "last ounce" juggling the fine balancing rests between these two controls.

Providing the left-hand drum is fairly closely set this can for the time be ignored. You will discover that the left-hand side control can be set at one particular point, and after that completely ignored during the process of programme-hunting. This intriguing process is almost entirely the concern of the Extenser and reaction controls, and you will not have had the set in action for half an hour before you discover how easy it is to handle successfully.

The H.T. current consumption of this set is approximately 12 milliamps when the recommended valves are used and correct G.B. and 120 volts max. H.T. are applied. A mains unit can safely be employed and a 20 M/A max model will be quite large enough.

A REMINDER REGARDING THE "STAR" COMPONENTS.

- 1 Panel (10 by 8 ins.) (Permol, or Goltone, Red Seal, Parex, Wearite, Becol).
- 1 Cabinet with baseboard (Peto-Scott, or Ready Radio).
- 1 '0005-mfd. double-drum-drive Extenser (Cylton, or Wave-master).
- 1 '0001, '00013 or '00015-mfd. differential reaction condenser (Ready Radio, or Telsen, Lotus, Igranic, Wavemaster, Polar, J.B., Parex, Burton, Formo, Cylton).
- 1 '0005-mfd. solid dielectric condenser (Ready Radio, or Telsen, Polar).
- 2 H.F. chokes (Lewcos and Telsen, or Ready Radio, Peto-Scott, R.I., Varley, Dubilier, Wearite, Watmel, Sovereign).
- 1 2-meg. grid leak and holder (Graham Farish, or Telsen, Ready Radio, Dubilier, Ediswan, Ferranti, Mullard, Varley).
- 1 600-ohm spaghetti res. (Bulgin, or Ready Radio, Lewcos, Telsen, Peto-Scott, Sovereign, Graham Farish, Goltone, Igranic, Varley).
- 1 25,000-ohm spaghetti res. (Varley, or see above).
- 1 L.F. transformer (Lotus, or Telsen, Ferranti, Igranic, Varley, R.I., Mullard, Lewcos, Goltone, Formo).
- 1 Output choke (Telsen, or Ferranti, Igranic, R.I., Varley, Atlas, Wearite, Bulgin, Lotus).
- 1 Filament switch (Bulgin, or Ready Radio, Telsen, Goltone, Igranic, Lotus, Benjamin, Peto-Scott, Wearite).
- 3 Valve holders (Lotus, or Telsen, Benjamin, Formo, Igranic, Clix, Bulgin, Graham Farish, Junit, Wearite).
- 1 '91-mfd. fixed condenser (T.C.C., or Dubilier, Telsen, Ferranti, Mullard, Igranic, Goltone, Watmel, Graham Farish).

- 1 '001-mfd. fixed condenser (Dubilier, or Ready Radio, Telsen, Watmel, Igranic, Ferranti, Goltone, Dubilier, Ediswan, T.C.C.).
- 1 '0003-mfd. fixed condenser (Goltone, etc.).
- 1 1-mfd. fixed condenser (Formo, or Telsen, T.C.C., Igranic, Mullard, Hydra, Helsby, Dubilier).
- 2 2-mfd. fixed condensers (Igranic and T.C.C., etc.).
- 1 Fuse (Bulgin, or Ready Radio, Telsen).
- 1 P.J.2 coil (Sovereign, or Lewcos, Ready Radio, Melbourne, Peto-Scott, R.I., A.E.D., Wearite, Formo, Watmel, Parex, Ferranti, Goltone).
- 1 P.J.3 coil (Sovereign, or see above).
- 2 Coil quoits (Peto-Scott, or Ready Radio, Sovereign, Melbourne, Wearite).
- 3 oz. of No. 30 D.S.C. wire.
- 1 Screen, 13 by 8 in. (Parex, or Ready Radio, Peto-Scott).
- 2 Control discs (Peto-Scott).
- 2 Terminal blocks and terminals (Belling & Lee).
- 4 Crocodile clips (Goltone).
- Glazite or Lacoline.
- 2 Side-control brackets (see text).
- Flex, screws, wire, plugs, etc. (Belling & Lee, Igranic, Elex, Clix).

ACCESSORIES

WE RECOMMEND

- LOUDSPEAKER.—(Amplion, Blue Spot, Celestion, B.T.H., Mullard, Undy).
- VALVES.—1 S.G. (Osram S.22, or Cossor, Mullard, Mazda, Eta, Six-Sixty, Dario, Fotos).
- 1 H.L. or Special Detector (Mazda H.L.210, or Cossor, Osram, Eta, Six-Sixty, Mullard, Tungsram, Dario, Fotos).
- 1 Power (Six-Sixty, or Mazda, Osram, Mullard,

- Tungsram, Dario, Fotos, Eta, Cossor) or super-power.
- BATTERIES.—H.T. 120-150 volts. Double or super capacity (Ever Ready, Drydex, Pertrix, Magnat).
- 1 G.B. for S.G. valve, '9 or 1'5 volts (Ever Ready, etc.).
- 1 G.B. for L.F. valve, 9-13 volts, to suit valve (see above).
- ACCUMULATOR.—2-volt (4 or 6-volt if 4 or 6-volt valves are used). (Exide, Ediswan, Pertrix, G.E.C., Lissen).
- MAINS UNIT.—(Regentone, Ekco, Tannoy, Atlas, R.I., Heayberd, Lotus). (State details of set and give voltage and type of mains when ordering.)

THE P.J. COILS

- P.J.2.—Former 2-in. diam., 2 in. long. wire 30 D.S.C. Medium-wave aerial unit without reaction.
- AERIAL WINDING.—9 turns, tapped at 4 and 6. Beginning "A" (red flex); end "X" (blue flex). Space $\frac{1}{2}$ in. between aerial and grid.
- GRID WINDING.—64 turns. Beginning marked "G" (white flex); end marked "Y" (black flex).
- P.J.3.—Former 2 in. diam., 3 in. long. Interval medium-wave unit with reaction. Wire, 30 D.S.C.
- PRIMARY.—30 turns, tapped at 10 and 20 from beginning marked "A" (red flex); end marked "X" (blue flex). Space between pri. and grid windings, $\frac{1}{2}$ in.
- GRID.—64 turns. Beginning marked "G" (white flex); end marked "Y" (black flex). Space between grid and reac. windings, $\frac{1}{2}$ in.
- REACTION.—34 turns. Beginning marked "Z" (green flex); end marked "R" (yellow flex). Windings of ALL coils in SAME direction.



At your command

G.P. Kendall
CHIEF ENGINEER
READY RADIO

THE "P.V." PLUS

Kit A (Less valves and cabinet) £4.5.6
 or 12 equal monthly instalments of 8.0

Kit B (With valves less cabinet) £6.4.6
 or 12 equal monthly instalments of 11.6

Kit C (With valves and cabinet) £7.9.6
 or 12 equal monthly instalments of 13.9

Completely assembled Receiver, Aerial tested, Royalties paid - £8.19.6
 or 12 equal monthly instalments of 16.6

THE "P.V." STAR

Kit A (Less valves and cabinet) £5.18.6
 or 12 equal monthly instalments of 11.0

Kit B (With valves less cabinet) £7.17.6
 or 12 equal monthly instalments of 14.6

Kit C (With valves and cabinet) £9.5.0
 or 12 equal monthly instalments of 17.0

Completely assembled Receiver, Aerial tested, Royalties paid - £10.15.0
 or 12 equal monthly instalments of 19.9

All Ready Radio cabinets have the special LANDOR finish. The beautifully subdued effect of the LANDOR process will give your set the same handsome appearance as that of the most expensive and exclusive receiver on the market.

DESPATCH.

TO INLAND CUSTOMERS.— All Your goods are despatched Post free or Carriage Paid.

TO OVERSEAS CUSTOMERS.— Everything Radio can be supplied against cash. In case of doubt regarding the value of your order, a deposit of one-third of the approximate value will be accepted and the balance collected by our Agent upon the delivery of the goods. All goods are very carefully packed for export and insured. All charges forward.

★ When you buy Ready Radio Kit Components you are definitely assured that they are the finest possible for their particular job. Mr. Kendall is your surety. Every Ready Radio Kit Component is chosen by him only after submission to stringent laboratory and broadcast tests. And again, before despatch, they are tested and passed under his personal direction.

★ Should you ever be in difficulties with your set, you can avail yourself of his wide and experienced technical knowledge, FREE. Mr. Kendall controls the new Ready Radio Technical Department, formed mainly for the purpose of helping you out of your radio troubles.

MEET HIM AT STAND No. 6, NATIONAL RADIO EXHIBITION, OLYMPIA.

159 BOROUGH HIGH STREET
LONDON BRIDGE S.E.1

'Phone: Lee Green 5678
 'Grams: Readirad, Sedist.
 Showrooms: 'Phone: Hop 3000.



BAND-PASS COUPLING—FILAMENT HEATING FROM A.C.—MILLIAMMETER CONNECTIONS.

Under the above title week by week our Chief Radio Consultant comments upon radio queries submitted by "P.W." readers. Don't address your questions to Capt. Eckersley, however—a selection of those received by the Query Department in the ordinary way will be answered by him.

Band-Pass Coupling.

B. H. J. (Fulham).—"Judging by the theoretical circuit of a band-pass tuning arrangement, the essential components are a two-gang variable condenser, a coupling condenser and two inductance coils.

"Is there any reason why two ordinary plug-in coils and one of the old type dual condensers should not be used in a band-pass tuner?"

I fear I don't know exactly what you mean by the term "old type dual condenser."

The theoretical circuit of the band-pass tuning arrangement that you describe appears to be capacity coupled, whereas you are suggesting, I think, inductive coupling. I can only say that so long as there are two tuned circuits tightly coupled in any known manner, the band-pass effect will take place.

It is really a question of practical convenience. If you have a great many variables to play about with, and if the two circuits have absolutely separate adjustments, then it is not easy to get a pure band-pass effect if you want constantly to vary the tune of the whole arrangement.

Ganged condensers are therefore a convenience because they fix one variable once and for all. The variation of coupling between two plug-in coils, by varying the distance between them, may introduce spurious effects due to the extra capacity introduced by the coils when they are brought very close together.

Theoretically, then, any arrangement which complies with the specification I give above should be satisfactory, but capacity coupling of circuits rather than inductive coupling is usually more convenient practically.

Filament Heating from A.C.

G. T. (Leigh-on-Sea).—"Although the practice is very common nowadays, I understand that lighting the filament of a battery valve, such as an L.S.5A, with alternating current shortens the life of the valve. Is this a fact and, if so, what is the reason?"

I have never actually heard it said that alternating-current lighting shortens the life of a valve designed for battery-current lighting, but it is conceivable that this might be so.

An alternating current starts from zero, rises to peak value, falls to zero, reverses its

direction, attains a peak value in a negative direction and then again returns to zero, and so on. The average heating effect can be adjusted to be the same as if a battery were applied to the same circuit as that through which the alternating current is supposed to act.

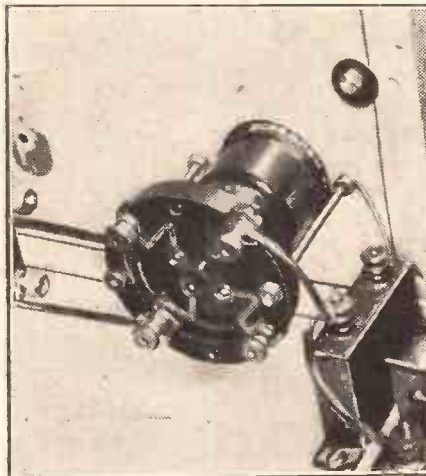
The peak current with alternating current, however, is necessarily greater than the steady current supplied by the battery, because the alternating current would at times be zero and at other times less than the battery current, so, in order to produce

currents would actually produce a momentary heating effect enough to disturb the stability of the filament structure, although the average heating was the same as with direct current.

This is rather a far-fetched idea because, in effect, the average temperature should remain constant.

I personally have used the type of valve you mention with alternating current with great success, and I have not so far noticed a great difference between the life of a valve used in this way and the life of the valve used with direct current. I think the effect, whatever it is, is not very important.

HERE'S A GOOD STUNT!



By means of the two lengths of threaded brass rod an ordinary valve holder is supported by the screen and holds the valve horizontally. The circuit leads are then beautifully short, the one rod acting as an earthing-point for the filament if desired. Note how the terminals are reversed.

the same heating effect, it must at times be greater than the battery current.

Filaments are usually coated with chemical substances, and depend for their action upon not disturbing this coating more than a certain amount by the heat of the current. It might be that the peak

Milliammeter Connections.

W. E. (Plymouth).—"The connection between the output valve and loudspeaker in my receiver is via the conventional choke condenser circuit. I intend inserting a milliammeter in the plate circuit of the output valve.

"Does it matter if the meter is connected between the choke and valve, or must it be on the H.T. battery side of the choke?"

It is much better style to connect your milliammeter on the H.T. side of the choke, but it really doesn't make a great deal of difference. The disadvantages of connecting the milliammeter between the choke and the anode are as follows:

- (1) The maximum voltage to earth at this point is greater than if the milliammeter is connected to the H.T. side of the choke, so the insulation of the instrument, particularly if the case is earthed, must be greater and there is a greater risk of breakdown.
- (2) The milliammeter might show considerable self-capacity to earth (it is unlikely that it does) and the top frequencies might thereby be cut off.

I personally would like to see the milliammeter at the H.T. end of the choke, particularly if the case is earthed, but if the case isn't earthed I don't think it would make the slightest difference one way or the other.

TECHNICAL ARTICLES BY CAPT. ECKERSLEY

are only to be found in The Big Three—"P.W.," "Modern Wireless," and "The Wireless Constructor"; and remember—he answers queries ONLY IN "POPULAR WIRELESS."

All READY RADIO KITS are TESTED and are READY for IMMEDIATE DESPATCH

Every Ready Radio Kit consists of chosen components exactly as used in the tested model and all components are tested and passed before despatch. Every constructor using a Ready Radio Kit is assured of being able to build a receiver identical in performance and appearance to the original model.

G.P. Kendall

THE "P.V." PLUS THE "P.V." STAR

	£	s.	d.
1 Ebonite panel, 18" x 7" x 3/16", drilled to specification	1	5	0
1 Polished oak cabinet, with baseboard 10" deep	1	11	0
2 Wavemaster .0005-mfd. extenser condensers with S.M. drive	1	10	0
1 ReadRad filament switch	2	6	0
1 ReadRad .00015-mfd. differential condenser	1	0	0
2 Four-pin valve holders	1	9	0
1 Junit horizontal valve holder	2	10	0
1 T.C.C. 1-mfd. fixed condenser, type 50 (non-inductive)	1	9	0
1 T.C.C. .01-mfd. fixed condenser, type 40	1	10	0
1 T.C.C. .001-mfd. fixed condenser, type 34	1	6	0
1 T.C.C. .0003-mfd. fixed condenser, type 34	4	0	0
2 ReadRad "Popular" H.F. chokes	1	4	0
1 Lewcos 600-ohm Spaghetti resistance	1	4	0
1 ReadRad 2-meg. grid leak and holder	6	9	0
1 R.I. Dux L.F. transformer	2	0	0
1 P.J.2. coil unit	2	6	0
1 P.J.3. coil unit	1	6	0
1 Terminal strip, 18" x 2" x 3/16", drilled to specification	1	6	0
1 Bulgin grid battery clip	2	0	0
1 Aluminium screen, 10" x 6"	5	0	0
2 ReadRad long wave quoit coils, ready wound	1	0	0
6 Belling-Lee wander plugs	3	0	0
1 Siemens 1½-volt grid coil, type G.T.	2	6	0
2 L.T. spade terminals	1	3	0
10 Belling-Lee indicating terminals, type "R"	2	6	0
1 Sovereign .001-mfd. compression condenser	1	3	0
1 Packet Jiflinx for wiring	2	6	0
3 Mullard valves to specification: P.M.12, P.M.1.H.L. and P.M.2A.	1	19	0
Flex. screws, crocodile clips, etc.	1	9	0
TOTAL (including valves and cabinet)	£7	9	6

RECOMMENDED ACCESSORIES

	£	s.	d.
1 Fuller 120-v. super-capacity H.T. Battery	15	3	0
1 Fuller 9-v. grid bias battery	1	0	0
1 Fuller type S.W.X.H.7. L.T. accumulator	10	3	0
1 Amplion A.B.4. loud speaker	2	10	0

If you do not need the complete Kit you can buy any of the parts you require separately.

	£	s.	d.
1 Ebonite Panel 10" x 8" x 3/16", drilled to specification	1	7	6
1 "Londor" Cabinet to specification, with baseboard as specified, including panel and baseboard supports	1	15	0
1 Wavemaster double .0005-mfd Extenser with thumb control	3	6	0
1 ReadRad .0005-mfd. "Brookmans" condenser	6	0	0
1 Lewcos H.F. choke	4	6	0
1 ReadRad H.F. choke	1	4	9
1 ReadRad 2-meg. Grid Leak & Holder	1	6	0
1 Lewcos 600-ohm Spaghetti resistance	5	6	0
1 Lewcos 25,000-ohm Spaghetti resistance	12	6	0
1 Lotus L.F. Transformer	1	6	0
1 R.I. Output choke, type G.P.	1	6	0
3 Four-pin Valve holders	1	9	0
1 T.C.C. .01-mfd. fixed condenser, type 40	1	6	0
1 T.C.C. .0003-mfd. fixed condenser, type 34	2	10	0
1 T.C.C. 1-mfd. fixed condenser, type 50	7	8	0
2 T.C.C. 2-mfd. fixed condensers, type 50	1	10	0
1 T.C.C. .001-mfd. fixed condenser, type 34	1	3	0
1 ReadRad Fuse and holder	2	0	0
1 P.J.2. Coil unit	2	6	0
1 P.J.3. Coil unit	5	0	0
2 ReadRad Long wave Quoit coils, ready wound	2	0	0
1 Aluminium Screen 13" x 8"	3	0	0
1 ReadRad Filament switch	3	0	0
2 Control discs	1	0	0
4 Belling-Lee Indicating terminals, type "R"	1	10	0
5 Wander Plugs	2	6	0
2 L.T. Spade terminals	1	0	0
1 Packet "Jiflinx" for wiring	2	6	0
2 Sovereign Terminal blocks	1	0	0
1 Siemens 1½-volt Grid Cell	1	0	0
2 Brackets as specified	1	19	0
3 Mullard Valves: P.M.12, P.M.1.H.L. PM.2A.	3	0	0
Fix. screws, crocodile clips, etc.	1	19	0
TOTAL (including valves and cabinet)	£9	5	0

RECOMMENDED ACCESSORIES

	£	s.	d.
2 Fuller 60-v. triple capacity H.T. batteries	1	3	0
1 Fuller 9-v. grid bias battery	1	0	0
1 Fuller 2-v. 40-amp. L.T. accumulator	12	9	0
1 Celestion D.10 loud speaker (oak)	3	0	0

See also pages 155 and 159.

