

With Splendid FREE Book "Sets and Speakers"

# Amateur Wireless

Every Thursday 3<sup>d</sup>

and Radiovision

Vol. XIV. No. 346

Saturday, January 26, 1929

# FREE

## The Season's SETS and SPEAKERS

FOR THE HOME CONSTRUCTOR

6<sup>p</sup>

# 32 PAGE BOOK

73  
ILLUSTRATIONS



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Sets

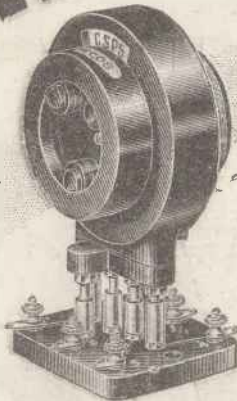
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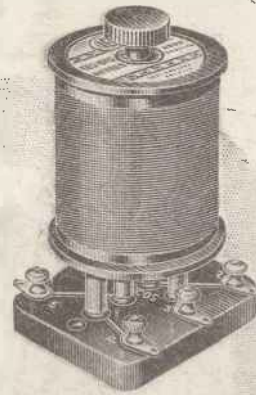
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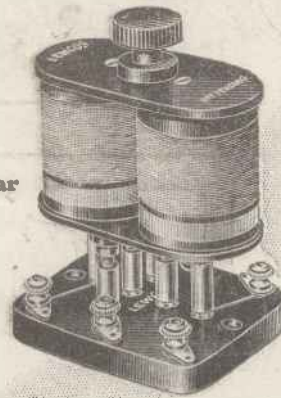
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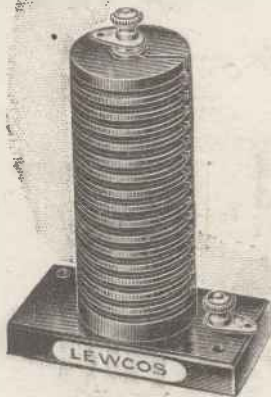
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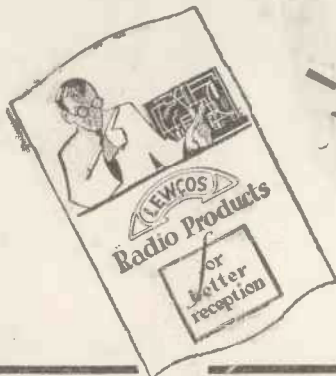


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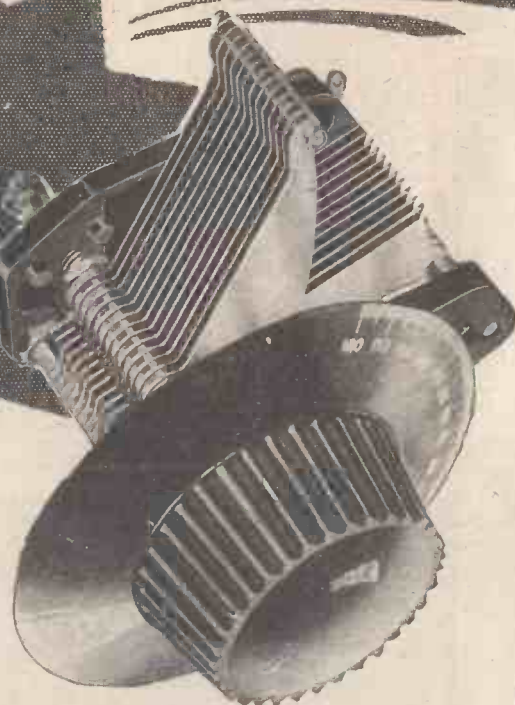
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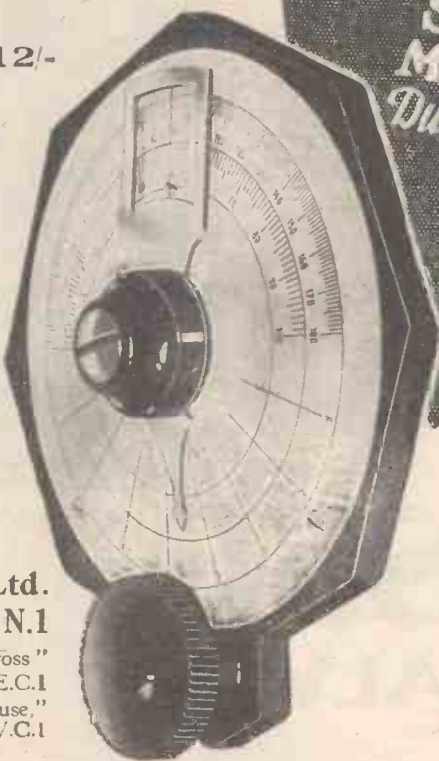
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# Amateur Wireless and Radiovision

The Leading Radio Weekly for the Constructor, Listener and Experimenter

— Editor: BERNARD E. JONES —

Technical Editor: J. H. REYNER, B.Sc., A.M.I.E.E.

Research Consultant: W. JAMES

Assistant Editor: H. CORBISHLEY

## This Brussels Business—"Rotten Television"—and "Secret Television"— For Dickensians—G.P.O. and B.B.C.!—Sensation!—A Lonesome Padre

**This Brussels Business**—It is, perhaps, too early yet to issue a verdict on the new Brussels wavelength scheme. Certainly as we go to press there seem to be many complaints of heterodyning, but this may be due partly to some of the foreign stations not conforming exactly to plan. A few more days may see the arrangement working more satisfactorily, and the only satisfaction one can get from the B.B.C. at the minute is the advice to "wait and see."

**"Rotten Television"**—This is the bright title given in an American contemporary to a "ham's" first experience of television, and of synchronising. And this is a piece of it: "For about half a second, actually, I had the picture. It flickered . . . and about the time I was wondering how and why they picked on a cow to televise it suddenly dawned on me that it was a man's face I was looking at. Then I lost synchronism and my man disappeared in a maze of badly intoxicated lines."

—and **"Secret" Television**—Well, television is different, though in its infancy, in this country. But what are we to do when a Sunday paper publishes, as one did recently, a column under the heading, "Secret Broadcast at Midnight," and commencing, "From an upper room of a building in the West End of London a secret television programme will be broadcast to-morrow night. It will be received by over 500 people . . ." The italics are ours. Where is the secrecy?

**For Dickensians**—The Lord Chief Justice (Lord Hewart) will speak at the annual dinner of the Dickens Fellowship on Thursday, February 7, and this will be relayed from the Piccadilly Hotel. A feature worth noting for all lovers of Dickens.

**G.P.O. and B.B.C.!**—Perhaps because the Post Office is like a kindly father handing out pocket-money to the B.B.C., there have been few broadcast skits on the P.O. Tommy Handley's little item, which introduced the catch-phrase



The nave of York Minster from which the recent ceremony of the enthronement of the new Archbishop was broadcast.

"A penny stamp, please," repeated *ad nauseam*, is one of the most successful so far. Well, now there is a new one, the creation of Roland Pertwee. The title is *Postal Orders*, and it is to be given from 5GB on February 1.

**Sensation!**—And, talking of broadcast dramatic art, it is worth noticing that on Monday next Belfast will have Clifford Bax's "thriller," *Upstream*. It is described by the Savoy Hill department concerned as a "drama of madness, nigger-driving, and stark murder." This sounds like the subtitle to a sob-stuff American film, and it is to be hoped that the broadcast version of Bax's play is better than its advertisement.

**"Seamark"**—The tragic death of "Seamark" (Mr. Austin J. Small) marks a real loss to broadcasting. Plays were not so much his strong point as short stories, but his famous *Ole in the Road* is one of the most successful items ever broadcast. It is the only one such item broadcast twice on the same day, for on October 20 last the famous *Ole* was given from 2LO, 5XX, and all stations except 5GB, and later in the same evening in the alternative programme from 5GB. A B.B.C. official informed an AMATEUR WIRELESS correspondent that "Seamark" was in touch with Savoy Hill about a new item for broadcasting when he died.

**A Lonesome Padre**—Tristan de Cunha, known as the world's loneliest island, will soon know wireless. The Rev. A. G. Partidge, who sails this month to take up his voluntary duties as chaplain on the island, is taking a short-wave set with him, and it is anticipated that this will put Tristan in touch with Chelmsford, PCJJ, 2FC (Sydney), and perhaps with America through 2XAD, 2XAF, and so on. A special schooner will call from Cape Town once a year, and this will enable the batteries to be attended to.

**Our Second Gift Issue**—Next week another handsome presentation will be made to readers of AMATEUR WIRELESS. We are giving away full-size blueprints of a remarkable "three"—the "Listener's Three"—and a New Linen-diaphragm Loud-speaker, both of which will be described in the issue. Do not fail to read the full announcement on page 128.

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# BROADCAST ARTISTES IN PICTURE



**KENNEDY ARUNDEL.**—One of the earliest baritones to broadcast in the first wireless concerts, Mr. Arundel has been heard frequently of late, his name figuring prominently in a concert at 2LO on January 9.



**CLARICE MAYNE.**—Most variety patrons remember "Clarice Mayne and 'That,'" the latter being the late James Tate, as clever a pianist as his wife is singer. Over the ether Miss Mayne has been partnered by Bobby Alderson.



**OSMUND DAVIES.**—A famous tenor heard a few days ago, who made his first broadcast in 1923. He has a wide classical, as well as light repertoire.



**DINAH EVANS.**—A brilliant young singer who was heard recently in duets in collaboration with Miss Anita Vaughan. Both are clever artistes and will be heard again shortly.



**J. H. SQUIRE.**—This famous leader of the Squire Celeste Octet needs but little introduction. He was one of the first to provide a "miniature" orchestra of picked soloists for wireless programmes.



**APRIL PENDARVIS.**—A favourite singer at 2LO, as well as at other stations, Miss Pendarvis has been heard many times in recent months. She has a wonderfully clear diction and wide experience.



**BOBBY BLYTHE.**—This well-known actor has toured the stations many times, chiefly as partner to the equally popular musical-comedy star, Dorothy Monkman. They both have been heard again frequently this month.



**MARY POLLOCK.**—Miss Pollock has sung in most types of B.B.C. programme. She possesses a lovely contralto voice and the happy knack of choosing the right songs for her various programmes.



**WILLIAM ARMSTRONG.**—Well known for his connection with the stage of Liverpool and the Liverpool B.B.C. station, Mr. Armstrong recently gave a talk on "The Provincial Theatre." He co-operated with Mr. E. Genn, of the Liverpool station, in "Faust."

# HOW TO TUNE



**G**OLFERS, and particularly early nineteenth-hole men, often talk about the importance of club grip—overlapping grips, “left and right” grips, and so on. Pianists put much trust in various “touch” theories. Well, the proper tuning of a wireless set demands something akin to the physical accuracy of the golfer’s grip combined with the delicate sense of touch of a pianist.

*To get the best in quality and range from a receiver careful tuning is necessary. This is quite simple, and here is described the proper methods of tuning-in with many popular types of sets*

So much for the actual manipulation of the control knobs, which, after all, is no

readjustment of the aerial condenser.

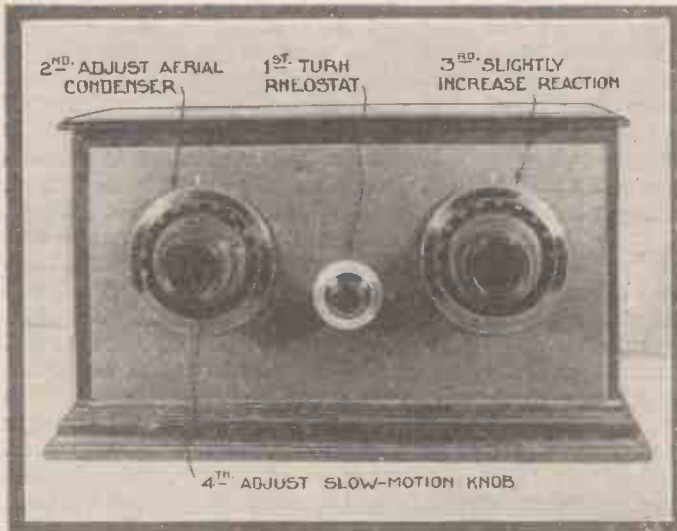
Now take another typical set, the panel of which is shown here, embodying one H.F. stage, a detector and as many L.F. stages as you like, since these have no bearing on the tuning. Here we have, as before, the aerial and reaction controls, a switch for all filaments and, of course, the additional tuning condenser for the

H.F. stage.

The method of going about things is not quite the same as in the no H.F.-stage set, for the extra control makes all the difference. This control does not play solo for pique, but makes the tuning operation of the whole set different from and rather more complicated than that of the two-valver without any H.F. stage.

First, set the aerial dial approximately to the required reading, the reaction control being at zero. Then the H.F. condenser dial is slowly swung round until the desired station is heard. Readjustment of the aerial condenser (trying the variation a little each way at a time) will again bring up the strength, and this may necessitate readjustment of the H.F. control. Then the effect of a little reaction may be tried in order to boost up signals and to sharpen tuning somewhat. Again readjustment of both aerial and H.F. controls may be needed, and a little practice will enable this to be done with both hands simultaneously.

*(Concluded at foot of next page)*



Here is shown the correct sequence in tuning a set which has reaction, but no H.F. stage

slowly turned round until the desired station is heard, possibly faintly. Then the reaction condenser control should be manipulated, the dial being turned in the direction which increases the strength. Signals will get louder, practically right up to the oscillation point, in most sets; and for broadcast reception, and when receiving any stations which other local listeners may want to hear, remember the B.B.C. slogan “Please don’t do it!”