IMMEDIATE DESPATCH ORDER FORM

To—READY RADIO, LTD.

159, Borough High Street, London Bridge, S.E.1

CASH ORDER Please despatch to me at once the goods specified for which I enclose payment in full of £.....

C.O.D. ORDER Please despatch to me at once the goods specified for which I will pay the sum of £.....

EASY PAYMENT ORDER Please despatch my Easy payment order for the goods specified for which I enclose first deposit of £.....

Name.....

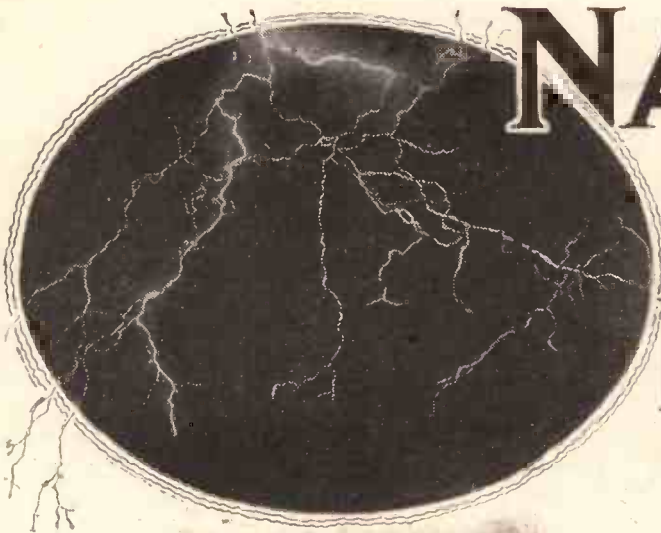
Address.....

Kit required.....

Ready Radio

159 BOROUGH HIGH STREET
LONDON BRIDGE S.E.1

Phone: Lee Green 5678
Grams: Readirad, Sedist.
Showrooms: Phone: Hop 3000.



NATURE'S RADIO NOISES

The sun may have denied us all but a very sparse show of its warming rays during the past summer, but, as Mr. G. H. Daly points out, it has been very actively contributing towards bigger and better ether disturbances!

IT is reported that atmospherics have been worse this year than ever before since wireless became popular. Yet, in spite of this, it is probable that there have been no more atmospherics actually created this year than there were last year or the year before. And the reason why we have heard more of them is, possibly because general conditions are more favourable for their reception than in the past.

The Sun Responsible!

Our old friend the sun is primarily to blame for this state of affairs. Owing to the increased activity of its surface the reflecting layers far above the earth's surface have received an unusually heavy bombardment from the sun, which has greatly improved the reflecting properties of the layers.

Consequently, reflection of wireless signals and incidentally their more powerful brothers, the atmospherics, has been better all round. And so we hear much stronger and a greater number of atmospherics than of yore.

But, because atmospherics are radiated by natural transmitters which are at least ten thousand times more powerful than man-made wireless transmitters, in addition to their being quite untuned, the atmospheric gets by far the best of the bargain, and the improvement is infinitely more noticeable in the case of the "X" than the wireless wave.

The majority of the atmospherics which we hear—if not all of them—come from lightning discharges, and it has been calculated that there are at least one hundred lightning flashes per second day and night throughout the whole world.

Lightning Flashes.

Each lightning flash may be anything up to a mile or more in length, and has a current somewhere in the vicinity of 10,000 amperes; and when we consider that a comparatively small wireless station with only a few amps. in the aerial can send signals round the earth several times, it is very surprising that we do not hear far more X's than is usually the case.

There may be other causes of atmospherics in addition to thunderstorms, and it is possible to a certain extent, by listening to X's on a directional aerial, to follow up the path of a depression

simply by noting the direction and strength of the atmospherics, so that changes in weather conditions other than lightning flashes may create atmospherics.

But, at the same time, there is little doubt that most of the X's we hear are created by lightning, whether the storm is taking place in England or Central Africa.

It seems likely, also, that they are born in the earth's lower atmosphere. Some may originate in outer space, but for the most part they are completely damped out, like the meteorites, by the earth's protecting layers of gas. Of course, some X's may get through under special and exceptional conditions, like the wireless echoes, but these will be few and far between.

Directional Aerials.

If a thunderstorm is raging some hundreds of miles to the northward of London, and we are listening to London from a point due west of that city by means of a directional aerial, then, owing to this

directional effect, we shall cut off a certain percentage of the X's coming in from the north.

Not a Complete Cure.

Unfortunately, a directional frame aerial reads equally well in the two opposite directions, and if a storm is raging over the Atlantic, then our directional aerial will not be of much use, for it will pick up the X's just as effectively as it will the wireless signals.

Directional aerials which will receive in one direction only have been evolved, and the greater development and use of these will, some day, help a great deal in overcoming the X nuisance.

Another partial cure with promise is the use of atmospheric-free wave-lengths for wireless work. Although it is hardly correct to speak of X's having any particular wave-length, their fundamental wave is somewhere in the vicinity of 600,000 metres, and if you wish to hear atmospherics at their brightest and best you must listen on enormously high wave-lengths.

The longest wave-length in use for wireless is about 30,000 metres, while most radio work is done below 2,000 metres, and it is because the fundamental wave-length of X's is so vastly different from the wave used for wireless work that we are not troubled by them so much as we might be.

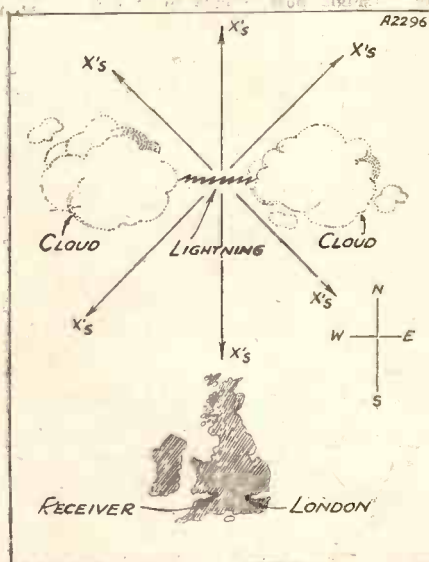
Consequently, the shorter the wave-length, the less we are going to be worried by X's.

If, then, we invent effective wireless systems which make use of waves of a few metres, centimetres or even millimetres in length, and there seems every reason to believe that such systems will presently be developed—then we shall be fairly free of atmospherics.

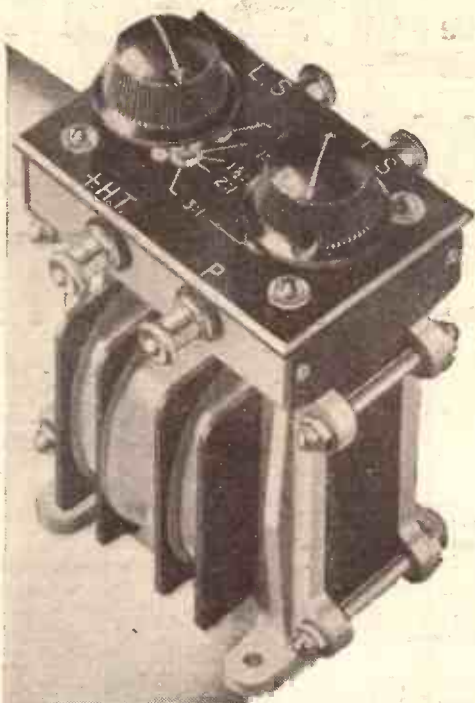
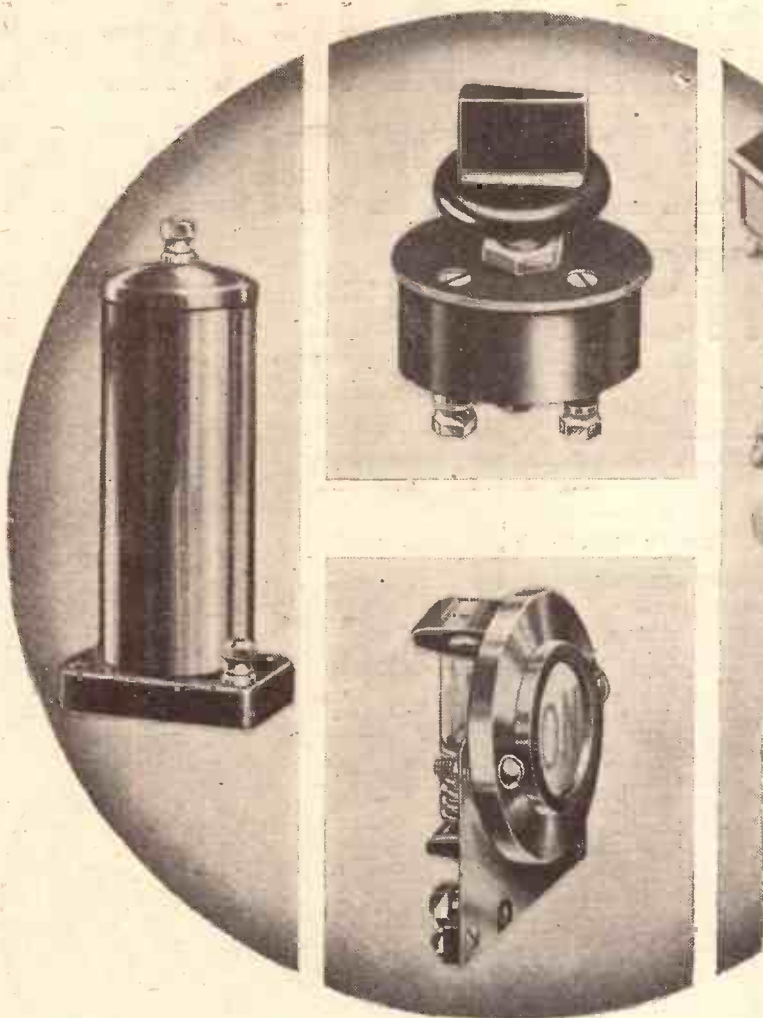
Short Waves Better.

The trouble here is that down on the ultra-short waves other troubles prevail, such as interference from magnetic storms and fading; yet no doubt these, too, will be overcome in time, and in tropical countries where wireless on ordinary waves is impossible owing to the terrific crash of atmospherics during the greater part of the twenty-four hours, it would seem that an atmospheric-free wave-length is about the only solution.

ONE-WAY "FRAMES"



It has been found that as "X's" have a definite place of origin, the development of frame aerials which will receive signals from only one direction may help to reduce the trouble.



READIRAD SUPER-HET H.F. CHOKE

Specially designed for use in the modern type of Super-Het circuits for excluding the intermediate frequency currents from the low frequency circuits. Should also be used wherever a Choke of extra high inductance is advisable. Price 5/6

READIRAD STANDARD H.F. CHOKE Price 4/6

READIRAD SNAP SWITCH

Almost instant action, the elimination of all noises and the instant suppression of arcing with exceptional positive and direct contact. Made in two types—"Radio-Gram" (single pole change over) and "On-Off." Price 2/9

READIRAD PANEL LIGHT

Shows the word "ON" in glowing red when the set is switched on. Adds a distinctive touch to the set and prevents battery wastage.

Two models; Battery Set, Mains Set - 2/3 each.

QUALITY
depends on
ACCURATE MATCHING
of valve and speaker

The most certain way of obtaining perfect matching between your output valve and loud-speaker is to use the INSTAMAT Output Transformer. The INSTAMAT is the only Output Transformer capable of giving you perfect quality instantly by the turn of a switch. Just connect between the output from your set and your loud-speaker, turn the switches until valve and speaker are accurately matched and you will be delighted with the improved quality. For perfect matching it is essential that the ratio change is instantaneous so that one tone can be compared with another. The Instamat is the **only** output transformer which gives you this rapid comparison.

INSTAMAT
OUTPUT TRANSFORMER
(Guaranteed for five years)

For all types, except low-resistance moving-coil speakers. Five different ratios all clearly marked.

Price 27/6

INSTAMAT MAJOR

For low resistance moving-coil speakers. Six ratios: 10 to 1 up to 25 to 1.

Price 37/6

Ready Radio

159 BOROUGH HIGH STREET
LONDON BRIDGE S.E.1

HEAD OFFICE AND WORKS
EASTNOR HOUSE · BLACKHEATH.
PHONE LEE GREEN 5678
(SHOWROOMS, PHONE HOP 3000 GRAMS: READIRAD, SEDIST)

BE
SURE
TO
VISIT
STAND
6
OLYMPIA

LEADERS IN THE NEW RANGE OF J.B. PRECISION INSTRUMENTS

J.B. ENCLOSED GANG. ('0005) Extremely rigid. - Totally enclosed. Units matched within 1% and fitted with '0001 "trimmers." Mounts on side or base. 2-gang, 20/- 3-gang, 29/6

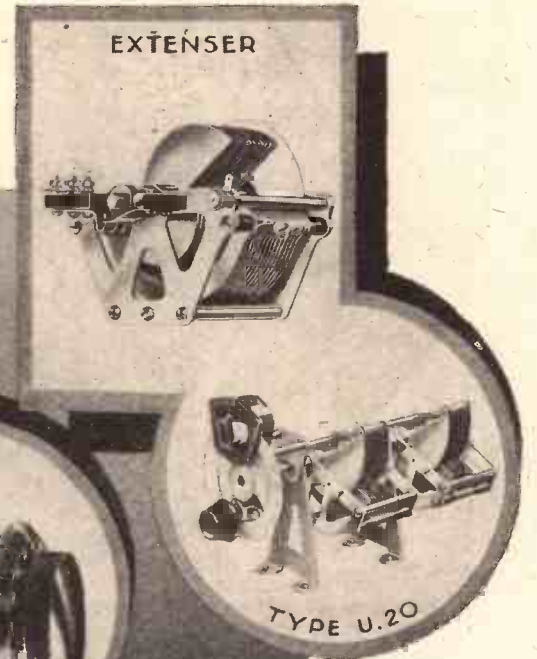
BASEBOARD DRUM DIAL. For use with above and all other ganged condensers. 4-inch Drum. Ratio 16:1. Oxidised silver or bronze panel plates. 7/6.

TYPE RM SCREENED 2-GANG CONDENSER ('0005) used in "Radio for the Million" V3 Kit Set. Complete with Disc Drive and Panel Plate 22/-.

POPULAR. Extra heavy gauge brass vanes. Nickel-plated frames. High grade ebonite insulation. Slow Motion Type (35/1) as illustrated, with 3-inch dial. 8/6. Plain Type, 6/- 4-inch Dial, 1/6 extra.

J.B. EXTENSER. Individually adjustable switch contacts. Rigid 4-point braced frame. Highly finished. Complete with illuminated Vernier Disc Drive. '0005 mfd. 14/6.

TYPE U20 2-GANG for use with "Square Peak" Coils. Complete with Illuminated Wavelength-calibrated Disc Drive. 24/-
Type U.30 3-Gang 34/6.



For J.B., years of specialisation have been years of progress. J.B. have gone on from success to success, making tuning still simpler and still more accurate.

J.B. design ensures electrical and mechanical perfection. J.B. precision results in unfailing accuracy and balance. J.B. workmanship and J.B. materials perfect a range of Precision Instruments scientifically designed by practical engineers.

New J.B. products not illustrated on this page include Air-spaced Differential Condensers at 4/3, Baseboard Trimming Condensers at 1/-, etc., etc.

See them all at

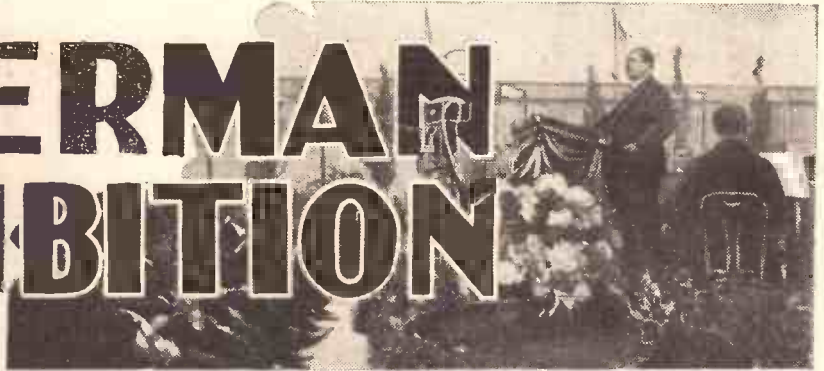
STAND 62
NATIONAL RADIO EXHIBITION, OLYMPIA.