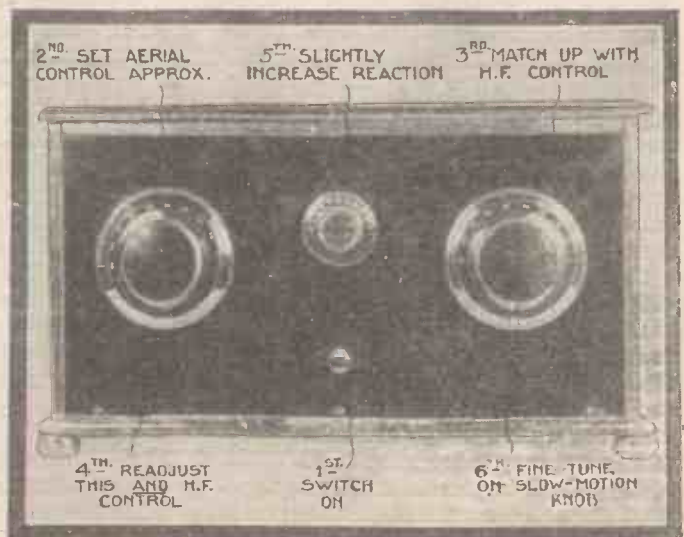
In other words, don’t force reaction above the limit at which the set oscillates and thus cause interference. Nor, if you are a stickler

more difficult than the changing of a gramophone needle or the putting on of a new record. Most valve sets nowadays have a fixed coil of some kind for both aerial and H.F. stages (that is, if there is an H.F. stage), and these are tuned by variable condensers. In addition, there may be a control—a small variable condenser, or perhaps a shaft on which a moving coil is fixed—for reaction. The “positive” controls, such as wavelength-changing switches, filament switches and so on, hardly come within the scope of tuning.

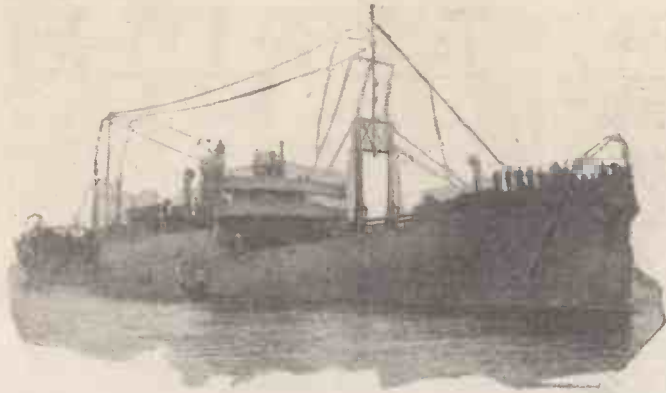
Consider a simple two-valver such as that the panel of which is shown here. This has been chosen because it is typical of so many receivers. It has aerial and reaction controls, a filament rheostat—and that’s all! It is just as easy to tune such a valve set as it is to tune a crystal set. The filament rheostat is turned on, the reaction condenser set at zero and the aerial condenser very

for purity, should you take so much advantage of reaction boosting that quality suffers; because, generally speaking, excessive reaction spoils purity.

The process is very much the same when receiving distant signals, but it will be necessary to keep one hand on the reaction condenser and the other on the aerial condenser, making generous use of reaction, without which the station may not be heard at all. With faint signals each alteration of the reaction setting may necessitate



The tuning of a set with H.F. valves should present no difficulty if the above sequence is followed



# HEARTBREAK RADIO!

*Much has been said of the benefits wireless confers on the Mariner—Here is the reverse side of the matter.*

LONG-DISTANCE wireless communication has become a commonplace. Britain's most powerful station, Rugby Radio, with its world-wide range, has firmly established itself as an Imperial asset. It broadcasts news to the far off Colonies and Dominions. It reaches out and hands messages to ships in every corner of the seven seas.

Shipowners can send messages to their ships whether they are off Cape Horn or Ceylon. *Via Rugby* is a route of wonder.

But there is another side to the picture.

## An Inglorious Uncertainty

What to the shipowner means sureness and certainty, is to the seaman translated into an uncertainty anything but glorious. Instead of going to sea with a definite destination in view, ships now set out not knowing where their voyage will terminate. Cargoes are sold and re-sold during the passage and the ship is sent to the place decided by the latest buyer. All very interesting and exciting to the youngster with no cares or ties, but for the great body of men in the Merchant Service, married men with families, this aimless wandering is heartbreaking.

For instance; a steamer sets out ostensibly for Rio de Janeiro with a cargo. After a week or two at sea she is well out in mid ocean, with the routine of the voyage going steadily along. Every one is beginning to look forward to letters from home—the home mail is the only thing that entitles the

sailor's existence to the name of life—when out of the blue comes a message *via Rugby* "Orders cancelled proceed Cape Town."

With a jolt all life is upset. The ship goes to Cape Town, but the letters with news of loved ones at home are at the other side of the Atlantic. Of course they will be forwarded, the postal service is excellent. Letters will follow, yes, always follow, month after month, from port to port they follow. It may be that some clerk in an agent's office will find out where the steamer is going next and forward the mail ahead to await her arrival, only to find that she has been diverted again—by Rugby

Then come many weary months of wandering, and wondering what is happening at home. There is news aplenty, Rugby sees to that. But the personal touch is absent, anything might be happening.

## The Unwelcome Message

Finally, however, the ship is headed for home. Hearts feel lighter and faces are brighter, but the wireless operator's appearance is always greeted with troubled glances; bitter experience has taught.

Through fair weather and foul the good ship carries along right up to the mouth of the Channel. Every one begins to think it is safe. If any change had been coming news would have arrived before this! London is the destination. Time tables are being looked up, tentative arrangements are being thought out for meeting wives, children, and sweethearts. The more

optimistic are sending off messages informing loved ones of time of arrival.

Up in the wireless room Sparks is listening to Rugby. A message for his call? Yes. Out it comes; temporarily he carries the sorrow of all the ship's company, as well as his own. He steps up to the bridge. The Captain stops in his stride as he sees the radio man appear at the top of the ladder.

One glance is enough. "What is it? Out with it man," he snaps. "We are ordered to Stockholm," is the reply as the envelope is handed over. And another pile of glorious dreams is shattered.

Possibly an even worse blow than this can be dealt *via Rugby* radio.

Its service is advertised as world-wide and when a casualty occurs in a seaman's family, thoughts naturally turn to the head of the family; the father, brother or son who earns his bread upon the salty waters. Then in the lonely watch of the night, through the crackle of atmospherics, Sparks picks out the dread message. "Mother died this morning." Or "Willie passed away last night."

It is no use trying to hand over a tragic note like that, with a mask of official indifference, to a shipmate of many months standing. One such message will sadden a whole ship's crew for days. And its memory lives long in the minds of seafarers. So it is that the term *via Rugby* has become synonymous with sorrow.

—FRANCIS STENGREAVE.

If there are two H.F. stages the job of tuning is not quite so easy, because Nature was not foreseeing enough to give us three hands! As a matter of consolation, though, the settings of the two H.F. controls will usually be found to be approximately the same, if the correct coils are employed.

There are one or two niceties of tuning which should not be overlooked. The reaction control is no plaything for ham-handed Henries (or Oscillating Oswalds for that matter!) because for good reception of really weak signals the set must be kept just under the shadow of the oscillation point, and the only way to accustom oneself to this tricky point is to practice a little on wavelengths remote from the broadcasting bands.

Oscillation should start and stop at exactly the same dial reading, any dis-

## "HOW TO TUNE"

(Continued from preceding page)

crepancy being known as overlap: usually this can be traced to incorrect battery values and should be checked because it is fatal to good results and tiresome for novices at tuning.

Some people use either the aerial or H.F. controls, or both, as a volume control, but this is a bad practice on two grounds. First, the detuning may tune in some other station which will give an unpleasant background or interference. Second, if the set is naturally sharply tuned and one is working a little to either side of the point of maximum signal strength, distortion of a kind may result owing to cutting off of the side bands.

## Other Arrangements

In some sets is incorporated a small fixed condenser in series with the aerial in order to increase selectivity, and there may also be some variable tapping on the aerial or H.F. coils for the same purpose. This must be operated in conjunction with the condenser controls and rapid tests made to see which gives the better result.

Receivers having screen-grid valves may have a variable resistance in series with the screen-grid, the purpose of this being to cut down the voltage. Alternatively there may be a separate tapping for this grid on the H.T. battery. In any case it will be found necessary to adjust this screen-grid voltage in conjunction with the H.T. voltage, for best results.



# A FRAME

THE little frame aerial to be described in this article forms an exceedingly useful addition to the equipment of any wireless enthusiast. Where the range is short or plenty of high-frequency amplification is available, the frame may often be substituted with beneficial results for the outdoor aerial, if when reception of the local station is in progress, interference of any kind is experienced. Its lower efficiency as a collector makes it much less liable than the outdoor aerial-earth system to bring in unwanted sounds, such as those produced by electrical machinery, spark signals, atmospherics, or more distant broadcasting stations on neighbouring wavelengths. For the super-heterodyne receiver a frame aerial is essential, and this pattern will be found exceedingly satisfactory. It also does very well for the portable, since it can be made, if required, of quite small dimensions.

### Trifling Cost

A frame of this kind can easily be made in a couple of hours and the total cost is ridiculously small. Here are the items required and their approximate cost:—

2 pieces of wood 1/2 in. square, s. d.	
24 in. long, say ... ..	0 4
1 piece 1/4-in. ebonite, 1 1/2 by 1 in.	0 1 1/2
3 3/4-in. countersunk 6B.A. screws and nuts...	0 2
3 6B.A. terminal tops, say ...	0 3
2 small wood screws and one 3/4-in. 4B.A. screw ... ..	0 1
About 20 yards of No. 26 d.c.c., say ... ..	0 2 1/2



By ARTHUR YORKE

each piece of wood 2 ft. 10 in. in length. Similarly, if a smaller frame is required for inclusion in a portable set, it can be made on exactly the same lines with the arms reduced to the required dimensions. If the size of the frame is 16 1/2 in., twelve turns will be needed to cover the broadcast band; the number of turns with different lengths of side is easily found by experiment.

### Construction

Begin the construction of your frame by making saw cuts at both ends of each of the pieces of wood in the way shown below. On the side that is to be at the front of the finished frame, rule six parallel lines a quarter of an-inch apart, the first

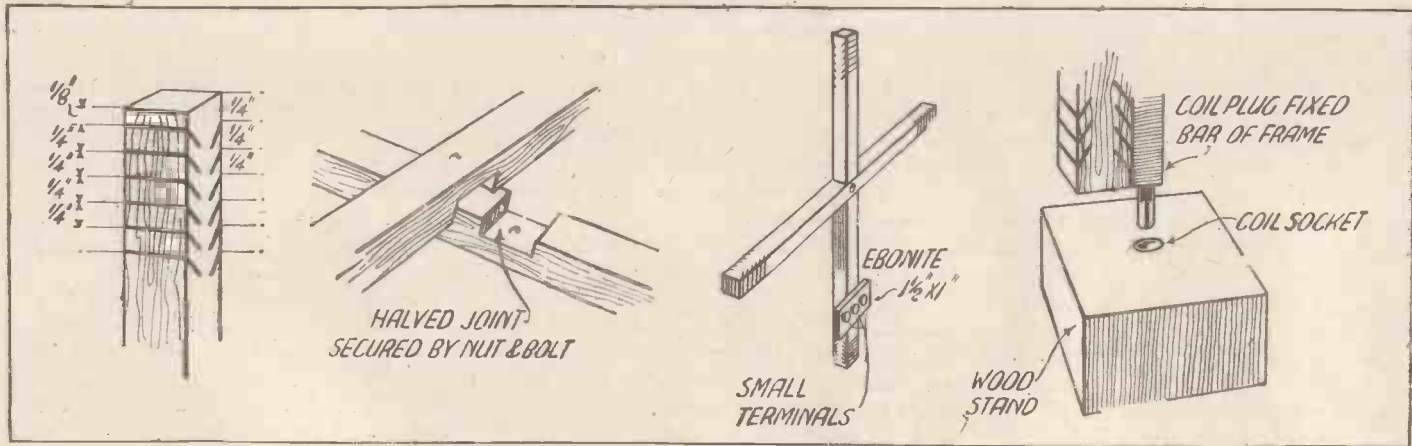
# AERIAL

joined so as to form a cross by the halving-in method also shown in detail. The halved-in joint is very easily made. Lay the two pieces across one another so that they are exactly at right angles, taking care that the mid-point of the upper one is exactly over that of the lower. Mark the places where the two pieces cross. Cut just half-way through each as shown cleaning up with a chisel. If care is taken, the joint will be a really tight fit with no play. It is secured by means of the 3/4-in. 4B.A. screw, which is passed through a hole drilled through the two parts as shown in the drawing. Put a washer under the head of the screw and another under the nut at its far end.

### Winding

Next make the little terminal strip from a piece of 1/4-in. ebonite, measuring 1 1/2 in. by 1 in. Along its middle line drill three 6B.A. clearance holes and make two others as shown in the sketch (in which is seen the finished frame) for the screws which will fasten the strip to the upright member. Countersink each of the 6B.A. clearance holes rather deeply. Insert a screw into each and fix it in position with a nut.

We are now ready to begin winding. Attach the end of the wire to either of the outer screws on the strip by means of another nut. Lay the wire in the notch nearest the centre at the front of each arm, keeping it quite tight. When the first turn is on, cross over to the back of the frame and put on the second in the same way. For the third turn come back to the front



All the constructional details of the frame aerial are shown by these sketches

1 coil plug and socket ... ..	0 2
Block of wood for stand, say ...	0 2
	1 6

The 2-ft. pieces of wood mentioned enable a frame with 16 1/2-in. sides to be made. I find this a very handy size, but those who prefer something larger can make the frame with 2-ft. sides by cutting

one being one-eighth of an inch from the end of the wood. At the back rule six similarly spaced lines, the first being a quarter of an inch from the end of the wood. The two sets of slots are thus "staggered." Place the wood in a vice and with a saw make a sloping cut as shown at each of the lines.

When all four ends have been dealt with in this way the pieces of wood are

of the frame and continue until you reach the sixth turn. Twist a small loop in the wire here and then go on with the remaining six turns. Fix the end to the unoccupied outside screw. Scrape away the insulation where you have made the loop, solder a short length of wire to this point, and with it make connection to the middle terminal. The centre-tapping will not

(Continued on page 150)

## TWO FREE BLUEPRINTS NEXT WEEK!

Our Second Great Gift Issue

With every copy of this present issue we are presenting a splendid little book, "THE SEASON'S SETS AND SPEAKERS FOR THE HOME CONSTRUCTOR," but this, you will note, is only the *first* of our special gifts.

Next week we shall have still another Gift Issue, and shall then be presenting *TWO FINE BLUEPRINTS*. The first of these shows, ABSOLUTELY FULL SIZE, a specially designed three-valver, one of the most compact, ingenious, and satisfactory sets we have yet produced. This set—

### The "Listener's Three"

includes a new coil arrangement which the reader can easily build for himself or, if preferred, can buy ready made. The set gives remarkably fine results and is particularly neat, its panel having all the virtues of extreme (and fashionable) simplicity. Truly it is a set for the listener—just one tuning dial and one reaction knob are the only controls on the panel. Without coil changing the set gives the British stations, including London and 5GB, and with a change of coils gives Daventry Senior, Radio Paris, Hilversum, etc. As a receiver for the broadcast listener, it will take a lot of beating. Full constructional details of the set and of the coils will be given in the issue itself, which, in addition, will contain many fine features.

So much for Blueprint Number One. What of the second? Many months ago

**ORDER NOW**

AMATEUR WIRELESS and WIRELESS MAGAZINE introduced

### The Linen-diaphragm Speaker

to this country. Very few people had even heard of it before we exhibited two examples on our stand at Olympia last September. Since then it has become the rage. Our experience with it has grown every week and has embraced a diversity of designs and any number of experiments, and we venture to think there are points in its design not yet dreamed of in the philosophy of some of our imitators. We now announce that the very best of the whole series has recently been produced by Mr. J. Sieger, the Chief of our Constructional Department, and it is this instrument,

### The Listener's Speaker

a duplex linen-diaphragm type, which will be the subject of Blueprint Number Two, presented free with every copy of next week's AMATEUR WIRELESS. We will not "give away" in advance the detail improvements that have gone to make this speaker the best of the series. We will just say this: you will simply "be in love with it." Full constructional details will appear in the pages of the issue.

Next week's number won't remain in print for many hours, so be certain to order yours to-day. Please pass the word to your friends and ask them to place their order immediately.

## For the Newcomer to Wireless: BATTERY CONNECTIONS

**I** NOTICE that in some sets high-tension negative is connected to low-tension positive, whilst in others the two negatives are joined. Which is the best connection?

There are points about both, though personally I very much prefer the latter, that is negative to negative.

The negative-to-positive connection, which places the batteries in series, is really a survival of the old days when good H.T.B.'s of satisfactory capacity and sufficient voltage were difficult to obtain. Most people used a 66-volt H.T.B., which was really not quite enough for the old general-purpose bright-emitters.

What difference do the battery connections make here?

By putting the two in series you obtained an extra four- or six-volts according to whether the accumulator had two or three cells, and this small extra voltage often made quite a difference.

Perhaps I am rather dense, but I don't quite see how putting the two batteries in series increases the plate voltage.

Well, you must remember that plate potential is always measured with reference to the potential of the negative

end of the filament. Thus when you wire H.T.— to L.T.+ and use a 6-volt accumulator and a 66-volt H.T.B., L.T.+ (and therefore H.T.—) is six volts positive to the negative leg of the filament; it follows that H.T.+ is 66+6 or 72 volts positive to the same point. The plate is thus 6 volts more positive with respect to the negative end of the filament than it would be if the batteries were wired negative to negative.

I follow that; but how is the position changed to-day?

First of all, high-tension batteries cost less and it is easier to obtain both high voltage and high capacity. Secondly I believe I am right in saying that the majority of wireless folk nowadays use 2-volt valves worked with single cells. Here series wiring means only a 2-volt increase in the plate potential, which is not worth while, as there is one rather serious drawback to the method.

What is that?

Let's just draw a very simple circuit of a single-valve receiver, with the batteries wired in this way . . . there we are. We will put in a connection between the plate lead and the filament negative lead to represent a short-circuit between H.T.+ and L.T.—. The positive end of the filament is

connected to H.T.— and owing to the presence of the short its negative end is connected to H.T.+ . We, therefore, apply 66 volts to the filament and the result is blue flames!

Bad enough in a single-valver, but one shudders to think of the same thing in a four- or five-valve set.

I agree. I have done it! Now let's redraw the circuit with the batteries in opposition. Again we put in a line showing a short from the plate lead to L.T.—. Since L.T.— is also H.T.— nothing happens to the valve, though the battery is liable to suffer.

Obviously the negative to negative connection is much safer.

With it we can burn out the valve only if we make a short between H.T.+ and L.T.+ , but this is a much rarer incident.

Why?

Well, don't you see, we usually earth low-tension negative and we earth also screens, and quite a number of other big metal parts of the receiving set, but there are comparatively few low-tension *positive* danger points if we use insulated wires. Practically the only ones in fact are the terminals and legs of the valve holders. The negative connection is a good safety-first practice.



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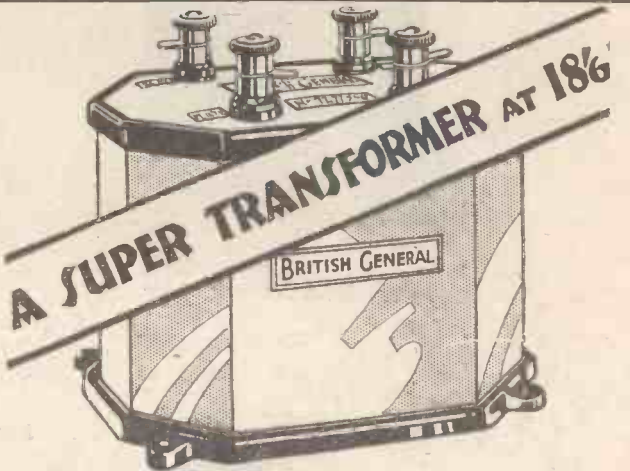
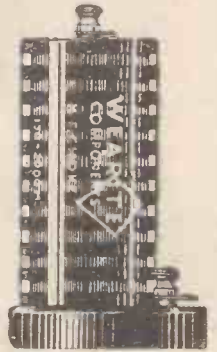
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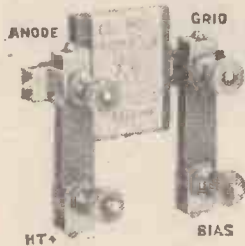
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## MET-VICK MOULDED RESISTANCES

Anode & Grid Leak for

**1/2**

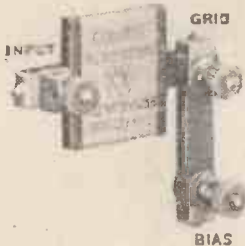
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“CRYSTAL,” who wrote the above, is the well-known wireless expert and critic of the *Manchester Evening Chronicle*, from which paper the extract is reprinted. His high opinion of the New Amplion’s qualities is shared by critics, experts, musicians and listeners everywhere. . . . Mr. Ernest Newman, the eminent music critic, writes of the “astounding results” obtained by Amplion. “I have had greater pleasure from listening-in than I have ever had before,” he says. Dr. N. W. McLachlan, the famous authority on loud speakers, says: “The New Amplion ‘Lion’ Loud Speaker reproduces sound better than any other loud speaker now on the market”. . . . Everyone is agreed on Amplion’s supremacy. Amplion means better reproduction, better Radio.

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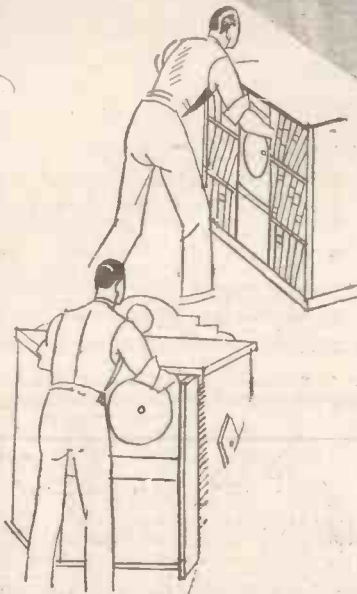
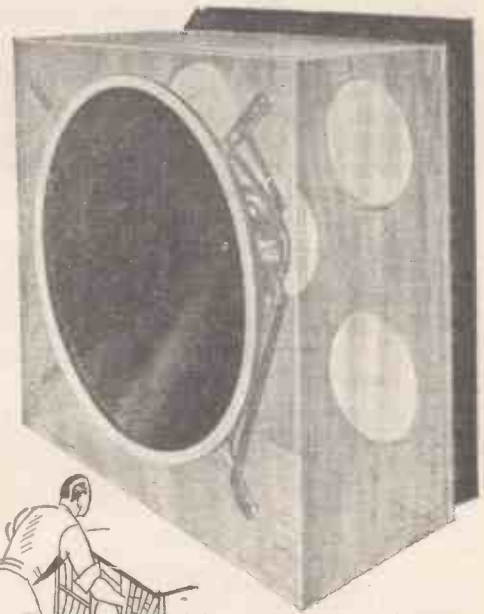
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There is no limit to the many ways in which existing furniture can be utilised to accommodate the New Amplion Chassis. Here, for instance, is a book-case in which the Chassis will fit perfectly.

Or that old chiffonier, used nowadays for storage purposes? Why not remove the door, fix a neat curtain, and make a home for Amplion?



# On Your Wavelength!

## Alternatives

SO far as London listeners are concerned, the B.B.C. has done very well in giving them good alternative programmes from 5GB. Nevertheless, in arranging these alternative programmes there is one little trap into which the "arrangers" fall very regularly. All the stations give frequent "orchestral" and "military band" concerts in which vocalists (accompanied by piano) take up almost as much time of the programmes as the bands themselves. Nobody grudges the weary instrumentalists their well-earned rests, when they may stretch their limbs and smoke their cigarettes. Some trick of fate steps in here and ordains that the B.B.C. bands and orchestras shall simultaneously "cease fire" and reach for their cigarette cases. The result is that efforts at obtaining a real alternative programme are useless, the B.B.C. ether being alive with sopranos and baritones.

## First Turn

The reason for this glut of song is not far to seek. It has become the conventional practice in the arrangement of concerts, radio and otherwise, for the orchestra or band to "open" the programme. After about a couple of items or a long overture, on comes the vocalist, who, as often as not, will sing us something good—yet painfully hackneyed. One can't help noticing that the same old songs turn up far too often, particularly those of the old-fashioned "drawing-room" type. To resume, the orchestra or band returns and gets to work again. This time it expands somewhat, giving us the "star" item of the programme—a symphony, a suite, or a thrilling piano concerto. (By the way, aren't those military band-piano concertos from 2LO most effective?) Exhausted by their splendid efforts, the instrumentalists stagger out of the studio and give way once more to the vocalist. And so on *ad infinitum*. The system is all right, but the result is a periodic broadside of ballads from all stations at the same moment.

## Out of Tune

I'm afraid I trod on a few toes when I made certain remarks about out-of-tune B.B.C. provincial orchestras. One angry musician, a member of one of the Scottish orchestras, ticked me off in no uncertain manner in a letter which ran to five hundred words, filling a whole column of AMATEUR WIRELESS! I admit that I am not a musician myself, and therefore I am unable to appreciate the various methods, such as "over-blowing," which good instrumentalists use to keep "in tune." However, as a frequent listener, via radio and otherwise, to the finest orchestras in the country,

I cannot help noticing (and occasionally writhing at) the inconsistency of provincial wireless orchestras in the matter of keeping in tune. One can only assume that inferior deputies are responsible for it. How else can one excuse some of the *blatantly* out-of-tune sounds heard from some of the provincial stations recently?

## "A" and "U"

Censorship of dramatic art has always been a difficult problem. The Lord Chamberlain is the censor of plays, and the film world has its own Board of Censors, of which the president is "Tay Pay" O'Connor, M.P. In the case of films, "A" certificates are awarded to films which are suitable for adult audiences and "U" certificates to films which may be exhibited anywhere at any time; films which don't obtain either certificates are "totally rejected." In general, only "U" films may be shown at children's matinees, but local authorities vary in their opinions as to the times of showing, etc., of the "A" films. There are great difficulties, I know; but it would help a great deal if the B.B.C. adopted some similar scheme of "certification" which would indicate to the "local authority" (the head of the house) whether the radio play was suitable for general family listening. Some of the finest plays are very "A," and it would be a pity if the serious listener was deprived of them simply because they were unsuitable for the general listening public. Of course, there are other plays which should be "totally rejected."

## Uncle Peter

London, Daventry, and Bournemouth children will be sorry to lose their cheery Uncle Peter. He is relinquishing his post of being "in charge" of 2LO's children's hour. Listeners won't lose sight—or, rather, hearing—of him, for he will probably be producing a few plays and sketches for grown-ups rather on the lines of his splendid little children's hour playlets. Good luck to Peter in his new sphere!

## Sorry You've Been Troubled

The sudden influx of complaints which have reached the French PTT authorities through the Paris press in respect to the interference caused by the Eiffel Tower to the reception of the Daventry 5XX programmes in France has induced the powers that be hurriedly to promise that the French high-power station, at least for the present, will close down nightly shortly after 9 p.m. G.M.T. For the time being the Paris radio fans are heaving a hefty sigh of relief, almost audible on this side of the channel, for the trouble caused by a high-

power station in the centre of a city must be experienced to be realised; it cannot be imagined. For some considerable period the French listener has cursed the harmonics of La Tour, which at odd times have poisoned the entire waveband and rendered difficult the reception of both local and distant stations.