PRECISION INSTRUMENTS



THE GERMAN EXHIBITION

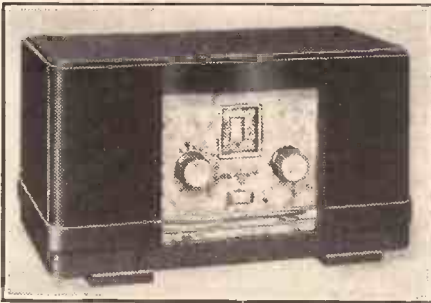
AS SEEN BY
"P.W.'S." REPRESENTATIVE



ALTHOUGH the average cost of wireless sets in Germany has previously been lower than we are accustomed to pay in England, the margin of difference seems to be disappearing, so far as one can judge from the prices ruling at the Berlin Exhibition.

In certain cases distinctly low levels were reached—for instance, there were a number of two-stage all-mains sets marketed at less than £5—but I may add that many of the sets deliberately designed to cut prices were of the "cheap and nasty" class, though there were some notable exceptions.

COMPLETE SCREENING



Safety in use and effective screening are ensured by housing this three-valver in an all-metal case.

As an English visitor I was naturally interested to see what progress the German manufacturers were making in super-het receivers. In this respect I must confess I was somewhat disappointed.

The models shown were by no means numerous and, although superior in design to the French, were not up to our own standard.

The Stassfurter Rundfunk Co.'s "Imperial Junior" was one exception. This is a six-valver, with a screened-grid amplifier coupled to a double-grid detector and oscillator. There are two stages of intermediate frequency amplification, followed by a second detector and pentode output.

An All-Mains Super-Het

It is designed for mains operation, and the chassis is marketed at £22 15s., complete with valves. A more expensive model fitted with moving-coil speaker costs just over £30; whilst a complete radio-gramophone instrument can be had for £48 inclusive.

The same firm market a standard four-valve set including a screened-grid amplifier, all-mains driven, at the very moderate price of £8 18s.

A second and concluding article concerning the great radio show at Berlin.

The outstanding feature of the "Imperial Junior" is the ganging system, in which four separate tuning condensers are linked to a single control. This appears to work admirably, and gives an exceptionally high degree of selectivity.

On the question of ganged control the Telefunken Company are also deserving of mention. In their T340 four-valve model three tuned circuits, including a screened-grid stage, are ganged with a series-parallel combination of aerial condensers to a single control. One interesting feature of this set is the use of "compression" condensers instead of the standard rotary type; another is the automatic provision made for loosening the aerial coupling to improve selectivity and to cut out local interference.

Making Inspection Easy

The combination of tuned circuits gives a band-filter effect. The low-frequency stages are resistance-coupled, and give a 600-fold amplification free from distortion.

A word of commendation must also be given for the admirable way in which the Telefunken circuits are presented for inspection. The exhibition models are housed in a glass cylinder mounted for rotation about a horizontal axis, so that the whole of the wiring can be clearly examined at leisure and in detail.

Another firm showing receivers of outstanding merit is Messrs. Siemens. Their type 35 model consists of a mains-driven screened-grid valve, coupled to a power amplifier.

Here, again, a feature is made of the aerial coupling and tuning-control which includes a combination of both variable condensers and variable inductances.

The aerial can be tapped at three different points to a basket-coil variometer, shunted by a tuning-condenser to form the input of the first valve. A similar variometer-

condenser combination is used for the intervalve coupling.

Reaction is controlled by means of a specially-shaped cam so that the set can never "spill-over" into oscillation. In all, there are no less than seven variable components, all ganged to the same control knob.

The tuning scale covers the complete wave-band from 200-2,000 metres, the controls being arranged so as to give a comparatively open scale between 300-400 metres, where the ether is most congested, and, again, between 1,000-1,600 metres, whilst the intervening markings on the scale are set relatively close together. The price of this ingenious set for A.C. mains operation is just under £11.

For Large Outputs

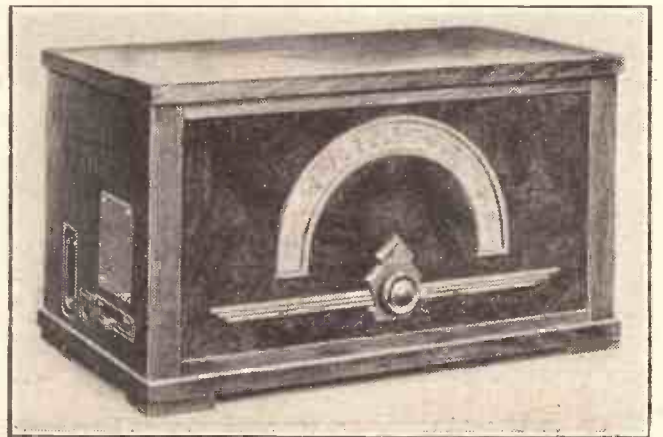
Another mains-operated set, comprising an S.G. stage, detector, first L.F. and two power valves in parallel, mounted on an all-steel chassis, is marketed by Messrs. Schaub at £17 5s. Od., complete with valves and moving-coil speaker. This is a distinctly attractive proposition at the price.

In the "Midget" class—a type which first originated in America, but which now appears to be coming into universal favour—mention must be made of the Loewe single-valver, designed for mains operation. The "single" valve really comprises three separate resistance-coupled stages, all mounted in the same glass bulb.

The tuning covers both medium and long-wave stations, and provision is made for plugging-in a gramophone pick-up.

(Continued on next page.)

ARRANGED FOR REALLY SIMPLE TUNING



This attractive receiver, with its giant illuminated scale and one-button control, is an example of Siemens' ingenuity.

THE GERMAN EXHIBITION

(Continued from previous page.)

The chief objection to the multi-stage type of valve is that it puts "all the eggs in one basket."

This objection is, however, offset to a large extent by the fact that the makers guarantee to replace any valve so damaged, either in operation or by a mishap, at the comparatively low charge of seven shillings.

Of course, since the different stages are all resistance-coupled inside the bulb, the circuits of a multi-stage valve cannot be very selective, since the whole of the tuning possible is confined to the input circuit. At the same time, the set is undoubtedly a neat and attractive proposition for loud-speaker operation from the local station.

A Two-Tube "Midget."

In another "Midget" model—marketed at £5—a back-coupled detector is transformer-coupled to a pentode output. The set is mains driven, covers both long- and medium-wave programmes, is moderately selective, and is by no means a bad bargain at the price mentioned.

Lorenz Radio are also marketing a neat two-valve mains-driven receiver with pentode output, completely enclosed in a metal case, at just under £5. Larger models with self-contained balanced-armature loud-speakers sell at £8 7s. 6d.

The same firm also have a neat six-valve super-het portable which costs £15 10s., including valves. The batteries run to a further £2 5s. A self-contained gramophone amplifier set with three valves comes out at £14.

The Eswe (Sachsenwerk) Co. have a particularly well-designed two-valver, including a screened-grid stage and pentode output, with valve rectifier for mains operation, which costs £4 15s. without valves.

On the still cheaper side the firm of

Roland Brandt offers a three-valve all-mains set, fitted with a change-over switch for long and medium working at an all-in figure of £4 19s. One could hardly expect much more for the money!

The price of valves appears to be somewhat lower in Germany than in this country, though here again the difference is not very marked. Ordinary three-electrode tubes for battery operation cost from 5s. to 10s. Indirectly-heated three-electrode tubes range from 14s. to 16s.

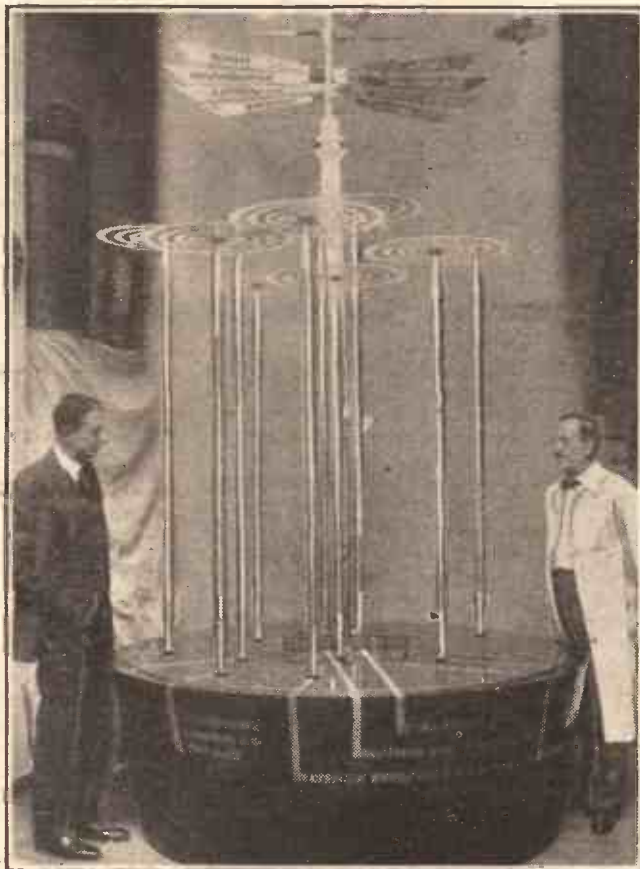
Mains-driven screened-grid amplifiers are to be had at prices varying between 12s. and 20s., according to their characteristics, whilst pentodes vary from 19s. to 22s.

Home-recording outfits for making permanent records either in person or from an existing gramophone record, or for "bottling" broadcast programmes, are another very interesting feature of the show.

Home Recording.

In the Siemens instrument the record is cut directly upon a permanent gelatine disc, so that it is ready for immediate reproduction; whilst in the Dralovid recorder the sound trace is first cut on a metal disc covered with a special wax covering, which is then sent to the makers to undergo a hardening process before it can be used for reproduction.

AN EXAMPLE OF GERMAN KULTUR



The cultural work that broadcasting is doing for Germany is symbolised in this typical work of art, where silver masts carry glass plates with concentric circles to represent the waves.

One of the cheapest recording sets is that marketed by the Allgemeine Electricitäts Gesell., at £5, or complete with microphone at £7 10s.

It gives tolerable reproduction, although, of course, it is not to be expected that a simple equipment of this sort can ever hope to compete with the elaborate apparatus used in producing the modern gramophone record.

Frey Radio exhibited a combined home-talkie and radio-gramophone under the name Pantophone. This instrument also incorporates an outfit for making gramophone records.

In the Luxury Class.

The radio-receiver side is a seven-valve super-het with moving-coil speaker, whilst the moving-picture projector is ingeniously mounted on a hinged panel which folds into the side of the cabinet when out of use. The entire outfit is expected to be retailed at about £80.

Another model de luxe consists of a standard automatic player-piano fitted with a radio receiver and moving-coil speaker, provision being made for switching-over to a gramophone pick-up. The record-disc is fitted with an electric motor.

The whole outfit is mains-driven, and represents a complete musical compendium.

Before leaving Berlin I was given an invitation to look over "Rundfunk Haus," the new home of German broadcasting, and the headquarters of the three principal companies operating the ether under the licence of the Reichspost.

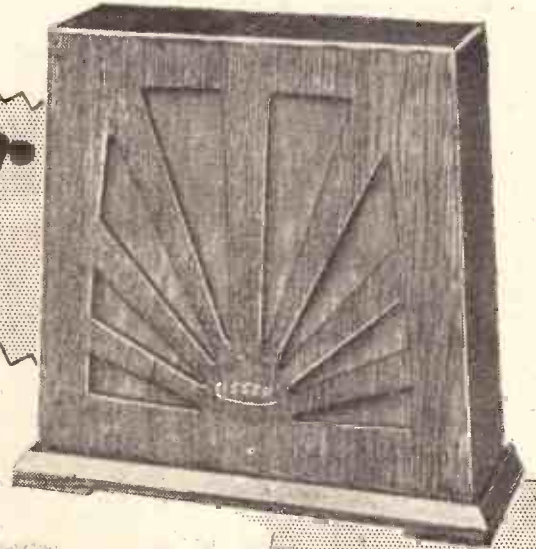
GETTING RADIO POWER FROM THE MAINS



Just as in this country there has been a demand for mains power, so in Germany the manufacturers have been concentrating on this aspect of simplified radio. This small mains unit is typical of those shown in Berlin.

Loudspeaker supremacy

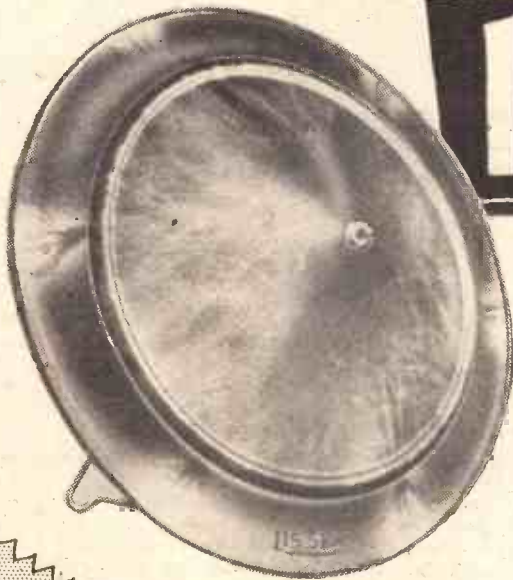
NEW LISSEN



CABINET CONE 22'6

No loudspeaker you have ever seen can challenge this new Lissen range for sheer value. See the new Lissen Cabinet Cone Loudspeaker above. That is a solid Oak Cabinet, naturally hand-polished to bring up the fine grain of the wood—distinctively simple in design, beautifully finished. In tone this speaker compares with anything you have ever heard—bass deep but not predominant, upper register brilliant, voice soft and natural, volume anything from a whisper to a great degree of loudness according to your set.

Lissen look forward to demonstration of this speaker alongside the season's greatest efforts, no matter what their price, because this new Lissen Cabinet Cone simply challenges comparison.



13'6

SPLENDID NEW LISSEN PLAQUE

For those who like the plaque design, here is a very handsome loudspeaker to stand on a table or hang on the picture rail. It incorporates the same unit and the same construction as the Cabinet described above, and at the price is outstanding value.

With Metal Frame, price 13/6.

In Black Moulded Bakelite, finished silver, price 15/-.

Do not buy until you are satisfied you have heard a fair test of these new Lissen speakers. They will do justice to the finest set you can buy or build, and you will never want to pay more for any cone speaker.

*Ask your
dealer to
demonstrate*

A SHORT-WAVE — SIGNPOST —

by J. ENGLISH



WHEN you are testing for the first time a new short-wave receiver, or experimenting with a fresh circuit or layout, much time is often taken up in searching for signals before you can make your adjustments for maximum efficiency.

Especially is this so when the wave-range of your tuning condenser and coils is an unknown quantity or when some little fault results in only a whisper of a signal being heard.

A "Wee" Transmitter.

At times like this it would be extremely useful to have on tap an artificial short-wave station of known wave-length, putting out a powerful and continuous signal of constant strength, from which you could adjust the short-wave set and circuit details for maximum sensitivity. This would also make it easier to track down any faults and to get the receiver working at full efficiency in a much shorter time.

Some time ago I made up for myself a small unit for producing an artificial short-wave signal of this nature in connection with some special experimental work. Both for this and subsequent short-wave experiments, this little device proved extremely useful, and is now a permanent addition to other testing apparatus.

As a unit of this nature is both inexpensive and simple to make and operate, with distinctly intriguing experimental possibilities, doubtless many of you would like to have further details.

Few Parts Required,

All we require for a miniature transmitter is a short-wave oscillator, which can be tuned to any desired wave-length, giving, in the receiver on test, a strong or weak signal continuing as long as desired.

The oscillator is a simple one-valve affair, working on small batteries, and requiring but few components, which in many cases can be obtained from your stock of spare parts. Normally it radiates an unmodulated carrier which is only audible when the receiver on test is oscillating. With very little extra trouble a modulated wave can be obtained, making the oscillator just like a real short-wave broadcaster on your doorstep, as it were.

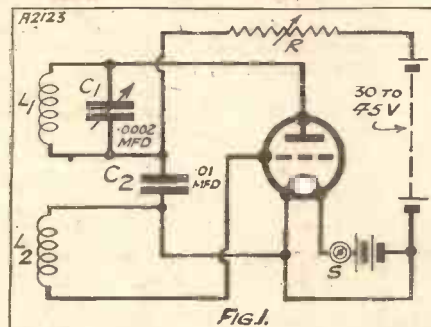
This signpost points the way to making a dinky little short-wave "station" of your own, which will tick like a clock or put out a miniature radio or record programme that will prove invaluable for testing! You ought to read all about it.

What is even more interesting is the practicability of arranging this short-wave oscillator as a "repeater" to radiate the programmes of any higher wave-length station, such as your local transmitter.

Taking, first of all, the circuit of Fig. 1 as the basis of the oscillator, you will notice that only the anode coil L_1 is tuned. This reversal of the usual order of things is necessary here as it provides the largest H.F. output.

The resistance R is also an important feature ensuring a steady output over the

MADE IN A "JIFFY"



The circuit is so simple that you'll knock it together in next to no time!

whole tuning range. If the oscillator is to be a permanent affair, it pays to make R a variable component, with a maximum resistance of ten or twenty thousand ohms. This resistance then gives full control of the oscillator's output, as well as serving an additional purpose when modulation is used, as will be seen later.

The values of the few necessary compo-

nents are indicated in Fig. 1. For the inductances L_1 and L_2 you can use ordinary short-wave plug-in coils, or the two coils can be wound on a 2-in. former, both windings being in the same direction. Full details of windings and coil sizes to cover a useful range of wave-lengths are set out in Fig. 2.