## The Cause of the Trouble

One of the main causes of the trouble with the Eiffel Tower is due to the fact that the long-wave band (1,350 to 1,852 metres) can barely accommodate seven high-powered stations, and if the allotment of wavelengths is to be an equitable one they must be given to Great Britain, Germany, France, Sweden, Denmark, Poland, and Finland. If this is the case, France may only possess *one* high-power station in that portion of the waveband, namely, Radio-Paris, which has been working for several years and has given an efficient service. But Radio-Paris is a privately owned transmitter, usually at loggerheads with the PTT authorities, who run the state-owned stations, of which Eiffel Tower is the principal unit. And there you have the problem in a nutshell!

## The "Plan de Bruxelles"

It is, of course, unfortunate that the wavelength of 1,485 metres should have been taken by both Paris and Moscow. For the present, FLE (Eiffel Tower) is broadcasting on a slightly higher wavelength, but this by no means clears the Russian 30-kilowatt. France now possesses a large number of State and privately owned stations, in competition with each other. Although specified wavelengths, according to the *Plan de Bruxelles*, have been allotted to that country, there are not enough to go round, with the result that the new scheme from the outset must meet with many difficulties through this sole reason; if it is wrecked at the start it will be solely due to the lack of co-ordinated co-operation on the part of French broadcasters.

## A Mystery Hum

I came across a curious effect the other day when using a moving-coil loud-speaker. In the particular arrangement which I had, the field magnet was of the D.C. type, taking 100 milliamps at 100 volts, and in order to energise this field it was being used as one of the chokes in the mains unit supplying the amplifier. This is quite a well-known method and operates satisfactorily. The whole amplifier had been tested out beforehand and had been working satisfactorily for some time, but one day I found the hum, which had only been faintly audible in the background even

## On Your Wavelength! (continued)

when no music was being transmitted, had suddenly increased in intensity and was now actually causing a certain amount of disturbance during the transmission of musical items. Somewhat perturbed, I ran over all the connections and made a number of changes, but no improvement seemed to result.

### A Simple Explanation

I ultimately traced the trouble down to the magnet itself, for when every other circuit was disconnected the hum was still coming from the loud-speaker. I then disconnected the moving coil and took the leads to another loud-speaker, which was energised separately. The hum still persisted, but to my surprise it came from the original loud-speaker, while the new loud-speaker was perfectly silent. Now, the original speaker had had no current passing through its moving coil whatever, the only current being that flowing through the field winding. There was no ripple in the moving-coil current, because the second speaker was quite silent. "Oh, ho," thinks I, "here we have the nucleus of a very pretty idea—a moving-coil loud-speaker without any moving coil."

It really was almost by accident that I stumbled across the solution, which was that the coil was touching the side of the magnet pot very slightly. This was sufficient to set the whole diaphragm in vibration in sympathy with the 50-cycle fluctuations in the current passing through the pot. A careful re-centering of the coil eliminated the trouble altogether and made it perfectly silent. I see, therefore, that my great invention will not come off.

### The New Wavelengths

It is perhaps rather early to form any opinion upon the success or otherwise of the new "Brussels Plan" of wavelengths, for at the time of writing it has been in operation for less than a week. Further, quite a number of stations are still working on temporary wavelengths, which will be altered as soon as the new system has got properly into its stride. One can therefore only give one's impression up to date of the working of the present order of things, reserving final judgment until a later date. On the evening of Sunday, January 13, when the "Brussels Plan" was tried out for the first time, I made a careful tour of the broadcast band from 200 metres up to 554 metres. It was a good night for reception, atmospherics being absent and stations coming through with very satisfactory strength, apart from a certain amount of fading noticeable in some cases.

### Wanderers

The first thing that struck me, after having covered about half the band, was

that though the 9-kilocycle separation prevents direct jamming and enables the transmissions of stations on adjacent wavelengths to be separated without much difficulty, it is apt to produce a high-pitched whistle, which in many cases is bad enough to spoil one's pleasure in listening to speech or music. The next point was that quite a number of stations were appreciably off their allotted new wavelengths.

### Transmission Faults

Here and there, too, one found that the closer packing of stations showed up a fault in transmission that was not so much in evidence with the wider separation; there are some stations whose wavelength does not remain absolutely constant, but wobbles a little during transmission. On some of the common wavelengths one found that certain members were a little above or below others in the group. On one point, therefore, there can be absolutely no question. Unless every station tunes to its proper wavelength and sticks to it, the 9-kilocycle system is going to produce chaos infinitely worse than was ever found under the old 10-kilocycle scheme.

### Individual Stations

On the whole, I found matters much better near the top end of the band than they were below 300 metres. There was, for example, no heterodyne whistle to be

**DO YOU READ THE  
WIRELESS  
MAGAZINE?  
THE BEST WIRELESS MONTHLY**

noticed accompanying the transmissions from Milan, Brussels, Vienna, Munich, or Budapest; every one of these was, in fact, coming through as well as one could desire. Down at the bottom, though, matters were not nearly so good. With a receiving set that is quite as selective as a set should be for good quality in broadcast reception, I did not find it too easy to separate Nürnberg from Newcastle. The German station is, of course, very strongly received in this country, and 5NO was coming through with a considerable punch. There was a whistle on both transmissions—probably caused by Rjukan, which works on a wavelength intermediate between these.

### German Stations

I must say that I was surprised at not being able to separate Nürnberg from Newcastle more easily, for there are 20 kilocycles between them. Nürnberg, how-

ever, showed at my station a wipe-out bigger than that from any other station except 5GB. Cologne does not seem to have benefited by the change. Interference is hardly noticeable, but quality is not quite what it was. Much the same may be said of Kaiserslautern, Münster, and Kiel. A station which does appear to have gained an advantage—so far, at any rate, as this country is concerned—is Copenhagen, which I now receive better than I have ever done before. Friends with sets that are not selective tell me that Leipzig often comes right through 2LO's transmissions. It seems to be rather a pity that such powerful stations such as Leipzig, 2LO, Stuttgart, Manchester, Toulouse, and Hamburg, should all be in the narrow band between 358 and 392 metres.

### Told Off

A correspondent who writes from Glasgow gives me a thorough hauling over the coals for having stated that the blackening of the bulb in a carbon lamp was due to electronic bombardment of the glass. "How," he asks, "could electrons shot off from a filament form a black coating on the inside of a carbon lamp?" He goes on to accuse me in the friendliest way of writing nonsense. Well, I have always understood that electrons are responsible for the blackening. Edison, too, must have thought that it was caused by a bombardment (I don't think that the word "electron" had been invented at the same time that he observed the effect), or he would not have had the brain-wave of introducing an anode.

### The Electrons Responsible?

But to my mind there is something much more convincing than this. Most readers will have examined at one time or another one of the old-fashioned bright-emitter valves made before the days when magnesium gettering was in use, so that the bulb remained clear after sealing off had been done. One very frequently noticed, when the plate was in the form of a horizontal cylinder, that the glass was very much blackened, a dark patch appearing on it opposite each of the open ends. This patch never made its appearance unless a valve had been subjected to the bombardment process, and there appears to be very little doubt that it was caused by a stream of electrons from the filament hitting the inside of the bulb with tremendous velocity. I remember once showing the head of one of our biggest valve-making firms one of his products which had a distinct dimple in the bulb over the black patch. He explained that the glass had begun to cave in a little, owing to the pressure of the outside air, under the effects of electron bombardment.

THERMION,

**OUR SECOND GIFT NEXT WEEK—FREE BLUEPRINTS of THE "LISTENER'S THREE" and THE LISTENER'S SPEAKER**





# Adventures with a FULTOGRAPH



An account of some first experiences in broadcast picture reception

By R. W. HALLOWS

WHETHER you have bought your picture receiver or, being skilled in the use of tools and well supplied with workshop equipment, have made it for yourself, the first thing that you will naturally wish to do, after spending some time in gazing upon it with pride, is to receive pictures.

Myself, I made rather an ambitious start, for having brought mine home by an evening train I could not wait for the next day's transmission from Daventry, but must needs go at once for Vienna at a range of 1,200 miles. Now the Rosenhuegel station is a bit of a problem at times, and on this particular night when I turned him on at about half-past nine I found him behaving in an unusually trying way. He doesn't often fade, but he was doing so then; nor is spark interference very frequent, but a spark transmitter was merrily engaged in blotting him out at intervals. However, I hoped for the best and kept Vienna tuned in, waiting for the thrilling words which would announce the sending of pictures. At times it appeared perfectly hopeless; then one had periods of elation, when the concert programme was coming through to perfection.

At 10.20 p.m. the announcer said that pictures would now follow. Quivering with excitement I switched on the picture receiver. Could I obtain the necessary two milliamperes from its rectifying valve? When the tuning note began the pointer crept up to a little over 1 milliampere and my heart descended to my boots, for nothing that I could do would increase the reading—a period of fading was in progress. The fates were kind and it came to an end just before the picture began. The needle of the milliammeter moved up to 2.4 milliamperes and remained steady.

"Tick-tick-tick-tock, tick-tick-tick-tock,

tick-tick-tick-tock," said the loud-speaker. I switched on and the queer noises which accompany a picture transmission were heard. My eyes were glued to the paper on the cylinder. Would anything come through under such unfavourable conditions? It would! It did! At the end of four minutes I had a picture, though frankly I must admit that it was not a very good one. My old enemy the spark transmitter had been at work.

### First Successes

On went a fresh piece of paper, the machine was cranked up and I was ready before the three "vics" sounded again. By this time the milliammeter was showing a reading of 3 milliamperes and my hopes ran high. Nor was I disappointed. The

the third came along, the results on the whole were a great success. One of the pictures was a line drawing, the supreme test for a picture receiver, since unless the synchronisation is perfect distortion is bound to be present. That synchronisation was as it should be was shown by the perfect legibility of the small lettering that accompanied the drawing.

By the time that Sunday came round I was feeling quite an old hand and, therefore, had few fears when I tried for Königswusterhausen at a quarter to one. Daventry is then silent, so that there is no difficulty about tuning in the German station. My first picture, however, was not quite successful, either Königswusterhausen was sending too fast or my motor was set to run rather too slowly. The picture was described by a friend as a "muzzeytint." For the next I set the motor at a higher speed. This was fairly successful, but the speed was not yet quite fast enough. Another increase was made for the remaining pictures and beautiful reception resulted. Make a note of Königswusterhausen's Sunday times: 12.45 to 1.30 p.m. He also sends on Mondays, Wednesdays, Thursdays and Saturdays from 12.45 to 1.30 p.m. and on Tuesdays and Fridays from 9.45 to 10.15 p.m.

You may have some difficulty in receiving his weekday pictures owing to interference from Daventry until you realise one very important point in connection with the Fultograph. For the

reception of audible broadcasting you must not make your receiver too selective or you will ruin the quality owing to the cutting of sidebands. This does not apply to the picture receiver. So long as you can receive the control notes you can cut everything else as finely as you like. This means that you can make your receiver ultra-selective

(Continued on next page)



Left: Machine running slightly too fast. Right: Paper moistened too much

spark transmitter remained silent; no fading occurred. An excellent picture resulted and I was in the seventh heaven of delight.

The next day I was bold enough to demonstrate to several friends when 5XX came on at two o'clock. Though I got the paper rather too wet for the first picture and forgot to wind up the motor before

# THE "LISTENER'S THREE"

## —and a NEW LINEN-DIAPHRAGM SPEAKER

Preliminary Notes on the Set and Speaker of which a Free Blueprint will be Given Next Week.

THE AMATEUR WIRELESS Technical Staff knows that there are very many listeners who want something different from the conventional type of set. A good example of such an "out-of-the-ordinary" receiver is the "Bantam Three," which was described recently in AMATEUR WIRELESS, No. 341. This is an ultra-compact little set with a giant performance. It found ready favour and showed that there is a demand for very compact receivers embodying even more ambitious circuit arrangements.

To meet this demand the "Listener's Three" has been designed. While it owes its conception to the "Bantam," it is, of course, an entirely new type of receiver. It embodies a screen-grid valve and so will appeal to the man who wants more "distance" than he can get on a three-valver without H.F. amplification.

### Three-valves—Single Control

Just think of it! A receiver with a screen-grid H.F. stage and highly efficient L.F. amplifying arrangements, the whole controlled by one knob, contained in a cabinet measuring only 7½ in. by 8½ in. by 10 in. This means

that in a midget box you have a really "hot-stuff" receiver containing the latest ideas in H.F. amplification. And because it is a one-knob control set it can safely be entrusted to any member of the family to operate.

To be finally convinced it will be necessary only for you to see the full description which will be given next week in a bumper number of AMATEUR WIRELESS. Nor is this all. It is probable that a set such as this will be made up by large numbers of entirely newcomers to radio home-construction, and by those who have old-fashioned equipment and want to "sweep with a clean broom." So accompanying the receiver will be a loud-speaker specially arranged to go with it.

### The New Loud-speaker

This loud-speaker is the latest type of linen-diaphragm reproducer and is considerably in advance of its forerunners in several important respects. As is well known, linen-diaphragm loud-speakers have been developed exclusively by AMATEUR WIRELESS in this country, and it is something to be proud of that the AMATEUR WIRELESS Technical Staff alone has been solely responsible for this new reproducer

which is in many respects an improvement on the moving-coil instrument.

Constructionally this instrument is just as easy as previous loud-speakers of this type, and the receiver, while being the last word in compactness, presents no more "snags" to the home-constructor than do any other receivers previously described.

### Free Blueprint

In presenting the exclusive details of the "Listener's Three" and its accompanying loud-speaker to readers, AMATEUR WIRELESS feels that it is rendering a service. And in order that everyone who reads next week's bumper number will have no trouble in constructing the receiver and loud-speaker. Blueprints of both will be given Free.

In this way it is hoped that all readers will be able to appreciate the receiver and its loud-speaker. Both are worthy of the valuable free gift of the blueprint. Both will be "winners," and despite the ever-increasing popularity of AMATEUR WIRELESS' constructional features it is anticipated that next week will see a record demand. So be wise and order your copy early!

## "ADVENTURES WITH A FULTOGRAPH" (Continued from preceding page)

and can further improve matters by employing a wave-trap. By using a tuner with very loose coupling between the aerial and the grid of the high-frequency valve—on these long waves it is better to tune the aerial than to leave it "aperiodic"—I have little difficulty in getting rid of 5XX even at a range of only forty-five miles.

I could not receive broadcast programmes with any pleasure with such a selective arrangement in full use, but it enables pictures to be received from the German station with astonishing perfection. If you want a wave-trap you can easily make one by connecting a suitable coil and a variable condenser in parallel and wiring these in series between the aerial lead-in and the aerial terminal of the receiving set. Be careful, though, to keep your wave-trap so far from the receiving set that no interaction takes place. To use this kind of trap set the condenser (at zero first of all and tune in 5XX as strongly as you can. Then move the knob of the condenser until his signals become very weak or disappear altogether.

You will now find that you can get Koenigswusterhausen; a slight retuning of the wave-trap may be necessary when you have done so.

The same applies to Vienna. With a smaller coil the wave-trap is equally suitable for cutting out 5GB or any other station that may be causing trouble. Make your set as selective as you can by getting rid of damping by legitimate methods, but

don't try to obtain the whole of your selectivity through the undue use of reaction.

Get your cylinder running at the right speed before you do anything else. Don't trust to luck, but set about it systematically. Connect up the instrument to the rectifying panel and the batteries, but not to the set. Wind up, release the brake of the motor, switch on and remove the negative grid-



This picture shows the effect of induction from A.C. mains

bias wander plug. The cylinder will now start to revolve. Count the revolutions made in one minute, as you can easily do either by listening to the clicks or by watching the clip that secures the paper. Adjust the speed control knob until you are getting between fifty-five and sixty revolutions a minute.

Be careful not to have your paper too damp when it goes on to the cylinder. If

it is over wet a smudgy picture will result.

Give a little attention to the adjustment of high-tension and grid-battery potentials. I find that normally from 72 to 80 volts H.T. and 7½ volts grid-bias is excellent. Should the tuning note be rather weak, an increase in both H.T. and G.B. may be made profitably.

Lastly, I want to mention a very important point. If there is any interference by induction from alternating current mains in the neighbourhood of your receiving set you may find that the unshaded portions of pictures show at times markings rather like the graining of wood. An improvement can often be made by moving the Fultograph into another room, using extension wires from the loud-speaker terminals and separate batteries. Personally, I am strongly in favour of using separate batteries for, I believe that it is real economy to do so. The Fultograph requires very little current from either H.T. or L.T. sources; therefore quite small batteries of its own can be used.

The still picture receiver opens for the wireless enthusiast an entirely new field of interest.

The three Graham brothers of the Graham Page Motors Corporation in America, are the "actors" in what is described as the first commercial talking film. By means of this, in conjunction with portable projectors, it is hoped to carry, in a very convincing manner, messages to dealers.

RECENTLY it was stated in AMATEUR WIRELESS that a radio beacon station was being provided at Start Point, Devonshire. As this station is not a new source of broadcast programme matter, perhaps the information was passed over with a sniff by some readers! But these beacon stations are vitally important, and are very interesting from the radio point of view.

AN AMATEUR WIRELESS Special Correspondent has examined the type of equipment at the Start Point station recently, and as there are quite a number of these beacons at various points round the coast readers may care to try picking-up the beacon signals.

The main idea is that there is a number of stations at coastal danger points each equipped with a transmitter giving a clearly distinguishable train of signals for the benefit of ships fitted with radio direction finders. So many merchant vessels carry a radio D.F. plant that a large number of these beacon stations is needed, so that bearings can be taken easily.

**Everything in Duplicate**

Start Point is at the southernmost end of Start Bay, near Dartmouth, and between Torquay and Plymouth. The station itself is on a rather barren promontory, and the radio portion is only part of a comprehensive coastal equipment. Externally the



BY AN "A.W." SPECIAL COMMISSIONER

obvious that everything is in duplicate; and this is necessary because a large number of merchant vessels put their entire reliance on the direction finders. Start Point's call sign is GSM, the wavelength 1,000 metres, and the power 500 watts. The estimated range is one hundred nautical miles, and as the signals transmitted are I.C.W. (interrupted continuous wave) listeners within range can pick up the beacon's indication whether their sets are oscillating or not.

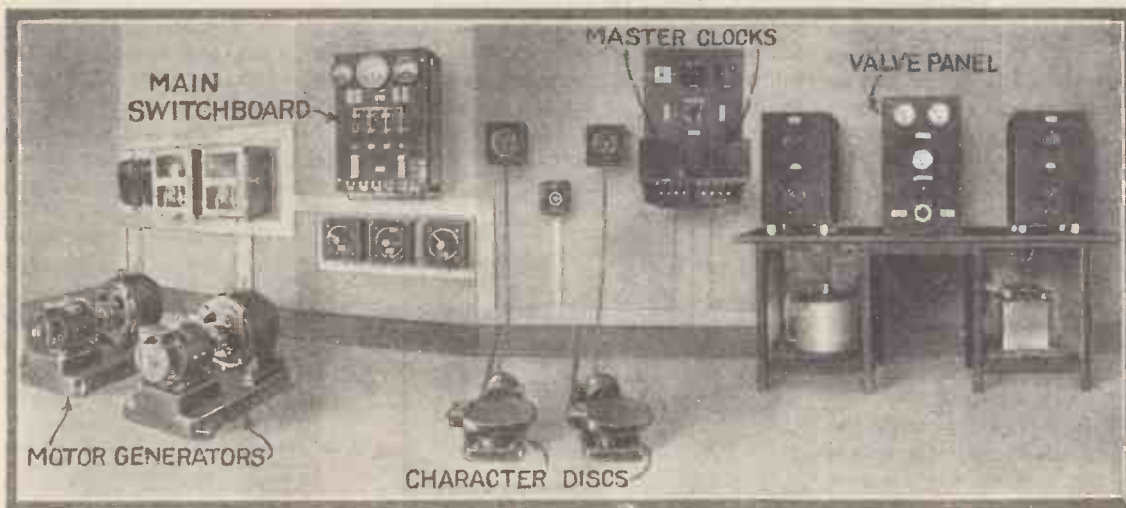
The power supply at GSM is a 50-volt accumulator driving a motor generator. The duplicate generators can be seen to the extreme left in the photograph, which shows a general view of the radio-room. Above these are the two automatic starters. To the right of these is the main switchboard and below the field regulators. All these controls can be pre-set and do not need frequent adjustment.

each driving motor, and this can be seen on the wall just between the two revolution indicators.

**The Control Clocks**

Just to the right of this apparatus is a large wall panel, which is, in effect, the key to the whole installation. It carries two master control clocks, which automatically start or stop the transmitter at specified intervals, and various relays and switches associated with the automatic starting and stopping.

So much for the power control and switching apparatus. The radio transmitter itself is carried on the table to be seen at the right. The centre panel is the oscillation generator (the main components of which, including valves, are in duplicate); the closed circuit inductance is to the left of this and the main aerial tuner to the right. Below are the closed circuit con-



In the Radio Room at GSM, the latest Radio Beacon Station—

at Start Point. Note the Master Clocks and the Signal Character Discs

only indication that there is any radio at the station is a lattice mast, a short distance away from the station itself and from which an aerial is stretched to the top of a lighthouse tower.

On first entering the radio-room it is

The mechanism for transmitting automatically the train of I.C.W. signals, known to the engineers as the character disc, is placed on the floor and, as mentioned, is in duplicate. This part of the apparatus can be seen in the centre of the

denser and the main power transformer.

Thus you will see that the wireless side is really simpler than the control and keying side. However, this is hardly surprising when you consider that the whole plant is switched on and off by the master clock.



# Selectivity with Plug-in Coils



If your receiver is not as selective as you might wish the hints contained in this article by Our Technical Editor will enable you to remedy matters

THESE are many readers who possess sets with which they are quite satisfied in the normal course of events, but who on occasion would like to obtain an extra measure of selectivity. They may be deterred from attempting to do this by the feeling that any alteration they make may detract from the efficiency or simplicity of their set for normal working. They consequently decide to leave well alone.

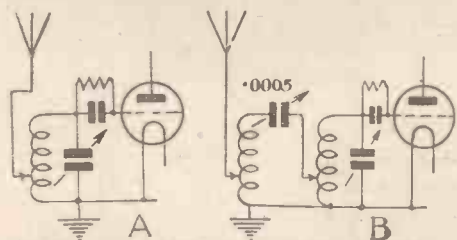
There is a great deal in this, but there are one or two devices which may be employed in order to increase the selectivity of one's

the use of this method over the plain detector, but this reduction in signal strength is not anything like as much as one might suppose.

In the early days of broadcasting, listeners in the Eastern area, particularly around Broadstairs, were considerably troubled by spark interference from the North Foreland station. Many users in those days employed crystal sets for their reception; so that no remedy of an elaborate nature could be utilised. Some tests by Post Office engineers showed that the use of a coupled circuit of a type similar to those shown in the diagrams was responsible for cutting out a great deal of the spark interference, and satisfactory reception from London could be obtained even on a crystal circuit. This indicated that the drop in signal strength could not be very serious and the method will repay investigation.

number of turns may be used if the coupling is kept weak, but the two circuits will interact if the coupling coil is large. The aerial can be coupled to the primary, as shown or by a .0001 condenser as indicated by the dotted line.

The variant shown in Fig. 3 may also be tried with a good measure of success. Here the two circuits are coupled together through a neutralising condenser. As the capacity of this condenser is increased, the



A normal Aerial Arrangement and a Loose-coupled System

receiver, which do not affect the set in any way and are purely in the nature of aerial arrangements. One of the most successful of these is the loose coupler. This has to a large extent fallen into disuse, but there is no reason why this system should not be employed to a much greater extent.

A circuit of such an arrangement is illustrated in Fig. 1. It will be seen that the aerial is not coupled directly to the grid coil of the receiver, the signals being fed to this position through an intermediate circuit. Both this intermediate circuit and the grid circuit are tuned with a .0005 condenser. The coil for the additional circuit should be similar to that used in the grid circuit. For the broadcast band two 60 X tapped coils may be used.

The object of this method is to make the signal go through a double filtering action before reaching the grid of the detector valve. The tuning of the circuit is no more complex than when using a high-frequency stage. In fact, it is somewhat easier, the only difference being that there is not the extra amplification arising from the high-frequency valve. There is, therefore, a slight drop in signal strength to be expected from

### Other Coupling Arrangements

I bore this in mind to some extent when revising the "Lighthouse Three," which was the receiver presented to Beachy Head Lighthouse by AMATEUR WIRELESS; and here, in order to make it as simple as possible, a gang-controlled arrangement was adopted.

Two variants of the principle are shown in Figs. 2 and 3. In the first figure we assumed that the aerial was coupled by the auto-tapped arrangement. The arrangements shown in Figs. 2 and 3 relate to other

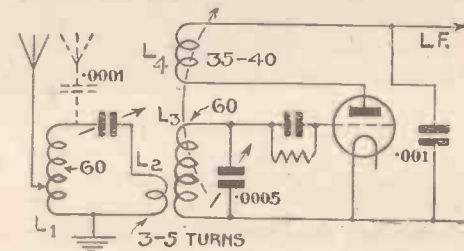


Fig. 2. A Good Circuit to Try

coupling is made tighter; so that it is possible to obtain a quick and ready control over the coupling.

It should be remembered that all these circuits are coupled circuits. Such circuits are only satisfactory for ordinary use as long as the coupling between them is comparatively weak. Under such conditions each circuit will tune sharply and at a single point. The selectivity of the two circuits will be found to be definitely better than with one only, this applying not only to the elimination of spark interference, but also to cutting out the local station and receiving distant transmissions. The circuit of Fig. 3 is particularly useful in this connection, for the coupling can be varied and the selectivity can be made almost anything that is desired, although as the selectivity becomes greater the signal strength will also fall off.

If the coupling is made too tight it will be found that the circuits tune in in two places instead of one. This is what is known as the "double-hump" effect, and will result if ever the coupling between two circuits is made too great. The circuit of Fig. 2 enables this to be tried quite easily, for if the coupling coil L2 is made too large, this "double-hump" effect will be obtained.

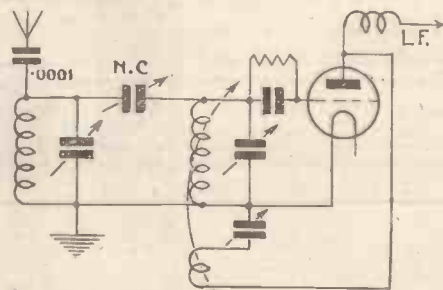


Fig. 3. Another form of Coupled Circuit.

methods whereby the primary circuit may be coupled to the set. The first of these is an ordinary coupled arrangement. A coil of five turns or less is used to couple the primary circuit to the secondary. A larger

# WITHOUT FEAR OR FAVOUR



*A Weekly Programme Criticism by Sydney A. Moseley*

**T**HE *Times* was interested in the extracts I sent it regarding the play about which I recently protested. I hear from a friend in Printing House Square that my letter was taken up to Savoy Hill authorities, who handed over to Sir Geoffrey Dawson, the editor of *The Times*, the manuscript of the play. Not only were my extracts found to be correct, but it was also found that there were other lines of a coarser nature which I had not mentioned.

The dignity of the great newspaper, however, was called into question when it was found that I had already ventilated the matter—as my readers know! “We notice,” they wrote me, “that your letter appears in a contemporary. . . .” My mistake. It won’t occur again. The Thunderer first, in future!

Seriously, I was sorry that so important a question was not more widely ventilated. As it is, the promise made to me that future plays would be more carefully read was not kept when the next big production was put over.