Some care is necessary in the choice of the oscillator valve. This should be a low-impedance type of high magnification factor, such as the Mazda L210, which I have found very satisfactory. You may find other valves of this class equally good or you can try a small power valve.

Low Voltage H.T.

The low H.T. voltage of 30 or 45 volts can be provided by quite a small battery, with a small 2-volt accumulator, or even a dry cell and rheostat for L.T. supply. If you choose to obtain the oscillator's anode current from a low-voltage tapping of your mains unit then it may happen that sufficient A.C. ripple gets through to modulate slightly the radiation, which is all to the good. It is also possible to get a signal with a strong A.C. hum by using an ordinary 4-volt L.T. secondary of the power transformer on your A.C. mains unit.

Construction of this testing unit is so simple that it is unnecessary to give further details. There are certain points about its operation, however, which require some explanation.

By far the easiest way of finding out whether the oscillator is working properly is to insert a milliammeter in the H.T. + lead. This should read some 2 to 4 milliamps, according to the type of valve, when the valve is oscillating. This will drop to 1 milliamp or so when you touch the anode terminal. Adjustment of R may be necessary here, too little resistance resulting in excessive anode current.

Steady Output.

When the tuning condenser is rotated from zero to maximum the meter should indicate little variation in anode current, showing that the strength of oscillation is more or less independent of tuning, a necessary feature for testing work.

The oscillator, when working correctly, develops a sufficiently strong field to give

(Continued on page 166.)



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155 CHARING CROSS RD., LONDON, W.C.2

A SHORT-WAVE SIGNPOST

(Continued from page 164)

you a loud signal in a nearby short-wave receiver without the necessity of any close coupling between the two. The unit is just placed on the test bench some three or four feet from the receiver under test. Incidentally the absence of a direct coupling makes the unit easier to use.

Now suppose that you have just completed a new short-wave receiver which you want to try out. Instead of wasting time searching for real signals, just switch on the oscillator and vary its tuning condenser until you hear a whistle on your receiver. The latter should be tuned somewhere on the same wave-band and reaction adjusted to produce oscillation.

A Wave-meter as Well!

This is where previous calibration of the oscillator tuning proves very useful, because you can find out very quickly the exact wave-range of the coils of your receiver. This is done by noting the oscillator tuning, and corresponding wavelength, required to give a whistle at top and bottom positions of the condenser dial of the receiver.

When making your adjustments to the receiver for maximum efficiency and in major details of operation, the oscillator tuning is set at some convenient wavelength and the receiver tuned to pick up the carrier. It is then an easy matter to make adjustments for getting the smoothest control of reaction and to trace any minor defects until you get a stronger whistle.

FROM 15 TO 80 METRES

APPROX WAVE-RANGE IN METRES	L ₁		L ₂	
	TURNS	PLUG-IN COIL	TURNS	PLUG-IN COIL
15 TO 26	2½	Nº2	3	Nº3
25 TO 50	4½	Nº4	5	Nº4 OR 5
50 TO 80	8	Nº6	9	Nº6 OR 8

H2124

FIG. 2.

Here is an extremely useful table showing the ranges covered by different coils.

It also helps if the oscillator's radiation is then considerably reduced, as it is easier to make comparisons of signal strength on a weak signal.

It is quite likely that after a time, you may find the whistle signal rather distracting, in which case a change-over to a modulated radiation is a relief. The circuit of Fig. 1 is a particularly good one for effecting this in a very simple manner.

Not the B.B.C.'s Method!

Before giving further details of this conversion I should like to tell you of a rather Heath Robinson idea which I have found quite effective for producing a modulated

carrier. This is to dismount the oscillator's tuning condenser and secure it to a loud-ticking alarm clock!

If the condenser is not too rigidly constructed the vibrations of the clock mechanism are transmitted to the condenser's moving vanes which, vibrating in sympathy, modulate quite strongly the H.F. oscillations in L₁, C₁. Consequently you can tune in on your receiver easily audible sounds of the works of the clock ticking-over!

This idea is surprisingly effective in spite of its ludicrous simplicity, and demonstrates the remarkable sensitivity of an oscillatory circuit to minute changes in the tuning capacity. In this case, of course, we are actually getting frequency modulation.

The Better Way.

Now for the more orthodox method of amplitude modulation of the oscillator's radiation. This is simply a matter of inserting the secondary of an L.F. transformer, shunted by a small capacity, in the grid return lead of L₂, as in Fig. 3.

The oscillator continues to radiate an unmodulated wave as before, but if you pass through the transformer primary an L.F. current, such as that obtainable from a microphone or pick-up, modulation of the carrier takes place. Consequently you are able to obtain an excellent reproduction of the record, etc., from your short-wave receiver. In spite of the several transformations which the sounds undergo, the reproduction is not perceptibly distorted.

Always "On Tap."

Now what about feeding the output of your broadcast receiver into the oscillator; does this work? Undoubtedly, it works really well. As a large input is not required, you can feed the oscillator direct from the detector of the broadcast receiver.

If the detector is coupled here by a transformer then the secondary of the latter can be connected straight across the shunt condenser C₃, thus dispensing with a separate transformer in the oscillator itself. Incidentally, tapping the detector in this way will not appreciably affect the reproduction of the broadcast programme for other listeners.

You now have a compact little short-wave transmitter and repeater providing a loud, steady, and sharply-tuned signal for testing purposes. In addition, you also have opportunities for some very interesting experiments in re-broadcasting, confined, of course, to your testing-room. What will also come as a surprise is the good quality of reproduction and the ease with which you can place a strong short-wave "station" on any desired wave-length.

Easy to Work.

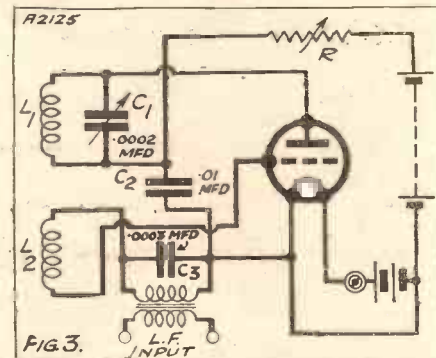
As regards operation, the modulated oscillator is set-up and adjusted as already described. The depth of modulation and consequent volume of the received signal is increased by increasing the resistance R up to a certain point where distortion begins. Beyond this point you get excessive modulation, and some very funny noises indeed through your short-wave set. Adjustment of modulation, however, has no effect on the tuning of the oscillator.

For the most realistic reproduction, a little negative bias on the oscillator grid is necessary, say a 1½-volt cell in series with

the transformer secondary. The resistance of R is then adjusted to a lower value to compensate for the drop in anode current.

In conclusion, I may perhaps be permitted to add a few words about calibrating the oscillator. This is carried out in exactly the same way for either oscillator, although the unmodulated type ensures the highest degree of accuracy. In the case of Fig. 3, merely leave the primary of the transformer unconnected. Also for permanence of calibration it is essential to use rigidly constructed coils and tuning condensers in the oscillator itself.

MAKING MODULATIONS



By adding an intervalve transformer, as shown, you can feed L.F. into the "signpost."

To commence calibration, you tune in on your normal short-wave receiver a station of known wave-length. The oscillator tuning is then varied until you get a whistle right on top of the station, due to the wave radiated by the oscillator heterodyning the station's carrier-wave. Then tune the oscillator to the silent point, when its dial reading will correspond to the wave-length of the station originally tuned-in.

Repeat the process for other stations of known wave-length until you have sufficient readings to plot the tuning curve of the oscillator. The scientific value of the latter will then be considerably enhanced.

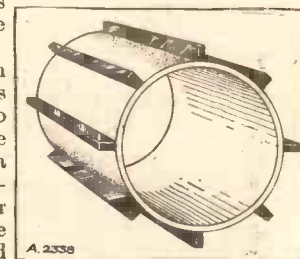
THOSE "TICKLISH" RIBS!

HERE is a simple way of constructing a ribbed former. First obtain an ordinary cardboard former of the required size, then saw eight strips of ebonite to the right length and fix them to the former as shown in the sketch.

To obtain the positions in which to place these strips, pass a piece of card-ridge paper round the former and so obtain the dimensions of the circumference.

Unwind the paper and lay it down flat, and divide the points obtained into eight divisions.

This piece of paper can now be placed on the former while fixing the positions of the ebonite. Unless a square is available it is better to use two such lengths of paper, one at each end.



A 2338

You might think it a ticklish job to fix ribs to a former—but it isn't really, as you will soon see.

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is being shown and demonstrated for the first time the wonderful **S. G. BROWN BATTERY — SUPERSEDER — an entirely new invention** which does away once and for all with the trouble and expense of H.T. Batteries.

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Yours faithfully

S. G. Brown

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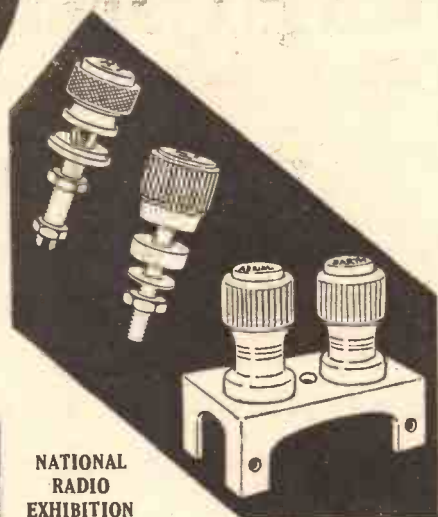
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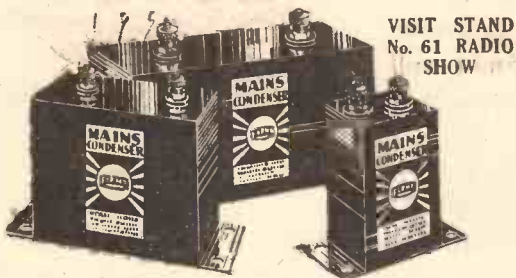


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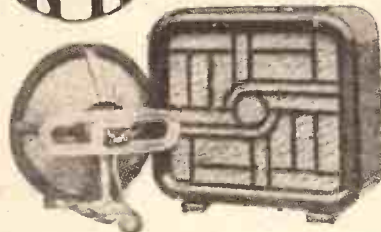
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CORRESPONDENCE

**TELEVISION—SELECTIVITY—
THE VALVE AS A COIL-
HOLDER.**

TELEVISION.

The Editor, POPULAR WIRELESS.

Dear Sir,—As a regular reader of your journal, I was naturally interested to notice in your issue, dated September 5th, an article entitled "Six Foot Television Pictures." Unfortunately, one of the main points stressed was misleading, and for the information of your readers and also of the author of the article, I feel it only right to take this opportunity of pointing out that the method of scanning in overlapping bands by means of a disc having three series of apertures in spiral arc formation was used by Mr. John Logie Baird, the English inventor, some time ago and a description of the system is contained in the specification of British Letters Patent No. 321,389. If this provisional specification is referred to you will note that it concludes with the following passage.

"To obtain better definition, the three sets of holes corresponding to red, green and blue may be arranged so that each set slightly overlaps each of the other sets. By this means instead of having an image composed of, say, thirty lines explored three times for each complete coloured image, owing to each of the thirty lines being moved, say, one-third of the diameter of an aperture relatively to the preceding set of holes, the effect is obtained of having three different views of the object and the equivalent of finer grain is thus obtained, and without loss of brilliance. This method may also be used without colour."

It will be appreciated that this statement covers the most important advances in the art which are alleged by the author of the article in question to be due to Mr. Sanabria.

In this connection also, it is interesting to note that Mr. J. L. Baird's Patent quoted above antedates both the application date and the issue of U.S. Patent No. 1,805,848 to U. A. Sanabria, the claims of which are directed to cover the use of a disc of the type used by Mr. Baird.

The earliest demonstration of television apparatus of this nature was given in the laboratories of Baird Television Ltd., in June, 1928, and these remarks can be substantiated quite easily if you refer to press cuttings of that date.

I trust that you will take an early opportunity of publishing this letter so as to correct any erroneous impression that may be in the minds of your readers through reading the article in question.

Yours faithfully,

H. J. BARTON CHAPPEL.

[NOTE BY THE EDITOR.—We are glad to give space to Mr. Barton Chapple's letter as an expression of a viewpoint of interest to television enthusiasts, and also in fairness to Mr. Baird. But it is not, of course, possible or even within our province to determine the question of priority which appears to be at issue.]

SELECTIVITY.

The Editor, POPULAR WIRELESS.

Dear Sir,—In these days, when the condition of the ether demands far sharper selectivity than was required only 12 months ago, in order to secure reasonably satisfactory separation of stations, and when the reasons by which this end may be attained are the subject continually of articles in the technical and other press, it is interesting to observe that, notwithstanding the various advances made in the knowledge of methods by which selectivity may be secured, it is, in the writer's view, obtained in the large majority of commercial sets available at the present day, merely by the expedient of the use of a speaker that does not reproduce the upper register.

The sets may be fitted with all sorts of elaborate tuning arrangements, but one has only to observe the effect on their selectivity of the use of a good moving-coil speaker reproducing up to, say, 8,000 cycles, or over.

This seems to throw a rather interesting sidelight on the question of selectivity and quality, and will doubtless be of interest to your readers.

Yours faithfully,

F. BAGGS.

New Moston, Manchester.

THE VALVE AS COIL HOLDER.

Dear Sir,—I notice with interest the idea of your correspondent, Mr. Arthur Broadhurst, in a recent issue, and as he is of the opinion that the scheme is new it may surprise your readers to learn that an identical plan was described and demonstrated to the Radio Society of Great Britain when

I was present some [eleven or twelve years ago. The purpose in view was not the saving of space, but it was claimed that a coil of wire around a valve would, by virtue of the field set up, increase the signal strength.

Unfortunately, I have lost the proceedings of the meeting and do not remember the circuit connections, but maybe this will catch the eye of another that was present who can supply the necessary data.

Yours faithfully,
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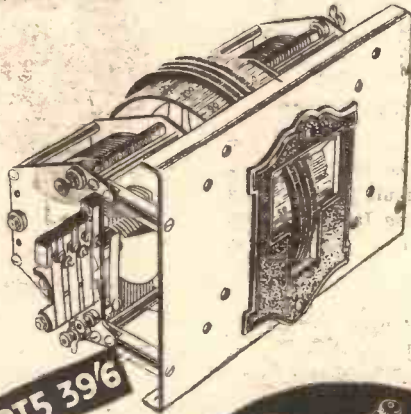
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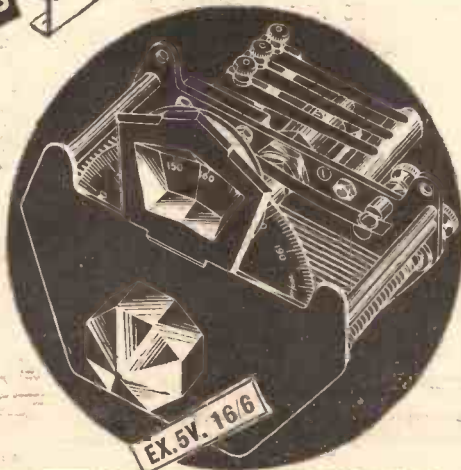
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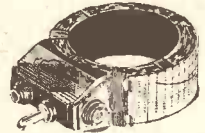
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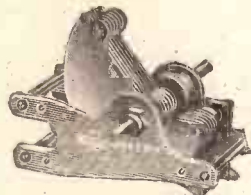
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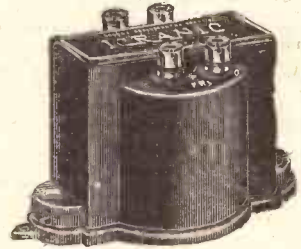
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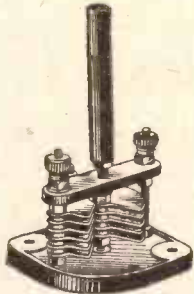
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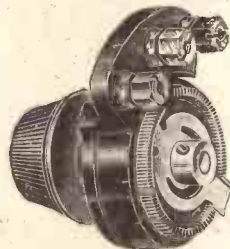
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Ratios 6-1 and 3-1.
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IGRANIC MICRO CONDENSER

Price .. 3/6



IGRANIC MEGOSTAT

Price .. 5/-



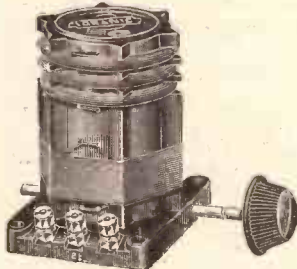
IGRANIC JACKS

Single Open Jack Price 1/9
Single Closed Jack .. 2/-
Double-Circuit Jack .. 2/3
Three-Spring Jack .. 2/3
Five-Spring Jack .. 2/9



IGRANIC INDI-GRAPH VERNIER KNOB & DIAL

Price .. 5/-



IGRANIC DUAL-WAVE COIL WITH SWITCH

Types A, S.G. and H.F.
Price .. 10/6 each



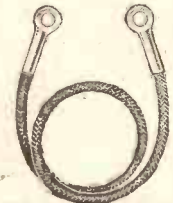
IGRANIC "PARVO" TRANSFORMER

Anefficient, compact, parallel-feed transformer.
Price 7/6



IGRANIC "ACME" L.F. TRANSFORMER

A super transformer, made in two ratios, 6 to 1 and 3 to 1.
Price .. 21/-



IGRANIC RESISTANCES

600 to 100,000 ohms
Prices 6d. to 1/6



The above are only a selection from the IGRANIC Programme.
Write to Dept. No. R.179 for our complete catalogue.



A VOLTMETER FOR MAINS UNITS

By F. BRIGGS.

THERE must be some thousands of mains units in use at the present time. In fact, I think it can safely be said that there are hundreds of thousands of these extremely useful accessories doing duty all over the country.