After *The Passing of the Third Floor Back—Carnival*. Plenty of “hymns” one day and much plente “hers” the next. You pays your ten bob and takes your choice.

*Carnival* was excellently produced, and I congratulate the anonymous man responsible. Also friend Maschwitz, alias Holt Marvell, who adapted the play for the radio in collaboration with the author, Compton Mackenzie. On the whole, it was one of the most successful plays of its kind heard recently. Why it was spoilt by some lines (which were as totally unnecessary) I can’t understand. And the play, timed to finish at eleven o’clock, finished near midnight. Somebody gone crazy again in the timing.

By the way, I invite readers to let me have their views about the coarseness of which I complain. When I gave a talk at 2LO on the same theme I was overwhelmed with letters of gratitude from listeners all over the country. I am a very busy man, but if I am encouraged I shall take this question up with energy.

Welcome back to Sir Oliver Lodge! One

of the few speakers who contrives to put over his personality in his speech. His asides—or, rather, parentheses—are his very own.

I think the children must have thoroughly enjoyed the whole series of the *Alice in Wonderland* plays. Well done, C. E. Hodges.

**We give away Free Blueprints of the “Listener’s Three” and a New Linen Speaker Next Week. See page 128.**

Billy Mayerl did the “Can you synopate?” illustrated talk in a most interesting manner. His speech is agreeable and his choice the best of possible musical illustrations for his purpose.

The “Indian Programme” from London was an unusual and interesting entertainment. I don’t think the reading of the poems of Rabindranath Tagore helped it at all; but, then, poetry on the wireless is not often heard at its best. I have taken quite a liking to that sweet melancholy instrument—the “sarangi.”

On the rare occasion when, instead of the usual service, we were given three-quarters of an hour’s church music, the choir was hardly first-rate, and the tenor with the *tremolo*—well, I suppose Sunday is not a lucky day for us. I still maintain that the studio choirs ought to be used with studio services—unless, of course, we can always have St. Martin’s-in-the-Fields.

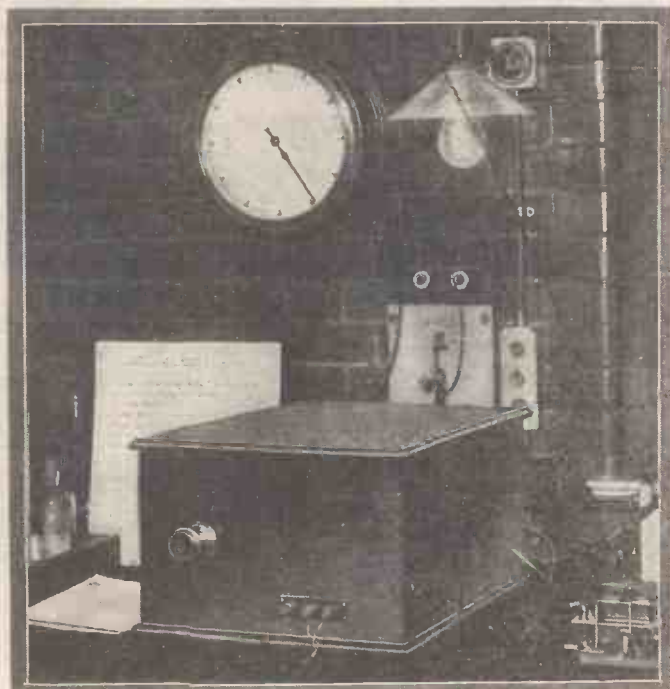
The old songs from 5GB on Friday were most enjoyable. It’s wonderful how the

sentimental tunes of years ago can come back and affect one. The only fault I have to find with the programme—or, at least, the way in which it was staged—is that the effect of a family sitting round the fireside, singing the old favourites, would have been heightened had the accompaniment been rendered on a piano rather than by the orchestra.

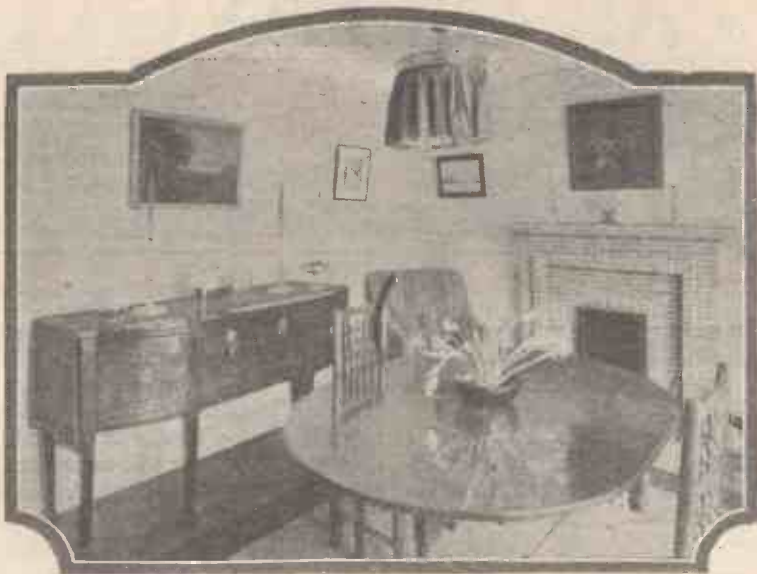
Whilst on the subject of old favourites, I must say that the *Geisha* and *Merry Widow* selections given us last week were most acceptable. There is almost unlimited scope in this direction, and I hope the B.B.C. are taking full advantage of it.

I prefer Tommy Handley by himself—thank you very much! His parties are too noisy and incoherent. By himself he is sheer joy. With a yelling background he becomes cheap and unintelligible.

Wacyn Wacyn’s voice, although a trifle throaty, is pleasant to listen to, and I like his songs. They always go with a swing.



**A PHOTO-ELECTRIC “DETECTIVE” BY THE G.E.C. CO.**  
A beam of light is focused on the opening and every interruption of this is shown on the dial. Thus every person passing in front of the apparatus is counted.



# THE HOUSE PORTABLE



**A** TRANSPORTABLE is a "cross" between an ordinary receiver and a portable. If you take a normal receiver with its outdoor aerial and earth, batteries and possibly an external loud-speaker you find that it really is a bulky piece of apparatus and one which does not compare favourably with, say, a table-grand gramophone so far as portability is concerned.

### Portable Types

True, this is not always an objection, because some people like to have a wireless receiver housed in an ornate cabinet, this being, perhaps, the premier article of furniture in a room. But there are other listeners who like their sets to be, so to speak, "out of sight when out of sound."

At the extreme of the scale is the portable

set proper, and while there must be quite a number of enthusiasts who use "pukka" outdoor portables for indoor work, simply, perhaps, because they find it much more convenient to carry about from room to room a box containing the whole of the "works" than three or four separate units, quite a deal is sacrificed to this portability.

### Portables and Performance

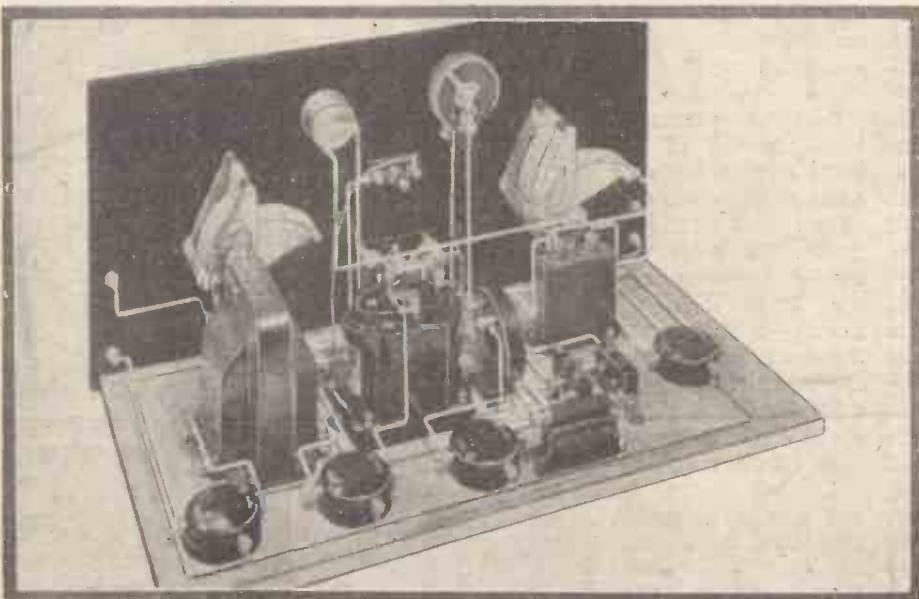
It must not be overlooked that the large majority of outdoor portables are designed to give somewhat of a compromise between a reasonably good performance, extreme lightness of weight and small dimensions. Sometimes this may mean that the performance, as a whole, is not up to the same standard as that given by an equivalent circuit on a permanent receiver.

For instance, in the portable it may be

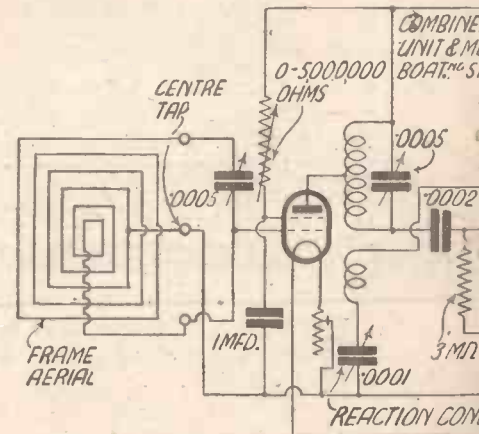
### COMPACT

necessary to use the very smallest H.T. batteries, it may not be possible to have as much anode voltage as is really desirable, and the accumulator may have a rather Lilliputian capacity. Moreover, the various valve stages may be so crowded together in order to cut down the overall measurements of the set that it will be rather unstable to work.

None of these snags is encountered in a normal "fixed" receiver, because a few inches added to the baseboard dimensions in order to space the components widely apart and a slight increase in the size of

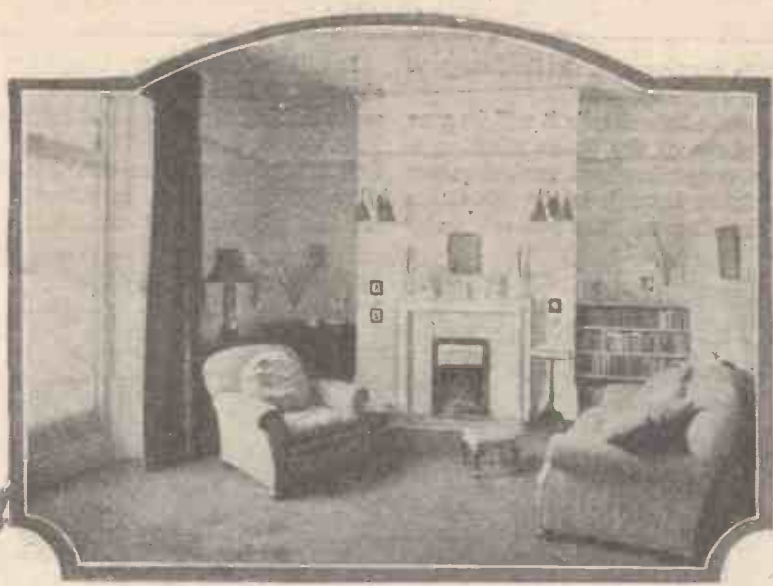


The Construction is Quite Simple



The Theoretical

# THE PORTABLE



## EFFICIENT

large compartment at the rear in which can be placed H.T. and L.T. batteries, of quite generous proportions, or a mains eliminator.

attempt has been made towards simplicity of operation. This is because, a frame aerial being employed, a fairly efficient circuit is required to get equivalent results to those obtainable with an outdoor aerial; and, furthermore, the owner of a receiver such as this, and who has the enthusiasm to carry the loud-speaker and set from room to room, will usually not be a stickler for fool-proof, one-knob control. So everything has been done to make the circuit as efficient as possible without great regard for simplicity of operation.

### Separate Loud-speakers

The loud-speaker is not an integral part of the receiver, for one reason because the space inside the frame aerial (which is the only part of the cabinet in which it could be contained) is rather limited, and, for another, because it is thought that many listeners have their own ideas on loud-speaker types, and like to use their own favourite models. So the loud-speaker is best kept outside the set, and not modified to fit within the restricted interior of the frame aerial.

### A Good Circuit

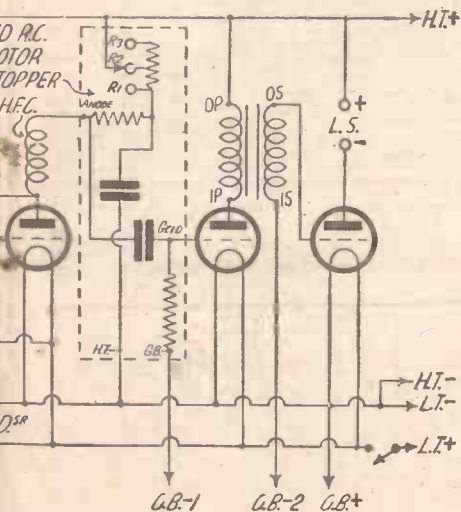
As will be seen by the circuit diagram this "four" incorporates a centre-tapped arrangement for the frame aerial, a screen-grid stage of H.F., a centre-tapped H.F. coil, reaction, a leaky grid detector, one

So far as the circuit and working arrangements of the set are concerned no particular

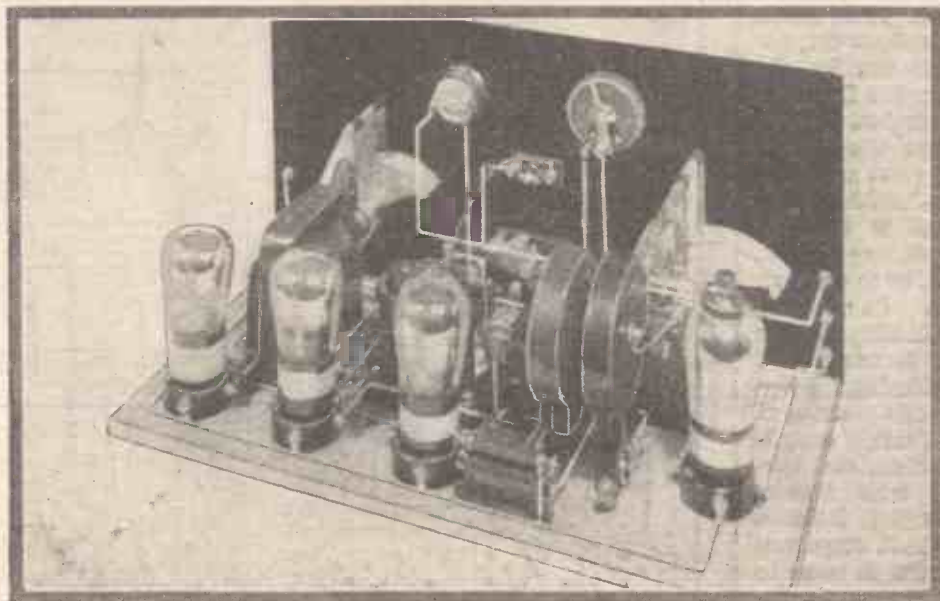
the battery compartment are things usually quite easy to effect.