What means have the owners for measuring their output voltages? None whatever unless they buy an expensive high-resistance voltmeter.

As most of you realise an ordinary voltmeter is useless for the job. As a rule, the cheaper editions have a resistance of some 5,000 ohms, or about 50 ohms a volt. According to Ohm's Law this means that for a full scale deflection of 100 volts they will consume a current of about 20 milliamperes.

Internal Resistance Counts.

Whereas this will be all right for measuring the voltage of a high-tension battery it is more than useless on a small mains unit. A dry battery has a fairly low internal resistance, and if it is called upon to give an extra 20 milliamperes for a few seconds it will not object a great deal, although it will have a serious effect upon its life if it were kept on for long.

A mains unit, on the other hand, is quite a different proposition. It has a high internal resistance, and at large output currents the voltage may fall away hopelessly. The result is that if your unit is connected to

a receiver which is drawing, say 10 milliamperes, and you put your "low" resistance voltmeter across the output terminals, the extra load will make the voltage drop right away to a very low value.

Although the voltmeter will give the correct reading for the extra load, as soon as the meter is removed the voltage will rise considerably. Thus, a "low" resistance voltmeter gives results which are absolutely useless.

Using a Milliammeter.

What we require, then, is an instrument which only takes a very small current for a full scale deflection, or, more correctly speaking, one with a very high resistance. Something in the neighbourhood of 1,000 ohms a volt.

Such instruments are rather expensive to buy, so I am going to tell you a way in which you can make one out of a milliammeter. This is written, by the way, specially for those readers who have such a meter in their possession. It should be one reading from 0-2, or 0-5 milliamperes.

Ohm's Law tells us that the resistance in a circuit is equal to the current divided into the voltage. So if we want our milliammeter to read in hundreds of volts instead of single milliamperes, we say that the current is to be one milliampere when the voltage is 100. If this is worked out according to Ohm's Law, the result is 100,000 ohms.

Therefore, if we want every milliampere division on the voltmeter to represent 100 volts, we must insert such a resistance in series with it. Thus, with 100,000 ohms in series a 0-2 milliammeter would read from

0-200 volts, and the other one from 0-500 volts—two very useful ranges. What is more, they would only consume 1 milliampere for every 100 volts.

From the above you will readily see that such an instrument is ideal for measuring the output voltages of mains units. It is, of course, essential that the resistance should be accurate. Luckily there are a number of progressive firms who, for a small extra charge will guarantee the value of their resistances, so you should have no difficulty on that score.

By using different values it is possible to make the instrument read over various ranges. For instance, with a 1,000-ohm resistance in series, every milliampere will represent one volt. With this arrangement the 0-5 meter will prove a very handy voltmeter for measuring the pressure in low-tension circuits.

Useful Multi-range Instrument.

If you do not happen to have one of these milliammeters, it may be worth your while to buy one instead of an ordinary high-resistance voltmeter. You will then have a very useful instrument which, with the assistance of a few accurate resistances, will enable you to cover all the useful ranges.

F.B.

NEXT WEEK

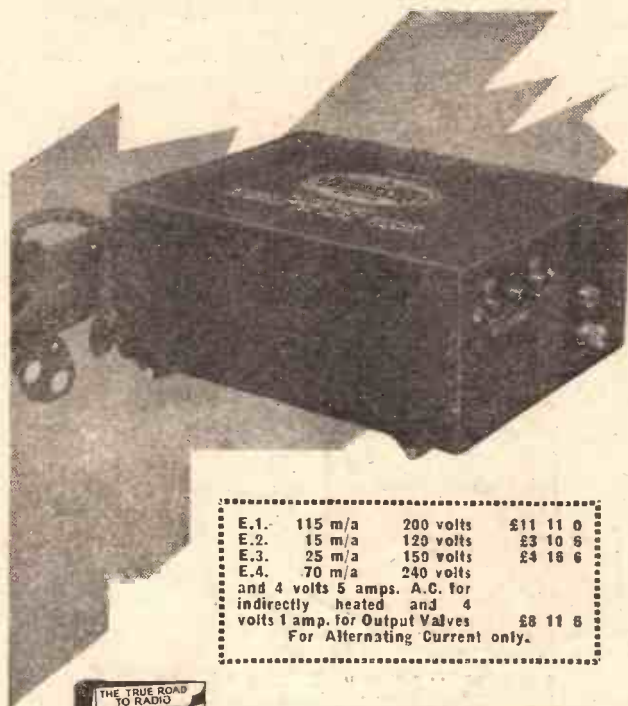
Details will be given in

POPULAR WIRELESS

of

THE "POP-VOX" FOUR

A receiver you must not miss!



E.1.	115 m/a	200 volts	£11 11 0
E.2.	15 m/a	120 volts	£3 10 6
E.3.	25 m/a	150 volts	£4 18 6
E.4.	70 m/a	240 volts	
and 4 volts 5 amps. A.C. for indirectly heated and 4 volts 1 amp. for Output Valves For Alternating Current only.			
			£8 11 8

NEW FERRANTI H.T. SUPPLY UNITS

Simplify the H.T. problem and ensure an adequate and constant supply of smooth and silent power for all types of Sets from the small 2-valver taking 15 m/a at 20 volts to the big 4-stage Push-Pull Receiver taking anything up to 120 m/a at 240.

NOW IS THE TIME to overhaul your Radio.

Dispense with batteries that deteriorate and impair reproduction, or accumulators that need frequent attention and ultimate replacement.

Let a FERRANTI UNIT provide from the mains adequate power at a trifling cost; power that never runs down and never shirks its job of driving your set without trouble or fuss. Built by Engineers to last—not for weeks or months, but for years.

MAKE UP YOUR MIND to have better Radio now and get a Ferranti unit to suit your set. If in doubt as to the most suitable unit, write to Hollinwood for advice.

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ELECTRICAL & RADIO ENGINEERS

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Aldwych, W.C.2.



Dx 39

40

RADIO TIMES

THURSDAY

DAVENTRY

193 kc/s (1.554.4 m.)

PROGRAMME

Foundations of Music

Get the best out of
this week's programmes
Get a Drydex

10.15 a.m. THE DAILY

10.30 TIME SIGNAL, CRF
Forecast

10.45-11.0 THE CHILD
IN SUMMER
Mrs. FRY

12.0 REGINA
AT THE ORGAN

Time Signal

1.0 A Concert
ALEC FEUERMAN'S QUINTET

- Selection, Three Musketeers Friml
- Birthday Serenade Lincke
- En La Alhambra (Serenata)..... Breton
- Fairy Pipers..... Brewer
- Mozart Selection..... Urbach
- Waltz, Moonlight on the Alster .. Petras
- Don Juan (Serenade)..... Tchaikovsky

2.0-2.30 Gramophone Records

5.0 EVENSON

From W

5.30

Makers of the world famous Exide offer greatest dry battery value

Obtainable everywhere from all good dealers in sizes and types to suit every wireless set. Also for torches, pocket lamps, cycle lamps and battery

Exide Batteries, Clifton Junction, near Manchester. Branches at London, Manchester, Birmingham, Bristol, Glasgow, Dublin and Belfast



Hillers, Dr
Green Guards, Dr
VINE, ERNEST DA
BELLENDEN POWI
A. BRANDON CR
A. NORMAN SHELL
WALTER SCHOFF
GROOME

Time Signal, Greenwich

The Second
WEATHER FORECAST, S
NEWS BULLETIN

9.15 Shipping Forecast &
Market Report

9.20 IDLE THO
Lady DIANA

9.35 GERSHOM P
and his SAXOPHC
And, if possible,
THE LONDON

10.30-12.0 DANC
LILLY MASON and
BAND, from the

- HUBERT LESLIE
- ALGAN BLAKELOCK
- IVAN SAMSON
- BREMER WILLS
- FREDERICK W. LLOYD
- ANDREW LEICH
- WALTER HUDD
- J. SEBASTIAN SMITH
- WILFRID GRANTHAM
- Pally
- Ravenswaters, Green

AT 7.30

FOR FILING PANELS

A Useful Tip For The Home Constructor.
By A. V. D. H.

WORK which is to be filed must always be securely held, in order to allow the file to function efficiently. This is especially important when a comparatively soft material like ebonite is filed, as otherwise scratches and dents will easily be made, which will impair the final finish of the job. It sometimes happens that it is necessary to trim up the edges of an ebonite panel with a file.

It Gets a Grip On.

Gripping one edge of the panel in the vice while the edge parallel to it is being filed is rarely satisfactory if the panel is of anything but the smallest size. The free edge is some inches above the point of support, so that the whole panel bends when any pressure is applied to the file, and the latter "screeches" at work—a sure indication of too much vibration.

The best thing to do is to discard the vice altogether for such work, and to fit up a temporary clamp on the bench. This device is illustrated in the accompanying photograph, a strip of wood a few inches longer than the panel is attached to the edge of the bench with a couple of long screws. A block is attached below, to support the lower edge of the panel.

The top strip should be thick enough not

to bend when it is screwed down hard against the panel, while the bottom support should be so placed that the edge of the panel projects just above the bench. This clamp is also most useful for holding long, thin strips of ebonite, when the lower support can usually be omitted, or for gripping wood panels and strips in order to plane up the edges.

A TEMPORARY CLAMP



The handy holder described above.

SHORT REMINDERS

Condensers—Distortion—Grid Bias.

Always try to get really reliable condensers because in many instances the main purpose

of these is to safeguard some other component such as a valve or loudspeaker.

A milliammeter in the plate circuit of the last valve provides an excellent check on distortion.

Generally if a loud passage causes the milliammeter needle to kick up to a higher reading the grid-bias on the last valve is too high.

SCOTTISH REGIONAL PLANS

IN a talk on "Coming Scottish Programmes," broadcast on September 9th, the Scottish Regional Director, Mr. Cleghorn Thomson, stated: "Before I talk to you again next year our new transmitter at Falkirk which hopes to reach out to more outlying districts than our present stations can attain will be completed."

"Until the establishment of this transmitter we will be passing through a transitional period in which we must ask our listeners to await the eventual fructifications of our plans.

Hearing in the Highlands.

"With regard to the problems of reception in the Highlands, and Galloway and the Borders, I can do no more than assure those who are concerned on this

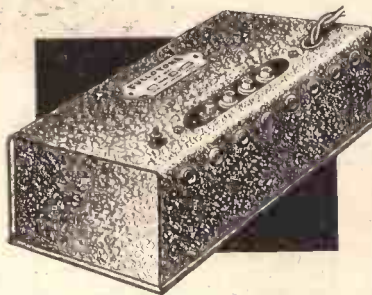
(Continued on page 176.)

Run YOUR Set off the MAINS!

ABOLISHES BATTERIES

NO ALTERATION TO YOUR CIRCUIT

SAVE AT LEAST 43/- A YEAR



Fit a Fullotone Eliminator to your set and you will marvel at the improvement in reception and low running costs. Just plug it into wall plug or lamp socket and connect to your set as you would an H.T. Battery; no tiresome connections, no more expensive batteries! Owing to our policy of dealing direct with the public, which saves all middlemen's big profits, we are able to offer a complete range of A.C. and D.C. models at prices much below the usual. Other A.C. models and Trickle Chargers at distinctly moderate prices.

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Phone: Gulliver 1017. Also Branches at:
CROYDON—41, George St. EAST HAM—149, High St. TOTTENHAM—561, High Rd. LIVERPOOL—13, Paradise St. MANCHESTER—85, Oxford Rd. BOLTON—47, Bradshawgate. HULL—Monument Bridge. GLASGOW—312, Argyle St.

FULLOTONE MAINS UNITS

Model D.C.15/30. Voltage Tappings: Screened grid 50/80. Detector 50/80. and Power 100/150. Output 15 M.A.

30/6

or 8/1 monthly for 4 months.

Model A.C.15. Voltage Tappings: Screened grid 50/80. Detector 50/80. and Power 100/150. Output 15 M.A.

42/-

or 6/- monthly for 8 months.

ALL applications for Advertising Space in

"POPULAR WIRELESS"
"MODERN WIRELESS"
and
"WIRELESS CONSTRUCTOR"

must be made to the Sole Advertising Agents,

JOHN H. LILE, Ltd., 4, Ludgate Circus, London, E.C.4.

Phone: City 7261.

AN ADVERTISER'S CORRECTION.

In the Graham Farish Advertisement in "P.W." Sept. 19th, there was an error in the description of the Type F.G.F. Pre-set condenser. This should have read '00005 to '0001 mfd. and not '00005 to '0001 as printed.

C. S. DEXTER, Barton, BEDS., Offers Complete Kits at Reasonable Prices. R. or M.V.3 Kit at 25/17s. 6d., including Mullard Valves and Specified Parts; A.C. Pop-Vox Kit, £10; Super-Quad Kit, £11. Send P.C. for detailed Specifications and Prices for any Kit. Also particulars of Free Gift Offer.

JUST TO REMIND YOU NOT TO FORGET TO

JOIN THE ELECTROCET CLUB

Write for full particulars. Simply put your name and address in the margin, and post in j.d. envelope to:—

THE ELECTROCET CLUB, SOLIHULL, BIRMINGHAM

ADVERTISERS PLEASE NOTE!

The Rate for a one-inch single Column Advertisement is 30/-

Minimum Space Accepted: Half-an-inch .. 15/-

Send Remittance with instructions to JOHN H. LILE, LTD., 4, LUDGATE CIRCUS, LONDON, E.C.4.

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EVERYTHING **The G.E.C.** ELECTRICAL
your guarantee

NEW WEMBLEY FILAMENT

**LONGEST 2-VOLT
VALVE FILAMENT
IN THE WORLD**

STRIKING 2-volt VALVE IMPROVEMENT

10% MORE FOR YOUR MONEY

After extensive research and experiment, a new 2-volt filament has been evolved giving:

**10% GREATER ELECTRON EMISSION
THAN ANY OTHER 2-VOLT FILAMENT OBTAINABLE**

This is the latest discovery of the G.E.C. Research Laboratories at Wembley. The "Wembley" filament means, that without loss of amplification, valves of amazing efficiency can be made with adequate electrode clearances, which result in:

- 1 Greater consistency between valve and valve.
- 2 Avoidance of internal contacts and valve troubles.
- 3 Production of non-microphonic valves even under most exacting conditions of use.

THE NEW "WEMBLEY" FILAMENT MEANS MORE RELIABLE WIRELESS, PURER TONE AND MORE FOREIGN STATIONS.

Write for the Osram Wireless Guide (1931 Edition) and also Station Indicator Card. Sent POST FREE on request.

Osram 2 VOLT BATTERY Valves

SOLD BY ALL
WIRELESS
DEALERS.

MADE IN ENGLAND

with the

NEW "WEMBLEY" FILAMENT

SUPREMACY IN RADIO - G.E.C. Radio

Adv. of The General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2 (also at the National Radio Exhibition).

SCOTTISH REGIONAL PLANS

(Continued from page 174.)

score that everything possible will be done to overcome the obstacles which geography, climate and the circumstances of international broadcasting has raised to keep one section of Scotsmen from the full enjoyment of Scottish wireless fare."

Looking After Listeners.

Details of forthcoming programmes announced by Mr. Thomson included the production of Compton Mackenzie's play about Prince Charlie in the first week of October, and the relays from various rural districts of Scotland in which attempt is made to give a picture of the characteristic life of the country communities.

There would also be more formal concerts relayed from various centres of Scotland, he said, for the fostering of local talent in such places as Inverness, Perth, and Ayr.

During the winter excerpts from the concerts of the Glasgow Choral and Orchestral Union and the Reid Symphony Orchestra would again be broadcast.

AN INTERESTING CRYSTAL SET.

The Editor, POPULAR WIRELESS.

Dear Sir,—In "Ariel's" bright and breezy epistle, I see he laments the fact that the faithful

plodders of the "feline's callipers" (to wit, cat's-whiskers) are assailing him with requests for some improvement in crystal sets. Although a novice, I had occasion, when my wet H.T.'s were being charged this week to rig-up a rough crystal set, and pass it on for your approval, and trust it may help the boys of the old brigade twentieth century version.

I had an old type 0005 condenser. This I mounted on a panel with crystal and cat's-whisker above, and two terminal strips either side (see sketch). I then tried two coils in baseboard-mounting holders, the aerial being a 35, with 4 tappings on it, home-made; approx. 10, 15, 20, 25. (I'm not sure, as the coil was made some time ago).

This I paired up with a Solenoid 35 coil, which you described in "P.W." on "Home-made Coils." I then tried it and found that by putting them together and taking apart I got different coupling effects, so I then thought of an old "flip-flop" coil holder I had, and put the coils in this. The result is unbelievable—and sharp and loud!

I have an 80-ft. aerial (outdoor), 25 ft. high, but am at the bottom of a hill and screened by trees and houses, but by setting the condenser (with the coils closed right up together) I get London Regional, and resetting the condenser and opening the coils, I get National, and cut out the opposite station.

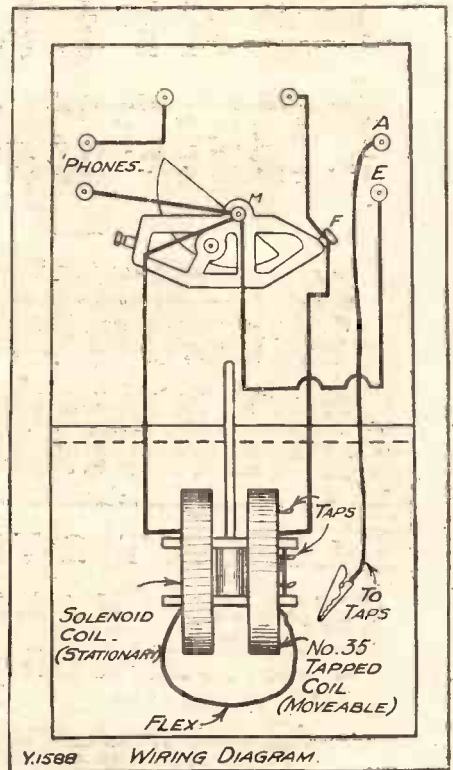
I feel sure if you spare a little time to make a sketch and give instructions, this would help some poor beggar who cannot run to a valve set. It is the best crystal set I know of in years.

Yours sincerely,

G. A. CHANDLER.

Anerley, S.E.20.

NO BATTERY BOTHERS!



If you feel inclined to make up this crystal set, the above diagram will give you all the information required. Read all about it in the accompanying letter from an enthusiastic "P.W." reader.

NEW PERMANENT MAGNET MOVING COIL SPEAKERS



P.M.3. Entirely new model at astonishing price. Gives true moving coil reproduction from any receiver capable of working an ordinary cone speaker. Weight of Cobalt Steel Magnet 5 lbs. Chassis only 45/-. Three-ratio output Transformer extra 7/6.



P.M.2. Identical with P.M.1 except that weight of Sheffield-made Cobalt Steel Magnet is 6 lbs. Has sold in thousands this summer. Chassis only £3. 10. 0. Three-ratio output Transformer extra 15/-.



P.M.1. The original, but with new chassis. Extremely sensitive. No hum, boom or resonance. Massive Darwin Cobalt Steel Magnet weighs 11½ lbs. Chassis only £5. 5. 0. Three-ratio output Transformer extra 15/-.

Give your set the speaker it deserves—a modern moving coil speaker. Give it the most practical form of moving coil reproduction—PERMANENT MAGNET. Give it "W.B." "W.B." are pioneers in this field. These three new models are the most reliable and efficient PERMANENT MAGNET Moving Coil Speakers that radio has known.

Write for Art Booklet "Speaking of Speakers"—FREE.



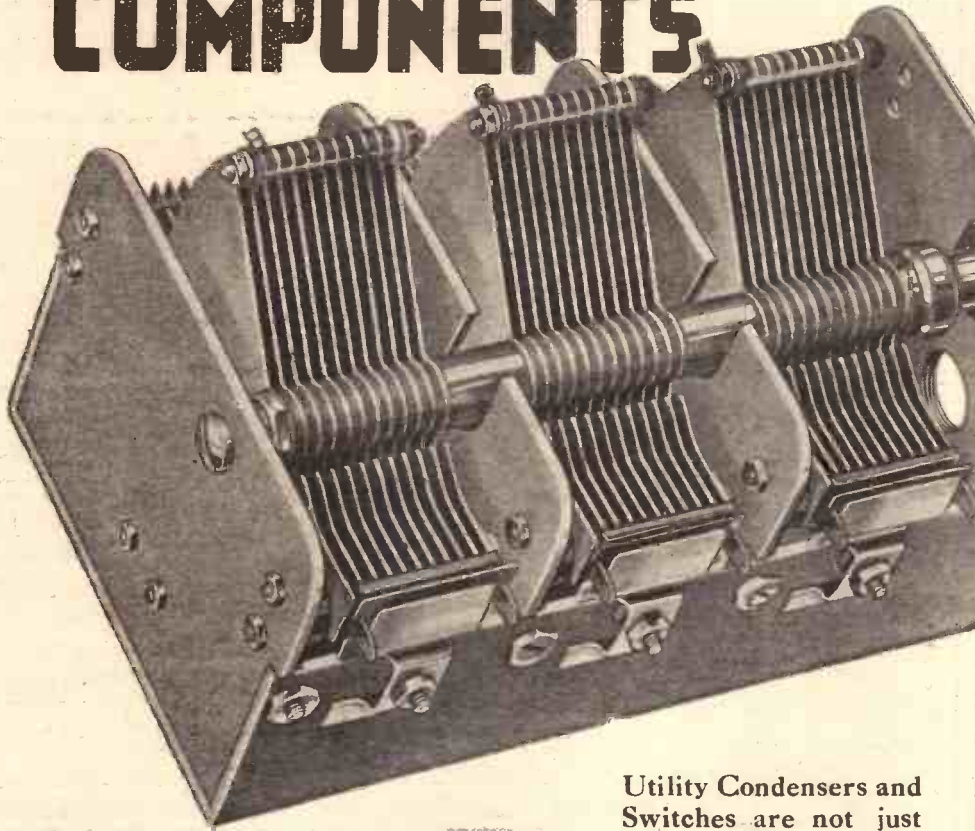
Made by the makers of the famous W.B. Valveholders and Switches.

WHITELEY ELECTRICAL

Hear them at your Radio dealer's. RADIO CO., LTD., NOTTINGHAM

RD., MANSFIELD, NOTTS

PERFECTED WIRELESS COMPONENTS



SEMI-SCREENED.

- Cat. No.
 W 305/2 Two Ganged 17/6
 W 305/3 As illustrated 22/6
 W 305/4 Four Ganged 40/-

TOTALLY-SCREENED.

- Cat. No.
 W 306/2 Two Ganged 22/6
 W 306/3 Three Ganged 27/6
 W 306/4 Four Ganged 42/6
 Disc Dials 2/6 extra.

Utility Condensers and Switches are not just ordinary components... they are *perfected wireless components*, designed and assembled by craftsmen. The correct application of modern theory and careful attention to detail of construction, plus a series of definite improvements in design, have placed Utility components the first in their class.

Utility components are fully guaranteed, and it is a significant fact that so many popular sets incorporate them. Look through the specimens at the right, or, better still, send a P.C. for the Utility catalogue. You will find many advanced designs in condensers and switches offering something entirely new in wireless development

★ Send a post-card for the new "Utility" Catalogue.

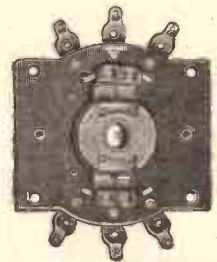
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 "UTILITY" WORKS,
 HOLYHEAD ROAD, BIRMINGHAM

AGENTS—London: E. R. Morton, Ltd., 22, Bartlett's Buildings, Holborn Circus, E.C.1. Scottish: E. B. Hammond, 113, Vincent Street, Glasgow. Lancashire and Cheshire: J. R. Lister, 93, Old Road, Blackley, Manchester. Westmorland, Cumberland, Durham, Northumberland, Yorkshire and Derbyshire: H. C. Rawson, Ltd., 100, London Road, Sheffield.



MICRO DIALS.

These dials are imperative for "knife-edge" tuning, particularly short-wave and superhet work. True micro control is given without backlash and with a 100 to 1 ratio. Two models are available, as illustrated with a fixed aluminium dial surveyed by a hair line and cursor, or with a revolving bakelite dial. Price 7/6 each.



BAKELITE SWITCHES.

Panel mounting or baseboard type. Two-pole change-over 2/- each. Three-pole change-over 3/6 each. Extra Switch units (2-pole change-over) for ganging, 1/6 each. These switches have been specially designed for ganging if required, and ganging rods are available at 6" 6d., 12" 1/-, 18" 1/6.



ANTI-CAPACITY CHANGE-OVER SWITCHES.

Possessing a minimum of electrostatic capacity, these switches are ideal for H.F. circuits. The nickel-silver contacts are self-cleaning and are controlled by a positive action ensuring an instant and silent make and break. Six sizes are available, covering 1-pole to 6-pole change-over.

Utility
 GUARANTEED
COMPONENTS
 "PERFECT TO THE LAST DETAIL"



RADIOTORIAL

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The Editor will be pleased to consider articles and photographs dealing with all subjects appertaining to wireless work. The Editor cannot accept responsibility for manuscripts or photos. Every care will be taken to return MSS. not accepted for publication. A stamped and addressed envelope must be sent with every article. All inquiries concerning advertising rates, etc., to be addressed to the Sole Agents, Messrs. John H. Lile, Ltd., 4, Ludgate Circus, London, E.C.4.

The constructional articles which appear from time to time in this journal are the outcome of research and experimental work carried out with a view to improving the technique of wireless reception. As much of the information given in the columns of this paper concerns the most recent developments in the radio world, some of the arrangements and specialities described may be the subject of Letters Patent, and the amateur and the trader would be well advised to obtain permission of the patentees to use the patents before doing so.

QUESTIONS AND ANSWERS

THE BULGING BATTERY.

S. G. G. (Paddington, London, W.)—“What would be the cause of one section of my accumulator, which is a 6-volter, swelling out and buckling its plates?”

Buckling of the plates of an accumulator is sometimes due to poor quality material, but generally due to misuse by its owner. It may be caused by spilling

the acid from one section of the accumulator, so that part of the plates are exposed to the air.

Another cause is to use part of a battery—say one 2-volt section, or a 4-volt section of a 6-volt battery—much more than the rest of it, and thus render it liable to be unequally recharged, resulting in undercharging of one section and overcharging of the other, or both.

The trouble may sometimes be minimised or put right by a good service station, and in any case it would be worth getting an expert's opinion as to what is the best course to take in your case.

AUTOMATIC GRID BIAS FOR DIRECTLY-HEATED VALVES.

J. G. (London, N.17).—“Will you please tell me how to obtain automatic bias when

using a directly-heated power valve on A.C. mains?”

Some caution is needed when an attempt is made to do this, but it should not be difficult if the directly-heated power valve is run by itself from a separate winding on the filament transformer. If this is so, at some point on this wiring—possibly one side of it, or maybe a centre tap—a connection is made with the earth terminal wiring. It is here that the automatic grid-bias resistance is inserted.

Complications arise, however, when more than one valve is fed from the transformer winding in question. But if it is a case of a straightforward connection from earth to a centre tap or end of the secondary of

YOUR BIT TOWARDS ECONOMY

Have you ever thought how difficult it is for a newsagent to order just the right number of copies of any particular paper each week? You can make his task much easier if you place a regular order with him. You will not only help him to order correctly and avoid waste but will make sure of getting your copy regularly each week.

the winding for heating this valve only, insert the usual biasing resistance in between the centre-tapped terminal and the leads to the rest of the set (usually a 1,000-ohm resistance is employed).

If a potentiometer is employed across the transformer winding and the connection from earth, etc., is made to the sliding arm of this, the resistance should be inserted in the lead to the moving arm of the potentiometer.

The return lead from the grid leak (if an R.C. stage is being employed) or L.F. transformer should be taken to that side of the new biasing resistance which is farthest from the filament winding—in other words, the earth end—so, generally speaking, this will remain unaltered.

THE “COMET” THREE.

E. C. F. (Liverpool).—“Having made a ‘Comet’ Three I must first of all congratulate (Continued on page 180.)”

QUALITY AND QUANTITY

MAKE

*Player's
Please*



THE FULL VALUE CIGARETTE

A Permanent Magnet

**Moving
Coil Speaker**
At a popular price.

The sensitivity of the R. & A. “100” is equal to the most expensive mains-energised types, and the reproduction of speech and music is as near the original performance as has yet been attained by any type of speaker. Perfect results are obtained with small receivers, and with large multi-valve sets.

The R. & A. “100” is the reproducer for those who study price, yet insist on performance.



*The
R & A
“100”
PERMANENT MAGNET
MOVING COIL
REPRODUCER*

No longer need you be content with an inferior moving coil speaker, nor need you use an energised field type, with its running cost. Ask your dealer to demonstrate, and write us for descriptive literature.

REPRODUCERS & AMPLIFIERS, LTD.,
FREDERICK STREET, WOLVERHAMPTON.

THE NEW TUNGSRAM POWER DETECTORS



T.3123.

Here are three types from the complete new Tung-ram range, particularly suitable for portable receivers: PD220, a new and specially designed anti-microphonic detector valve; P220, a new and extremely efficient low current consumption power valve; L210, an entirely new valve which is mainly suitable as detector or first low frequency amplifier. Characteristics are given below.

Type	Fil. Volts.	Fil. Amps.	Max. H.T. Volts.	Amp Factor.	Anode Resistance (Ohms).	Mutual Cond. m/a V.	Price
L210	2	.1	200	16	16,000	1.0	5/6
*PD220	2	.2	150	17	10,000	1.7	6/3
*P220	2	.2	150	7	4,500	1.5	7/9

*These types will be generally released during the early part of the season. Write to Dept S.T.3 for full particulars of the complete new range. Prices from 5/6 to 19/-. Tung-ram Barium Valves are manufactured under one or more of the following Patent Nos.: 289,762, 289,763, 311,705, and 313,151.

TUNGSRAM ELECTRIC LAMP WORKS (GT. BRITAIN), LTD.
Radio Department, Commerce House, 72, Oxford Street, London, W.1.

Makers of the famous Tung-ram Electric Lamps.

Branches in Birmingham, Bristol, Cardiff, Glasgow, Leeds, Manchester, Newcastle, Nottingham, Southampton.

Lamp, Valve and Glass Factories: Austria, Czechoslovakia, Hungary, Italy and Poland. I.F.S. Organisation, Tung-ram Lamps & Radio, Ltd., 11, Burgh Quay, Dublin. Tung-ram photo-electric cells: Nava "E" (for scientific measurement), £2 17s. 6d.; Nava "R" (Red sensitive cell (for colour matching devices), 23 3s.; Nava "EH" (for talkie work), £3 13s. 6d.



THE NEW 2 VOLT SUPER DETECTOR AND POWER VALVES

ENSURE 100% EFFICIENCY

PILOT AUTHORS' KITS FOR P.V. STAR AND P.V. PLUS ADVERTISED IN PAGE 138 OF THIS ISSUE.

PILOT KITS FAVOURITE "P.W." SETS

C.O.D. CASH H.P. as usual

POPULAR ACCESSORIES

EKCO H.T. UNIT. Type A.C.25. For multi-valve sets requiring up to 25 m/a. 3 tappings. S.G., detector and 120/150 volts. For A.C. Mains. Cash or C.O.D. Price £3 17s. 6d. Balance in 11 monthly payments of 7/1. Send **7/1** only

ATLAS A.C. ELIMINATOR TYPE A.C.244. 3 tappings—S.G., detector, power. Output 120 volts at 20 m.a. Cash Price or C.O.D. £2 19 6. Balance in 11 monthly payments of 5/6. Send **5/6** only

EKCO K.12 A.C. COMBINED H.T. ELIMINATOR and L.T. TRICKLE CHARGER. 12 m/a suitable for 1- to 3-valve sets. S.G. 80 v., 120/150 v. Charging rate 1 amp. at 2, 4, or 6 v. Cash or C.O.D. £3 19 6. Balance in 11 monthly payments of 7/4. Send **7/4** only

EXIDE 120-VOLT W.H. TYPE ACCUMULATOR, in crates. Cash Price, £4 13 0. Balance in 11 monthly payments of 8/6. Send **8/6** only

PILOT PERMANENT MAGNET MOVING-COIL SPEAKER. In Handsome Polished Oak. Cabinet fitted with specially designed Epoch M.C. Chassis, assuring a perfection of tone hitherto associated with Speakers double the price. With tapped input Transformer. Cash £3:15:0. Balance in 11 monthly payments of 6/11. Send **6/11** only

AMPLION M.C.6 MOVING-COIL SPEAKER, permanent magnet, with output transformer. Complete. Cash Price £3:7:6. Balance in 11 monthly payments of 6/2. Send **6/2** only

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KIT "A," less valves and cabinet, £4 0 0, or monthly payments of 7/4.
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Extra components required:

1 Keystone Star-Turn selector coil	s. d.
1 400-ohm B.M. potentiometer	12 6
1 Bulgin panel light (without bulb)	1 6
	2 6

Complete Kit "A" £4 16 6 or 12 monthly payments 8/10.
KIT "B" (with valves), C.O.D. or cash, £5 4 0, or 12 monthly payments of 11/8.
KIT "C" (with valves and cabinet), C.O.D. or cash, £7 4 0, or 12 monthly payments of 13/3.

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KIT "A," less valves and cabinet, cash £7 15 6, or 12 monthly payments of 14/3.
KIT "B," with valves less cabinet, cash £10 14 6, or 12 monthly payments of 19/8.
KIT "C" complete with valves and cabinet, cash £11 14 6, or 12 monthly payments of 21/6.

Any parts supplied separately CASH or C.O.D.: If value over 10/- sent post paid.

SPEAKERS, ACCESSORIES, SETS EVERYTHING NEW IN RADIO

P.V. STAR and P.V. PLUS C.O.D. LINES

Peto-Scott Side Control Swivel, Jointed Brackets **3/6** Per pair

Peto-Scott Side Control Ebonite Discs with Knurled edge. Per pair **3/-**

Peto-Scott Ready Wound and Tapped Coil Quits Per pair **4/-**

Cyldon ('0005 mfd.) Extens. Type Ex2T5 **37/6**

Aluminium Screen to specification 13" x 8" **2/9**

Peto-Scott P.J. Coil (No. 2) **1/6**

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Any of the above items sent C.O.D. Pay the Postman. If value over 10/- we pay post charges.

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NEW B.T.H. MINOR PICK-UP and TONE-ARM. C.O.D. only **27/6**

NEW B.T.H. SENIOR PICK-UP and TONE-ARM. C.O.D. only **45/-**

G. E. C. INDUCTOR DYNAMIC SPEAKER Chassis type. Cash or C.O.D. £3 10 0. Balance in 11 monthly payments of 6/5. Send **6/5** only.

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R. & A. "100" PERMANENT MAGNET MOVING COIL REPRODUCER, with tapped Input Transformer. Cash or C.O.D. £2 17 6. Balance in 11 monthly payments of 5/4. Send **5/4** only.

HEAYBERD "D" MINOR H.T. MAINS UNIT. 120 v. at 12 m/a; 3 tappings. Cash or C.O.D. £2 17 6. Balance in 11 monthly payments of 5/4. Send **5/4** only.