### Self-contained

This transportable "four" has been designed to be a discreet combination of the portability of the out-of-doors set with the up-to-standard performance given by the normal indoor set with a corresponding circuit. The cabinet in which this receiver is housed is not unduly bulky. Nevertheless, the lid carries the frame aerial, the receiver proper is in the forepart of the cabinet, while there is a reasonably



Circuit Diagram



Panel and Baseboard Design is Orthodox

“THE HOUSE PORTABLE” (Continued from preceding page)

stage of R.C. coupling and the final stage of transformer coupling.

Delving more into details it will be seen that the whole of the frame winding is tuned by a .0005-microfarad condenser, one end being taken through to the grid of the screen-grid valve, and the centre-tapping

It will be seen that the baseboard carries almost in a line along the centre the H.F. valve holder, the anode and reaction coils, H.F. choke, R.C. coupler and L.F. transformer. In a second line nearer to the back edge of the baseboard, away from the panel, are the grid leak and condenser, and the

The Panel

The panel, looked at from the front, carries from left to right the frame tuning condenser, the rheostat controlling the H.F. valve filament, the reaction condenser and, above it, the on-off master filament switch, the rheostat in series with the screen-grid, and the H.F. tuning condenser. To the extreme left of the panel are three small sockets in which are plugged the connections from the frame aerial, while there are two similar sockets at the extreme right of the panel to which the loud-speaker connections can be made.

All the battery leads pass through a hole in the baseboard quite close to the R.C. coupler. These are small flex leads taken direct from the tapping points they serve; there are seven of them, these being for H.T. positive and negative, L.T. positive and negative, grid bias positive, and the two grid bias negative tappings.

Components Required

Ebonite or bakelite panel, 16 in. by 8 in. (Ripaults, Becol, Raymond, Ebonart, Radion).

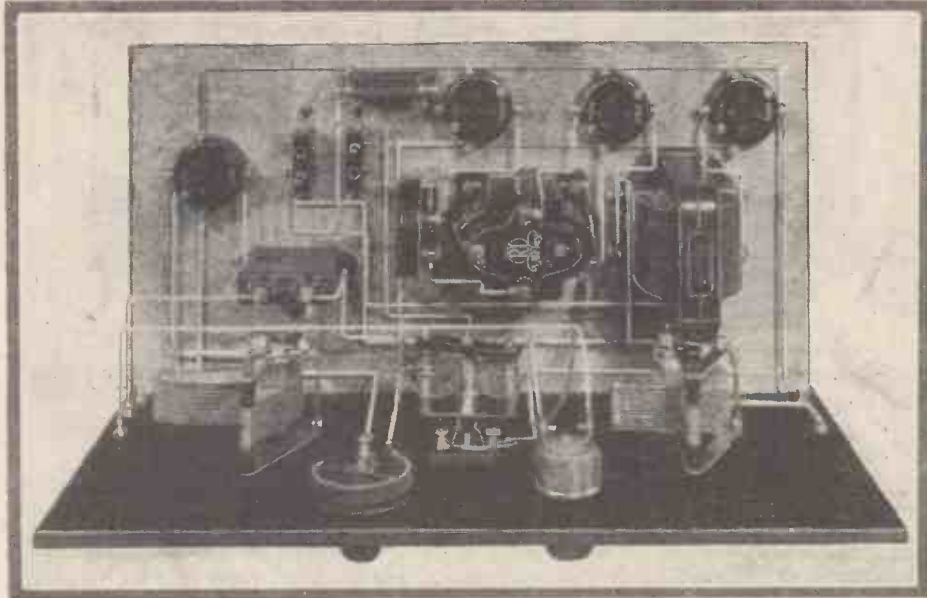
Two .0005-microfarad variable condensers (J.B., Polar, Burndept, Burton, Lissen, Ormond).

.0001-microfarad reaction condenser (Ormond, Burton, J.B., Lissen).

7-ohm panel-mounting rheostat (Lissen, G.E.C., Igranic, Burton).

Push-pull filament switch (Trix, Lissen, Benjamin, Wearite).

(Continued on page 150)

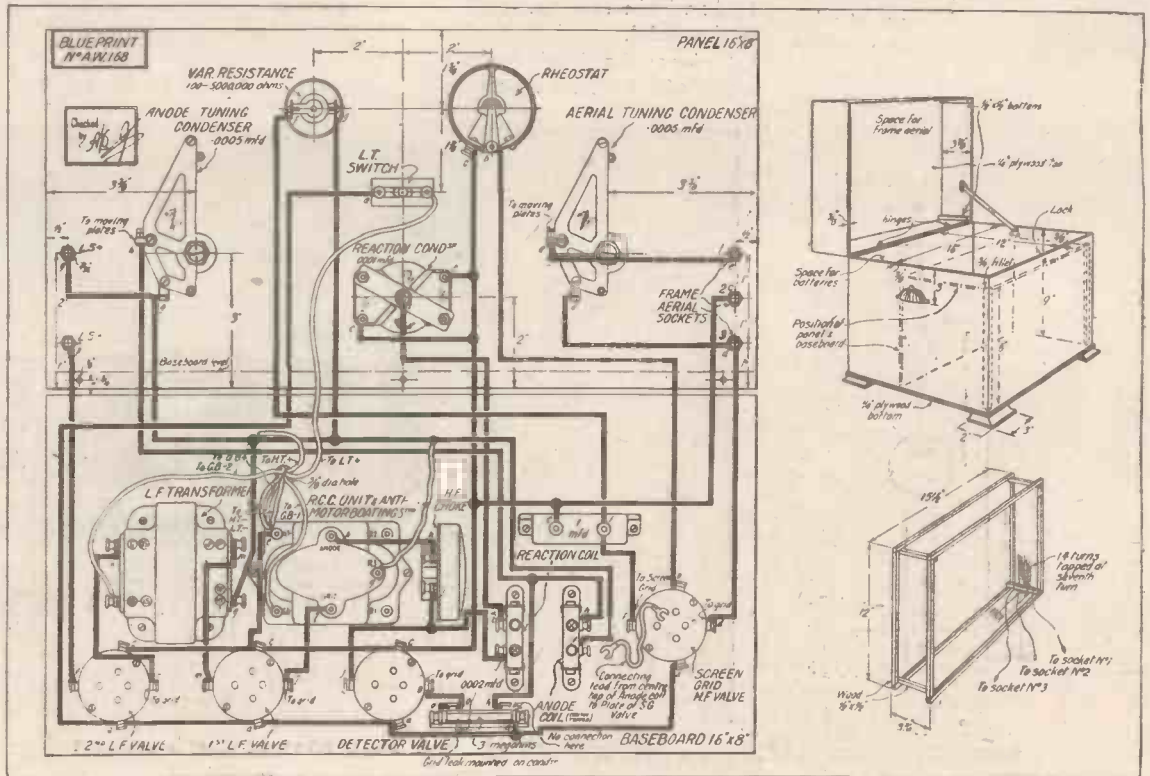


This plan view shows clearly the layout and wiring

of the winding being earthed. The voltage on the screen-grid can be varied by a resistance in the H.T. lead. There is a separate filament rheostat for the H.F. valve and a master on-off switch for all valves. For the coupling between the detector and first stage of L.F. a combined R.C. unit and motor-boat stopper is employed. Three values of motor-boat stopper resistance can be obtained on the R.I. and Varley coupler.

Perhaps the most striking point so far as constructional details are concerned is that the screen-grid stage is not screened, as is common practice. As a matter of fact, in this particular receiver it was found, when planning the layout, that the presence of a screen would complicate matters, and subsequent tests showed that complete isolation of the H.F. stage was not needed in order to make the set stable, provided, as usual, that “low-loss” precautions are taken

valve holders for the detector and L.F. stages. Close to the anode and reaction coils, and on the panel side, is a 1-microfarad fixed condenser between the screen-grid and earth.



The Wiring Diagram. Blueprint available price 1/6



# A single note from over eighty strings

## SILENCE BEFORE and SILENCE AFTER



A single note is struck upon the keyboard—a single string vibrates—notice how sharply defined the note is against the background of the succeeding silence.

It is just like that when a note impinges upon the background of silence in which a Lissen Transformer amplifies. Each note is given its full value, each instrument its characteristic tone; high notes suffer no distortion, low notes come through in all their sonorous beauty.

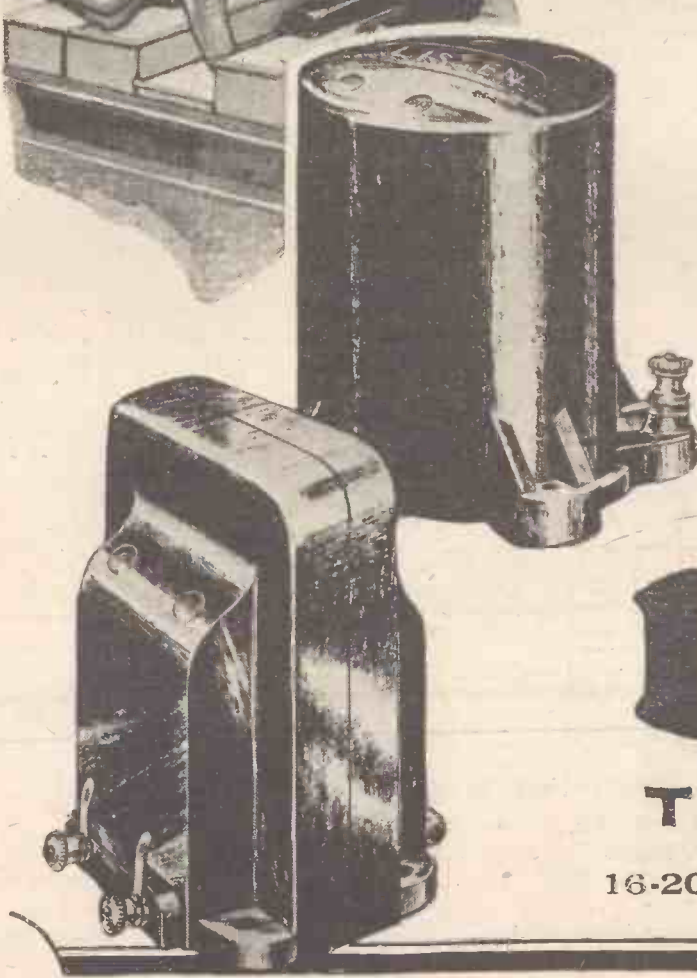
*Whatever set you have or whatever circuit you are building, this is the kind of amplification you want, and a Lissen Transformer will give it to you.*

### The LISSEN SUPER TRANSFORMER

This Super LISSEN Transformer is made in two ratios,  $3\frac{1}{2}$  to 1 and also  $2\frac{1}{2}$  to 1. The  $3\frac{1}{2}$  to 1 is suitable for use in either the first or the second stage of an L.F. amplifier, or can be used in cascade for both stages, and with practically any valve. The  $2\frac{1}{2}$  to 1 transformer is suitable for use after a high impedance rectifier valve without fear of distortion or loss of high notes and overtones. The price is the same for both ratios **19/-**

### The famous 8/6 LISSEN Transformer

Has won for itself the reputation of "The Transformer that will never break down." Suitable for all ordinary purposes. Turns ratio 3 to 1. Resistance ratio 4 to 1 **8/6**



# LISSEN

## TRANSFORMER

LISSEN LIMITED

16-20 Friars Lane, Richmond, Surrey

(Managing Director: Thos. N. Cole)

Please Mention "A.W." When Corresponding with Advertisers

# MY WIRELESS

Weekly Tips,  
Constructional  
and  
Theoretical—



# DEN *By* W. JAMES

For the  
Wireless  
Amateur

IT is customary to include a fixed condenser of one or two microfarads in the earth wire when a mains unit is employed for the purpose of supplying the high-tension circuits of a receiver from a direct-current source of electricity.

This fixed condenser is really included to isolate the supply from earth so far as direct currents are concerned and, of course, a condenser will do this as there is no direct connection between the two sets of plates.

It does not matter whether the negative or the positive main of the household supply of electricity be the one which is more nearly at earth potential; the condenser must be used. But although no direct current passes it must not be forgotten that a charging current will flow at the instant of switching on, from which it follows that if the earth wire be taken and its end be tapped on the earth connection, a small spark may be produced.

The amount of the electricity involved may be rather small and is probably not sufficient to be troublesome but at the same time an unsuspecting person handling the earth wire might experience a smart shock were the earth circuit to be broken or connected when the mains unit is on.

This is a point which should be remembered by those employing a mains unit.