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COSSOR MELODY MAKER Type 234

Screened-Grid, Detector and Power. Complete with specified valves and cabinet **£6:15:0** or 10/- deposit and 11 monthly payments of 12/6. Finished Instrument. Royalties paid. £7:10:0. Cash only.

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Improved version of this famous 4-valve set. 2 Screened-grid, Detector and Power. With valves and cabinet **£10:15:0** or 12 monthly payments of 19/8. Finished Instrument. Royalties paid. £11:15:0. Cash only.

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Screened-grid, Detector and Pentode. With valves less cabinet **£6:10:0** or 12 monthly payments of 11/11. Finished Instrument with valves and cabinet. Royalties paid. £7:17:6. Cash only.

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Powerful, selective and ultra modern. Screened-grid, Detector and Pentode. With valves less cabinet **£5:17:6** or 12 monthly payments of 10/9. Finished instrument, with valves and cabinet. Royalties paid. £7:8:6. Cash only.

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Add more stations to your set. Plugs direct into your battery or eliminator of operated receivers. Complete with instructions. Sent C.O.D. Postage free. Pay the postman. Mahogany Cabinet 7/6. Nothing more to buy—no valves or any extras. **37/6**

Send for PETO-SCOTT RADIO BULLETIN. Full details of all latest "P.W." Sets.

EXPRESS ORDER FORM

To PETO-SCOTT CO. LTD. Please send me C.O.D./CASH/H.P.

for which I enclose Cash/H.P. Deposit £ s. d.

Name

Address

(2) P.W. 26/9/31

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TRADERS! Peto-Scott Radio Kits for "Popular Wireless" sets supplied in distinctive and sturdy cartons. Send for terms.

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 180.)

The windings lie side by side on the tube, with a space of three-eighths of an inch between the end of one winding and the beginning of the next. Begin by fixing the wire at about 1/4 in. from the end of the tube, the usual method of passing it through two or three small holes pierced in the coil former being perfectly satisfactory.

Mark the beginning with "A." (In the manufactured coils this point is distinguished by RED flex.)

Wind on 4 turns, twist the wire into a 1/2-in. loop for tapping, wind on 2 more turns, loop again for the second tapping, wind on 3 more turns, and finish off. That is a 9-turn coil with two taps. Mark the end "X" (blue flex).

Three-eighths of an inch away start the second (grid) winding, and wind this in the same direction as before. Mark the beginning "G" (white flex, on the commercial coils), and as there are no tappings this time carry right on for 64 turns. Mark the end "Y" (black flex).

Be sure to leave a nice little 8-in. or so length of wire at all ends and beginnings for connecting up.

P.J.3.—This is a medium-wave coil, for interval coupling. It has a reaction winding, so a longer coil former is used, viz., 3 in. long, same diameter as before (2 in.). Wire 30 D.S.C.

The first winding is the primary, consisting of 30 turns, tapped at the tenth and twentieth. Beginning marked "A" (red flex). End marked "X" (blue flex).

Leave a space of 1/2 in., and then commence the grid winding. It consists of 64 turns, no

taps. Beginning marked "G" (white flex). End marked "Y" (black flex). Remember always to wind in the same direction.

A quarter of an inch from the end of the grid winding start another one, this time for reaction. There are 34 reaction turns, beginning marked "Z" (green flex), and end marked "R" (yellow flex).

So long as you always wind in the same direction you will find the coils very efficient. But if you chop and change your direction your results will probably be awful! (Which is not

points are arranged for when the coil is wound. The usual method is to have a "crocodile clip" on flex "biting" an exposed place on the wire, as this is easily arranged for.

As it is important not to break the coil, the best way is to wind on as usual to the turn where you want to tap, and then don't break the wire, but twist about 1 in. of it into a little loop.

Carry on with the winding, making more loops for other tappings if required, and complete the coil before worrying about the taps.

All you have to do with them when the coil is finished is to twist them neatly and firmly with pliers, first cleaning off their insulation with a penknife. Then the crocodile can get his teeth on to them easily!

"P.W." PANEL NO. 38.—CALIBRATING.

A set is said to be "calibrated" when by means of a list, or graph, or other convenient method, its wave-length adjustment can always be related to its dial-reading.

The method of calibrating by means of a graph drawn on squared paper is exceptionally useful, and easy.

If the horizontal lines represent wave-lengths, and the vertical lines dial-degrees, a line connecting the known stations together will assist in finding all unknown stations.

Such a line is known as a "Tuning Curve."

to be wondered at, considering that reaction may be reversed.)

Finally, stick exactly to the directions—and take your time.

TAPPING A COIL.

"TOMMY" (Newcastle).—"What do they mean when it says take a tapping at the sixth turn when winding a coil? What do you do to take a tapping?"

A "tapping" is simply a connecting point. If you wind a 50-turn coil of insulated wire you get only two connecting points—namely, the beginning and the end of the coil. All the rest of the wire is insulated.

But it is often necessary to connect at some intermediate point (say the 20th turn), and this is called "tapping into the coil" (at the twentieth turn in that instance). So, instead of winding a perfectly plain coil and then having to fidget about afterwards to make extra connections, the required tapping

TESTING A FIXED CONDENSER

P. R. F. (Cheltenham).—"Seeing a note in 'P.W.' about testing a fixed condenser with a spark, I tried this on all the spare condensers I have in stock. Using an H.T. battery (120 volts or so) I got quite a good spark from all the large condensers, but none of the small condensers will give me anything.

"What would be a way of testing .001 or smaller, and why is it that only the big ones can be tried out in this manner?"

The reason that only the big condensers will give a visible spark is that the amount of electricity stored by a condenser charged from a given battery-voltage or mains-voltage will depend upon the capacity of that condenser.

The .001 has only 1-1,000th of the capacity of the 1-mfd. condenser, and any capacity smaller than this is correspondingly smaller still; so that the

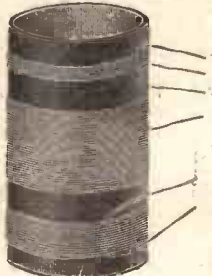
(Continued on page 184.)

SOVEREIGN IN P.V. STAR and P.V. PLUS

P.J. COILS
Wound to specification of "P.W." No. 1, 2/-; No. 2, 1/6; No. 3, 2/-; Nos. 2 and 3 specified.



Sovereign's latest coils specified in the P.V. Star conclusively prove Sovereign superiority. Wound on special formers and exclusively protected.



VOLUME CONTROL
Press and public alike insist upon SOVEREIGN VOLUME CONTROL (Type V.C.), most famous of Sovereign components. High performance, reliability and low price. 4/6

AT OLYMPIA Stand No. 64 EMPIRE HALL



COIL QUITTS
Another Sovereign triumph. Coil Quoit in both sets adds further tribute to the quality of these famous components. In moulded brown bakelite with features that help to facilitate winding. Each 6/-



L.F. TRANSFORMER
The latest addition to the Sovereign range is housed in moulded bakelite case. Precision manufacture ensures greater volume and purer tone. Ratios 5:1 and 3:1. Each 7/6

SOVEREIGN PRODUCTS, LTD., 52/54, Rosebery Av. Lond

HERE IS THE OAK WIRELESS CABINET YOU ARE LOOKING FOR, INSTALL A LANGMORE

and be Proud of Your Set.

THE LANGMORE No. 8 (as illustrated)

has been designed to meet the demand for a simple well-made Cabinet at the lowest possible price, consistent with good workmanship and finish. Strongly constructed of selected Oak and Plywood.

SIZE OVERALL: 33 ins. high by 21 ins. wide by 15 ins. deep.

THE TOP COMPARTMENT: To accommodate the Wireless Set. Measures 9 ins. high by 18 ins. wide by 13 ins. deep, and takes a panel 18 ins. by 7 ins. or 18 ins. by 8 ins.

THE BOTTOM COMPARTMENT: To accommodate Loudspeaker and Batteries. Measures 16 ins. high by 18 ins. wide by 13 ins. deep inside.

All are fitted with hinged top heavy baseboard, and lift-out back, so that all parts are easily accessible.

BEAUTIFULLY FINISHED IN JACOBEOAN OAK. TRADE ENQUIRIES INVITED.



PRICE 30/- EACH

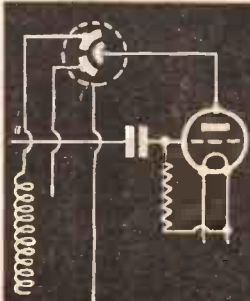
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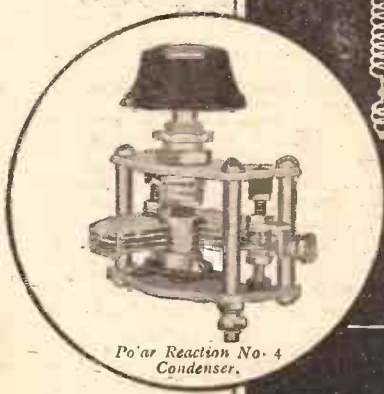
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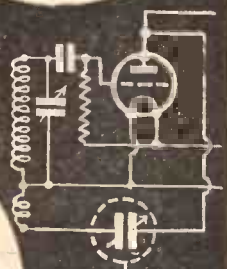
GIVES YOU FINER REACTION



Polar Differential Condenser.



Polar Reaction No. 4 Condenser.



REACTION NO. 4.

DIFFERENTIAL CONDENSER

An Air di-electric reaction condenser. Rigid construction. Smooth ball-bearing action. Bonded rotors.

Direct Drive. Constructed of highest quality materials. Smooth action gives very accurate control. Insulated spindle. Supplied with Knob.

'0001, '00015, '00025 **3/9**

'0001, '00015, '0003 **3/-**

Fully Illustrated Catalogue Free.

Slow motion Type made in same capacities as above **6/6**

Stand 60 Olympia

WINGROVE & ROGERS, LTD.
188-189, STRAND, LONDON, W.C.2.
Polar Works, Old Swan, LIVERPOOL.



AMPLION

MOVING COILS

THE famous Amplion M.C.6 Unit is acknowledged as representing the best value and the greatest efficiency amongst small permanent magnet moving coil speakers. Its reproduction and sensitivity are really remarkable, and it will handle without distortion adequate volume for all normal requirements. It requires no external excitation and the universal transformer which is fitted enables the speaker to be correctly matched to either Power, Super Power or Pentode output from standard British 2, 3 or 4 valve receivers.



M.C. 6 UNIT COMPLETE WITH TRANSFORMER

67'6

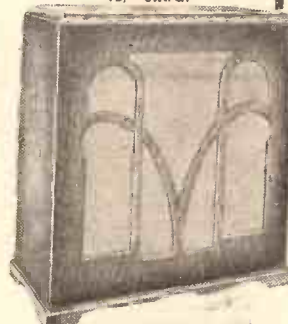
M.C.9 UNIT

This is also a permanent magnet type, but is much larger and more powerful than the M.C.6.

Unit only **£6 - 0 - 0**

Or on deferred terms, matching transformer 15/- extra.

CABINET MODELS



THE M.C.6 Unit is also available in handsome cabinets of very modern and striking design. Transformer is also fitted in Cabinet Models.

M.C.6 Oak - **£5 - 10 - 0**

M.C.6 Walnut **£5 - 19 - 6**

Both Cabinet Models are available upon deferred terms.

M.C.9 Oak - **£9 - 9 - 0**

M.C.9 Walnut **£10 - 10 - 0**

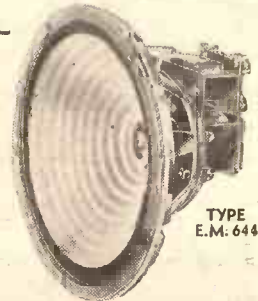
All M.C.9 models are available on deferred terms. Both the Cabinet Models are fitted with matching transformers.

D.C. ENERGISED MODEL

A MOST efficient unit for D.C. Voltages 100/110, 200/240, very suitable for A.C. sets. Full details of alternative methods of operation supplied with each model.

UNIT ONLY **29'6**

UNIT WITH matching transformer **42' -**



TYPE E.M. 648

Don't forget to visit the **AMPLION Stand No. 75 EMPIRE HALL, OLYMPIA.**

Ask at Stand for invitation to **AMPLION HOUSE** (close to Olympia), where all **AMPLION Models** can be heard working from direct Broadcast.

GRAHAM AMPLION LTD., 26, Savile Row, W.1.

CLIX

CONSTRUCTOR'S KIT

Saves you Time and Money

This kit contains an assortment of nineteen Clix fittings specially selected for the set builder.

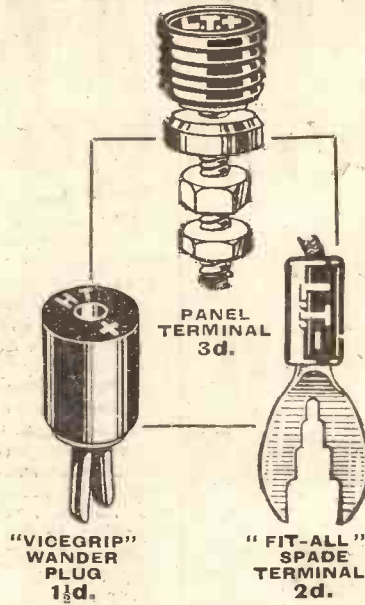
Buy a Clix Kit for your next set and save fivepence.

Value 3/5



PRICE 3/-

See full Clix range on Stand 202 Olympia.



Contents:—2 Spade Terminals engraved L.T.; 2 Plugs and Sockets (A and E); 7 Terminals, H.T., L.T., L.S.; 6 Wander Plugs, H.T., and G.B. Value 3/5. Price 3/-.

Folder "P." on Request.

Cheapest PERFECT Contact

Lectro Linx Ltd., 254 Vauxhall Bridge Road, S.W.1.

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 182.)

amount of power taken from the battery or H.T. unit varies greatly according to the capacity of the condenser under test.

It is this power which shows up in the form of a spark when the condenser is subsequently shorted, and only a fairly large capacity will provide sufficient power to produce the necessary easily visible spark.

There is, however, an easy method of testing the insulation of the smaller condensers, and that is to use a more sensitive test than the presence of a spark—namely, the "click" in a pair of telephones.

For this test you connect the small condenser across the battery (or H.T. unit) as before, remove it, and allow it to stand aside for several hours, and then connect the 'phones across it to see if a momentary click in the 'phones results.

If the insulation of the condenser is in good order and it is holding its charge, this will be quite sufficient to send a current round the telephone circuit when the tags of the 'phones are connected across the condenser, even after the condenser has been standing aside for several hours.

"HULLO! WHAT'S WRONG WITH THE SET?"

Perhaps the switching doesn't work properly? Or some mysterious noise has appeared and is spoiling your radio reception?—or one of the batteries seems to run down much faster than formerly?

Whatever your radio problem may be, remember that the Technical Query Department is thoroughly equipped to assist our readers, and offers an unrivalled service.

Full details, including scale of charges, can be obtained direct from the Technical Query Dept., POPULAR WIRELESS, The Fleetway House, Farringdon Street, London, E.C.4.

A postcard will do. On receipt of this an Application Form will be sent to you post free immediately. This application will place you under no obligation whatever, but, having the form, you will know exactly what information we require to have before us in order to solve your problems.

LONDON READERS, PLEASE NOTE: Inquiries should NOT be made by 'phone or in person at Fleetway House or Tallis House.

The joining of the telephone tags across the condenser under test must be done with some care as it is very easy to allow the charge to leak away, and so produce no click in the 'phones, thus giving the false impression of defective insulation. The best way is to hold the tags of the telephones very carefully and not with the fingers, but by the cords themselves, thus making sure that any little charge on the condenser will not leak away across the fingers and so fail to produce the click which gives the O.K.

SEND FOR FREE CATALOGUE

CODWINEX

H.T. ELIMINATORS
Here's the greatest Eliminator value ever offered—
S.G.A./12 (For screened grid valves).
Output 12 m.A. 3 positive tap-
plugs—50, S.G. and 50-
POWER
S.G.A.T./12 as above with
L.T. Trickle
70-
Charger every type
Models for A.C. or D.C.
of set. For A.C. or D.C.
supplies. Del. Terms.
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FOR YOUR RADIO COMPONENTS

A. T. HARRISON & CO.

Copper and Aluminium Screens by return of post.
Bakelite Moulds, Bakelite Mouldings.
Trade inquiries invited.

KINTORE WORKS, BERMONDSEY, LONDON, S.E.1.

They're all buying

WUFA

(OPPOSITE OLYMPIA)
SEPT. 18-26

WET H.T. BATTERIES
Solve all H.T. Troubles.
SELF-CHARGING, SILENT, ECONOMICAL
JARS (waxed), 2" x 1 1/2" sq. 1/3 doz.
ZINCS, new type 10d. doz. Sacs 1/2 doz.
Sample doz. (18 volts), complete with bands and electrolyte, 4/1, post 9d.
Sample unit, 6d. Illus. booklet free.
Bargain list free.

AMPLIFIERS, 30/- 3-valve set, £5.
P. TAYLOR, 57, Studley Road, STOCKWELL, LONDON

EASY PAYMENTS

The first firm to supply Wireless parts on easy payments. Seven years advertiser in "Popular Wireless." Thousands of satisfied customers.

COSSOR 1932 Kit. Cash £6 15s. 0d., or 10/- with order, 11 monthly payments of 12/6d.

EXIDE 120v. H.T. Accumulator. Cash £3, or 6/- with order, 9 monthly payments of 6/8d.

AMPLION Permanent Moving Coil Speaker, with step-down transformer. Cash 67/6d., or 7/5d. with order, 9 monthly payments of 7/5d.

BLUE SPOT 66R. Unit, with Cone and Chassis. Cash price 42/6d., or 5/6d. with order, 9 monthly payments of 4/6d.

New Goods Obtained for Every Order.

Send us a list of the parts you require, and the payments that will suit your convenience, and we will send you a definite quotation. Anything wireless.

H. W. HOLMES, 29, FOLEY STREET, 'Phone: Museum 1414. Gt. Portland St., W.1.

PLEASE be sure to mention "Popular Wireless" when communicating with Advertisers. Thanks!

THE "M.W." "SUPER-QUAD"

OWING to pressure on press-day, an omission of two important items appears in the Peto-Scott advertisement for the "M.W." "Super-Quad" published in the October issue of "Modern Wireless." The extra components to be included are:

(1) Lewcos intermediate-frequency band-pass filter (type I.F.T.126), 12s. 6d.

(2) Lewcos intermediate-frequency band-pass filter (type I.F.T.P.126), 12s. 6d.

This increases the price of the Pilot Author's Kit for this receiver accordingly by 25s. "Kit A" should read £8 15s.; "Kit B," £11 17s.; "Kit C," £12 17s. H.P. terms are increased by 2s. 4d. monthly in each case.

Readers should also note that the price of the Peto-Scott swivel-jointed collapsible aluminium brackets for the "P.V. Star" is also omitted from their advertisement in POPULAR WIRELESS, September 19th, 1931. This should have been listed at 3s. 6d., which amount is already included in the total (for "Kit A") £5 11s. 11d. All prices are, therefore, correct as published.

PLAIN WORDS and Sweet Music

MoToR Units need no high-sounding superlatives to describe their vivid, brilliant tone. Two words only are necessary. Hear them! Their better performance speaks for itself. There are no other units like them, or to equal them. They are the year's supreme givers of radio enjoyment.

Go to your nearest radio dealer and ask to hear the 1932 MoToR Units and Cabinet Speakers. You will hear loudspeaker performance that will make you immediately dissatisfied with your existing speaker.



**MoToR SUPER
POWER UNIT**
Type S9

35/-

The master-piece of all balanced armature units—with double magnets, super sensitive adjustment, amazing punch and beauty of tone.

**MoToR
CHASSIS, C 99**

56/-

This popular Chassis assembly can only be described as amazing in its performance—in its bell-like clarity and wealth of volume.



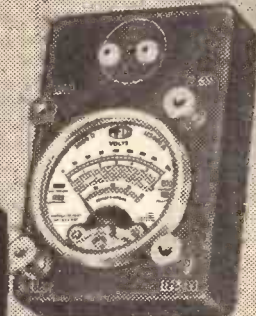
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MIRROR OF THE B.B.C.

(Continued from page 130.)

Beethoven nights, especially with Lamond as solist, have proved very attractive, and so too were the first all-Tschaikovsky programme and the Mozart-Haydn concert in the early part of September.

Many people liked the all-British composers nights, but generally speaking the completely miscellaneous programmes were the least popular of all.

The last concert of the season, which, by the way, will be broadcast to National listeners, will be a great occasion, when our loudspeakers will re-echo with the applause to Sir Henry Woods.

Hard-worked Musicians.

However enthusiastic may be the members of the B.B.C. Symphony Orchestra, who have borne the burden of giving a concert a day for 48 days, with three hours every morning for rehearsal, the strain of so much work is bound to have its effects in a desire for a few days' rest.

Long before the winter is through public appreciation of the B.B.C. will be greater than ever. Some of the officials know it is coming, and they know also that it can

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only be kept if there is not too much messing about with B.B.C. affairs.

The Government's drastic economy measures and increased taxation must inevitably hit the entertainment industry very hard, so much so that thousands of people who normally take their amusement in the theatres and picture palaces will be compelled to remain at home and depend on the wireless.

The Proposed Cuts.

In times like these, broadcasting means more in maintaining the stability of the country than most people have any idea, in assisting the community to forget its troubles and pay its way without resort to expensive diversions as happened during the War.

It is therefore essential that Sir John Reith shall have sufficient money at his disposal to maintain a high, but not extravagant level of the programmes, and that the work of his staff in those other phases which contribute so much to smoothing out difficulties shall go on unhampered. To-day broadcasting is one of the greatest powers of our country. Let us see that we treat it right and use it properly.

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FOR THE LISTENER

(Continued from page 130.)

In a time of crisis, the service of the B.B.C. is admirable, and of the greatest possible value. And I have on these occasions a feeling which I never get at any other time.

When I am listening to a play or to a concert I never have the feeling of being one of a large audience. I may reflect, and say to myself that thousands are listening with me; but I never feel them listening. Their presence makes no difference to me.

I never get the thrill of being one of a great crowd, such as one sometimes gets in a theatre or at a mass meeting. But when I am listening to critical news, I do get the feeling of the solid nation as a whole. As if we had all come together for it, were standing together listening to it.

The Premier's Speech.

At six o'clock the whole nation becomes a living unity, a felt unity, waiting expectant and with great concern.

For instance, I heard Mr. MacDonald's speech at the hotel on the top of Mottarone. (Mottarone is a small mountain near here, about 4,000 feet high.) We were the only English people there, and I asked if we might hear the Prime Minister's speech. Italians are friendly and hospitable people, and they agreed, on the understanding that I would tell them what it was about.

Besides, they were interested, too. England is still the crux of the world; and if England is in danger, everybody is eager and sympathetic about it. So we heard the speech. We heard it as plain as if we had been in London. I gave them the gist of it as it proceeded. It was an occasion to be remembered.

So that, although I feel that in normal times the News Bulletin hardly justifies itself, I am extremely grateful for it at such times as these.

Linked With Home.

In the olden days you had to wait days or weeks for a letter; and, by the time the letter came, either the worst had come to the worst, or the "worst had turned best"; in either case you could do nothing.

But now, thanks to wireless, I hear the news at the very moment you who are at home are hearing it. I am alarmed when you are alarmed, and relieved when you are relieved. I am from home and yet I am at home.

Here, in this little peasant community among which I am living for the moment, there is no crisis—no money crisis. They hardly ever see money, except when I bring it with me to pay my rent and my little bills; and what they do with it, I don't know.

No Money Troubles!

Stow it away in old stockings, I suppose. For they live on what they produce; eggs and milk and vegetable soup, and such. They never seem to need money. They pay no rent; they pay no wages; they take no holidays; they never seem to buy anything; they wear wooden clogs which last for ever; and, although their clothes don't last for ever, they never seem to cast them off so long as they will hold together.

So it happens that sometimes, when I have been listening to "bad" news from England, I wonder whether they haven't got the best of it; I rather envy them.

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ELIMINATORS

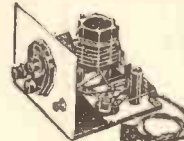
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EKCO A.C.25 H.T. ELIMINATOR. Send Tappings—S.G. 50/80 volts, 100/150 volts at 25 m/a. Cash £3 17s. 6d. Balance in 11 monthly payments of 7/1.

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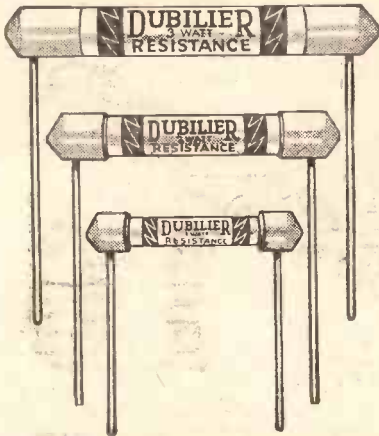
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This range of resistances caters for every requirement in radio; it fulfils a long-felt want for a really reliable British-made resistance, which is manufactured under a patented process embodying all the essential features required at a price within the reach of everyone.

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TECHNICAL NOTES

Some diverse and informative jottings about interesting aspects of radio reception.

By Dr. J. H. T. ROBERTS, F. Inst.P.

Controlling Volume.

WHERE a screen-grid valve is used in the H.F. part of the receiver it is often convenient to introduce a filament rheostat into the negative lead to the filament of this valve.

This arrangement is much more suitable with a screened-grid valve than with an ordinary one, because whereas it is apt to introduce distortion in the case of a three electrode valve, it is practically without that drawback in the case of a screened-grid valve, owing to the particular characteristics of the latter.

When the filament voltage is reduced the amplification is also reduced and this is (within limits) virtually without distortion. It is, however, very important that the rheostat should be introduced into the negative lead of the screened-grid valve so that the grid bias will automatically adjust itself according to the way in which the filament voltage is adjusted.

Where reaction is used to bring up the volume to the necessary amount it is a very simple matter to bring back the reaction a little so as to diminish volume, but if the volume is already too great without reaction, clearly the adjustment of the reaction control does not give you any means of reducing volume.

The Wrong Way.

Perhaps one of the commonest methods of diminishing volume when this is too great is to detune the set, but in these days of selective sets and crowded wave-lengths this method is not to be advised because it is very apt to bring in the background of another station.

In any case, with many sets detuning, altogether apart from the question of interference, it is apt to introduce very nasty distortion and therefore it is much better to adopt one of the more conventional methods of volume control which I have mentioned recently.

Screens and Stability.

When you are using a metal case or other form of metal screen in proximity to an H.F. coil, remember that some of the energy of the coil is being dissipated by reason of the eddy currents set up in the screen.

These eddy currents will be out of phase with the currents in the coil which produce them, and this is the means by which the external field is neutralised by the screen. So that in order to get the advantage of shielding we have to pay for it electrically by loss of energy.

This means that the effective resistance or damping of the coils is increased and whether this is an advantage or disadvantage depends upon whether the set has a tendency to oscillate or not.

(Continued on page 190.)

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Models of eliminators for home construction will be exhibited, and circuit diagrams explaining their assembly may be obtained.

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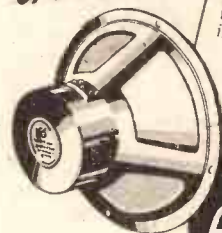
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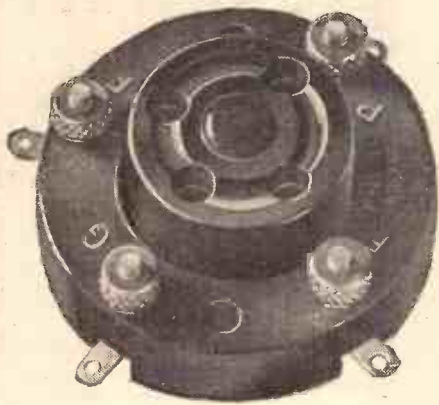
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WUFA

(OPPOSITE OLYMPIA)
SEPT. 18 - 26

TECHNICAL NOTES

(Continued from page 188.)

If the set is liable to oscillation without the screening, then the effect of the screen is to introduce the necessary damping to make the set stable, but if the set is already stable without the screen, the unavoidable dissipation of energy in the screen represents, simply so much loss of efficiency.

I mentioned this point in a somewhat different way recently, but I refer to it again in order to make it clearer in reply to certain points raised by readers.

A.C. Valves.

There are many people using battery-driven sets, at any rate for the L.T., who have A.C. supply available, but are uncertain whether to change over to indirectly-heated valves, owing to an idea that these necessarily produce a certain amount of "background" and cannot, therefore, give results equal to those obtained with a battery source of filament supply.

TECHNICAL TWISTERS

No. 80. LOUDSPEAKER CONNECTIONS

CAN YOU FILL IN THE MISSING WORDS?

When two loudspeakers are run from the same set they are generally connected in

This has the advantage of maintaining a high load, and enables one speaker to be switched on or off with a simple shorting switch.

Alternatively the loudspeakers may be connected in but usually this gives noticeably impaired results unless an output circuit is being used.

Last week's missing words (in order) were: Electrons. Direct. Alternating.

In the early days this might have been true, but with the very great improvements which have been made in indirectly-heated valves there is not the slightest reason why anyone should hesitate to use this type.

As a matter of fact, not only can the hum be reduced to negligible proportions, but the efficiency of the best type of indirectly-heated valve is much greater than that of the corresponding valves in the battery class, at any rate, with a few possible exceptions. Some people, in fact, will have it that the A.C. valve is about twice as good as the corresponding battery valve, so far as efficiency is concerned.

Question of Cost.

Another point which often exercises the minds of those who contemplate changing over to A.C. valves is the question of the cost of running, but here again there is no need at all to be nervous because with a three- or four-valve A.C. set the power consumption should not be more than about 30 watts, which means that the cost of electricity used in this way is much less

(Continued on next page).

Watmel's latest!

THE WATMEL SQUARE-LAW TAPERED WIRE-WOUND RESISTANCE

OUR latest product—the Watmel 50,000 ohms wire-wound potentiometer specially wound on a tapered former giving a perfect square-law reading.

This is the first resistance of its kind and was very favourably commented on at the Exhibition.



NOTE THE POINTS:—

- 1—Polished pointer-knob.
- 2—Engraved Bakelite front plate.
- 3—Wire Wound Former.
- N.B.—The resistance is WIRE, NOT compound with wire contacts. It is specially wound on a tapered former.
- 4—Insulating bush to insulate spindle from panel.
- 5—Contact finger. Phosphor-Bronzo.
- 6—One-hole fixing—Brass bearing bush resulting in perfect bearing.
- 7—Bakelite case—protects winding.
- 8—Back self-cleaning contacts.
- 9—Large contact plate.
- 10—Stops at end of wiring.

ANY RESISTANCE UP TO 50,000 OHMS **6/6**

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Telephone: Edgware 0323 (M.C.40)

TECHNICAL NOTES

(Continued from previous page.)

than when the same is obtained from accumulators if the latter have to be sent away periodically for recharging.

As regards the connections for A.C. valves, these vary to some extent and sometimes one method of connection will be found to give better results than another. The heater, which is a filament placed inside the tubular cathode (the cathode, of course, taking the place of the filament in an ordinary valve) is generally connected to earth; sometimes again a potentiometer is connected across the heater circuit, the slider of the potentiometer being connected to the cathode.

Circuit Connections.

There are different ways of connecting cathode and heater and it is not easy to say definitely what method will prove the best. This is a point which it is better to try out for yourself.

Generally speaking, as I have already mentioned, the slider circuit should be earthed, but it is not always necessary for the cathode to be earthed. Instead of the ordinary potentiometer arrangement a "capacity potentiometer," or capacity bridge, as it is sometimes called, may be used instead, the centre of the capacity-potentiometer being connected to earth.

Again, another method is to connect the centre tap of the heating winding of the transformer to earth. If a resistance of suitable value is placed in series with the cathode and H.T. supply it is possible to obtain automatic grid bias, since the cathode is brought, by reason of this resistance when current is flowing, to a higher potential than that of the H.T. negative.

Automatic Grid Bias.

Clearly the positive potential of the cathode in relation to the H.T. negative will depend upon the value of the biasing resistance and the current which is flowing, and in any case this voltage has to be subtracted from the effective H.T. volts.

If you are using more valves than one it is not wise to use the same biasing resistance for all the valves, because this is very liable to cause back-coupling between the valves, which cannot, as a rule, be overcome by the use of bypass condensers. As a matter of fact, you will want plenty of bypass capacity on each of the resistances; in any case.

Tests with Portables.

I have lately been having some very unsatisfactory experiences with a portable which suffers from lack of selectivity. Most modern portable sets are fairly selective, some very selective indeed, and there is a common impression that selectivity is a distinguishing feature of all portables, whatever other disadvantages they may have. But this is not by any means always the case, particularly with portables a couple of years old, like the one with which I have been experimenting.

A good deal can be done in the way of separating stations by taking advantage of the directional property of the frame serial in the portable, but, of course, if the

(Continued on next page.)

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Also 4 volts and A.C. Mains types.

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TECHNICAL NOTES

(Continued from previous page.)

two stations to be separated happen to be coming from practically the same direction (or directly opposite directions) clearly this rotational effect is of little or no value.

In the case of two stations having nearly but not quite the same bearing, it is better to arrange the frame aerial so that it is in the minimum position for the interfering station, and then to bring up the volume of the desired one by skilful use of the reaction. Incidentally, I expect you know that the position of a frame aerial for *minimum* reception is more sharply marked than the position for *maximum*.

An Absorption Trap.

However, although something can be done in this way, I found I had to have recourse to the use of a trap and in this connection some observations made by the Technical Editor of this Journal some time back came in very useful.

You will probably remember that Mr. Dowding went to the trouble to make a complete survey of the question of selectivity in portables and he found that the introduction of a wave-trap (not including a series capacity) into one of the leads to the frame aerial was sometimes very effective, but in other cases an absorption wave-trap was more useful.

I tried out these methods and eventually I found that in my own case the absorption wave-trap method was the better. In order to use this kind of trap you do not have to interfere with the set itself at all.

The trap simply consists of an external frame aerial of as nearly as possible the same size as the internal frame aerial of the receiver, this external aerial being tunable by means of a small compression condenser of, say, 0.0005-mfd. capacity. The external or absorption circuit is tuned until the interfering programme is reduced to a minimum and then the desired station is brought up by the controls of the receiver to the best possible volume.

Of course, the closer the interfering and desired wave-lengths, the more your absorption wave-trap will absorb the desired wave-length as well as the other.

WHAT OLYMPIA WILL PROVE.

(Continued from page 129.)

doubt—if they will do so without the low-frequency filter.

What a pity it is that the only way to demonstrate at Olympia is to take an imperfect loudspeaker and attach it to a nearly perfect low-frequency input and call it a day! Before next year I really must propose a scheme I have in mind to give all manufacturers a like facility to demonstrate on all wave-lengths.

Yes, the show will be interesting, and we will see if there are some really novel ideas about, or whether it will be necessary to put the works in a beer glass or a picture frame to obtain an advantage in publicity. Selectivity, selectivity, selectivity and quality, quality, quality, but oh! please Union Internationale give us a chance to get both.

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