### Two-stage Push-pull

Readers who are able to supply a reasonable amount of high tension current to their receiver, but are limited in the respect of voltage, may be interested to learn the transformers suitable for two stages of push-pull low-frequency magnification are now marketed.

Those, for instance, who employ high tension accumulators, or who have a supply of direct current for lighting are often quite unable to obtain the necessary volume without valve overloading unless a push-pull circuit be used.

The new transformers enable a circuit such as that shown on this page to be employed. The valve  $V_1$  is the detector, which is coupled by a transformer  $T_1$  having a centre-tapped secondary to the small power valves  $V_2, V_3$ . These valves are, in turn, coupled to the super-power output valves  $V_4, V_5$ , by a transformer  $T_2$  having a centre-tapped primary and secondary; the usual output transformer  $T_3$  follows.

An arrangement such as this may be recommended to those who have found good transformers satisfactory and who wish to secure good results. The valves  $V_2, V_3$  should be supplied with sufficient high-tension and grid-bias to ensure that only the straight portions of their characteristics be used.

### A Push-pull Advantage

In drawing the above circuit I was reminded of a definite advantage possessed by the push-pull amplifier.

It is that no low-frequency currents need circulate through the high-tension supply.

This is a great advantage and means that only the minimum of smoothing is necessary. In the circuit illustrated, for example, it is hardly necessary to include an anti-motor-boating resistance-capacity filter in the anode circuit of the detector.

When high-tension voltage is a consideration the merits of an arrangement which does not have to be fitted with anode resistances for filtering are obvious!

### Anode-bend Detectors and Quality

That the quality of the reproduction may be spoiled by overloading a detector of the

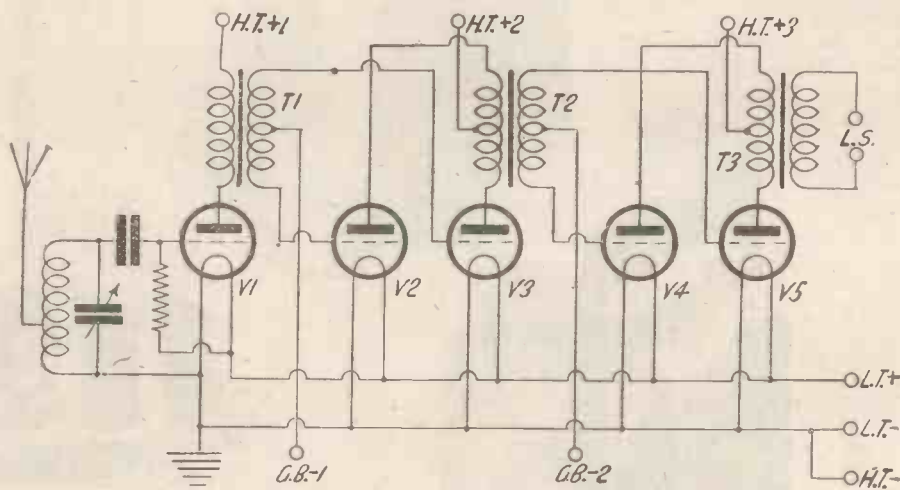
satisfactory. When, however, no volume control is fitted in such a position that the amount of the input to the detector may be reduced to at least a little below 1.5 volts, grid current will flow and will introduce more or less serious distortion.

The local station in particular is likely to be received at such strength that the detector will be overloaded and as this is the station which we usually expect to receive with the best quality, the defect of such a detector arrangement is obvious.

Quite often I find a valve of lower impedance can be employed for detection when, for the same high-tension voltage, a much larger negative grid bias may be used. The amplification is, of course, reduced a little, but I doubt whether this is of importance in comparison with the better quality of reproduction that will be obtained.

### Legs and Sockets

Do you make a practice of always opening valve legs? Personally, I always open them a little in order to make certain they will fit tightly in the sockets of a holder. A day or two ago, however, a valve which I had fitted in a set gave me an amount of



A circuit employing two stages of push-pull amplification.

leaky-grid type is well known, but a number of amateurs seem not to appreciate that an anode-bend detector may also be overloaded.

The usual detector is provided with a grid bias of negative 1.5 volts with the high-tension adjusted to give the correct operating conditions—an arrangement often

trouble because one of the pins became jammed in a socket.

Eventually, I removed the valve, but one leg remained in the holder and it was quite an effort to effect a satisfactory repair. Fortunately I was able to solder a connecting wire to the short piece which projected through the base.

# WORKING NIGHT AND DAY

*to fill the demand for the new*

## LISSEN

### VARIABLE CONDENSER

Because the Lissen Variable Condenser, introduced at the beginning of the season, obviously represented a new and higher standard of value in variable condensers, the demand from trade and public was so great that even the huge production which Lissen had arranged for was unequal to the demand.

Lissen, therefore, have been working day and night to overtake the demand; and are now able to announce that the Lissen Variable Condenser is

**AVAILABLE AT ALL LISSEN DEALERS**

Not only this, but in the course of manufacture Lissen have found it possible still further to improve the design of this component so that for low-loss, for fine and facile tuning, for universal utility the Lissen Variable Condenser now ranks with the most expensive condensers on the market, while it is still sold at the original keen prices.

**DO NOT BUY A VARIABLE CONDENSER UNTIL YOU HAVE EXAMINED THIS NEW LISSEN COMPONENT.**

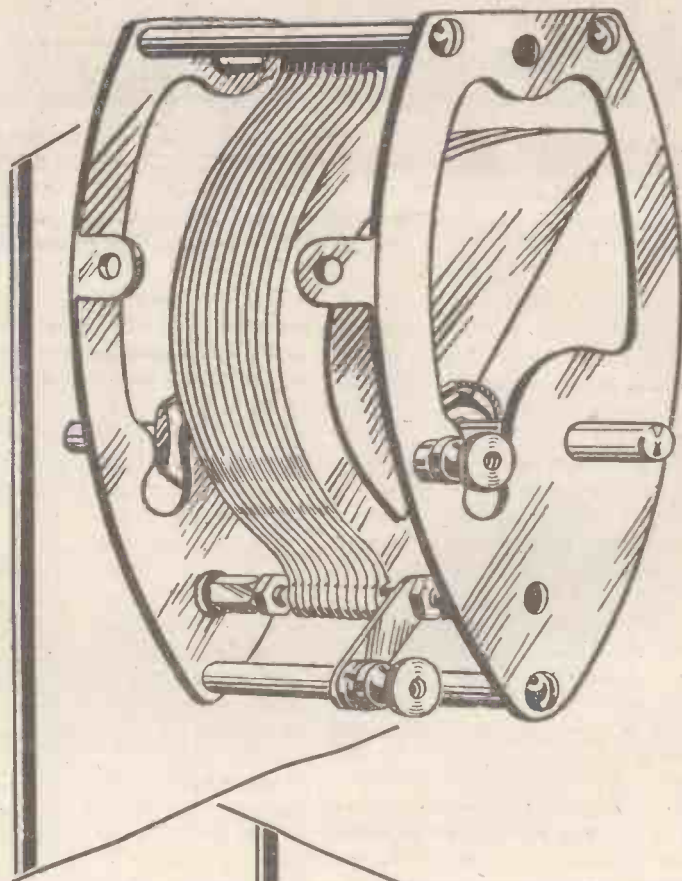
### A REAL LOW-LOSS CONDENSER

You can use it as a standard condenser in any circuit.  
You can gang it—two or three of them together.  
You can use a drum control for it instead of a dial.  
You can mount it on a panel and it has feet for base-board mounting, too.

.0001	mfd capacity	5/9
.0002	"	5/9
.0003	"	6/-
.00035	"	6/3
.0005	"	6/6

### LISSEN LIMITED

16-20 Friars Lane, Richmond, Surrey  
(Managing Director: THOS. N. COLE)

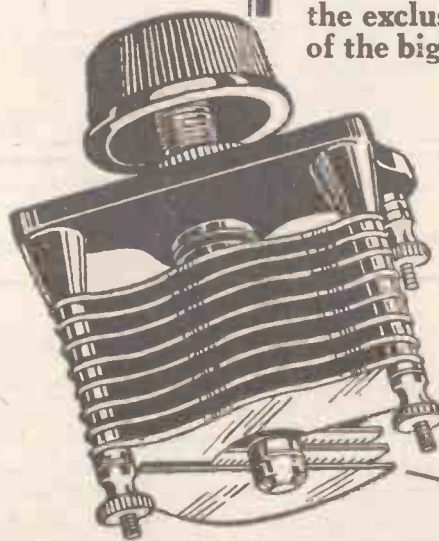


*and now a new*  
**LISSEN REACTION CONDENSER**

Embodies many of the exclusive features of the big Lissen Condenser, including no end pressure on any end plate to distort frame or vanes.

"A" Type 4/-

"B" Type with insulated bushes for mounting on panel. .... 4/6



*You will Help Yourself and Help Us by Mentioning "A.W." to Advertisers*

# "A.W." TESTS OF APPARATUS

Conducted by our Technical Editor, J. H. REYNER, B.Sc. (Hons.), A.M.I.E.E.

## N.S.F. Valve Holder

THE delicate nature of many of the modern high-efficiency valves has made it necessary for valve-holder designers to devise holders which will spring the valve efficiently without too much movement.

The N.S.F valve holder, which has been submitted for test by S. W. Lewis & Co., Ltd., of 39 Victoria Street, S.W.1, seems quite suitable in this respect. The central



N.S.F. Valve Holder

portion carrying the valve sockets is mounted on narrow metal strips, which, in addition to springing the holder, also serve to connect the sockets with four terminals and soldering tags arranged at the corners of a black moulded base. Stops are provided in order to prevent excessive motion both when removing and inserting a valve.

The springing was found to be good with the standard types of British valve. Electrical contact with the sockets between the valve pins and sockets was satisfactory—in fact, the pins are gripped with rather too much force, rendering insertion and removal of a valve rather difficult. This point might be improved.

The holder has an attractive appearance and is well finished.

## Dario Valves

MADE in one of the largest factories in France, Dario valves, imported by Impex Electrical, Ltd., of 538 High Road, E.11, have the backing of an experienced and efficient staff. This accounts for the fact that the large variety of Dario valves are all sold at a particularly reasonable price when regard is taken of their characteristics. We recently subjected a number of these valves to a test on our valve bridge and in representative circuits. The results showed that these valves can compete in performance and economy very favourably.

In the 2-volt series, there is a Dario Resistron Bi-volt, which when tested on our bridge had a resistance of 102,000 ohms and an amplification factor of 36 at an anode voltage of 110. This valve was found to

have a filament consumption of .06 amp. at 1.8 volt, and therefore forms a very economical resistance-capacity valve.

The next in the series is the Dario Micro Bi-volt, having a consumption of .06 amp. at 1.8 volt. The resistance here we found to be 29,000, with an amplification factor of 11.6, rendering the valve suitable for use as

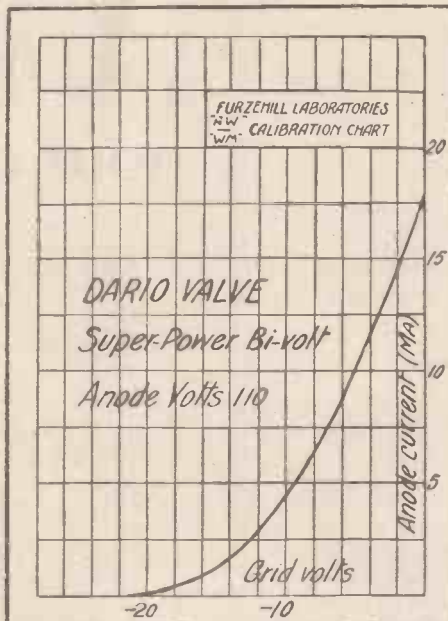
.2 amp. at 1.6 volt and an A.C. resistance of 4,000 ohms, with an amplification factor of 6. These are certainly commendable figures.

One of the special features of this valve, to which is attributable the high efficiency, is the duplicate construction, there being two anodes and two grids connected in parallel. This enables a long length of filament to be employed, giving high emission. In the two-volt valve, the filaments are connected in parallel, while in the four-volt type they are in series.

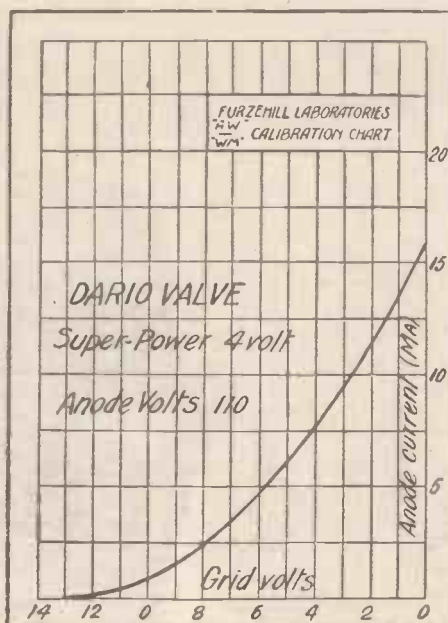
Similar types of valve are available in the 4-volt series; the first of these, the Dario Resistron, was found to have a filament consumption of 0.09 amp. at 3.8 volt. With an anode voltage of 110, the resistance was 100,000, with an amplification factor of 25. The next of the series, the Dario Micro-special, had a filament consumption of .07 amp. at 3.8 volt, and proved to have a resistance of 22,000, with an amplification factor of 9.8, at an anode potential of 60.

The final valve to be tested is known as the Dario super-power, having a filament consumption of .12 amp. at 3.8 volt. The A.C. resistance proved to be 4,800 ohms, with an amplification factor of 9.

A glance at the curves shown gives some indication of the power-carrying capabilities of the valves. Priced at 7s. 6d., they represent excellent value for money.



Characteristic Curve of the Dario Super-Power Bi-Volt Valve



Curve of Dario Super-Power 4-Volt Valve

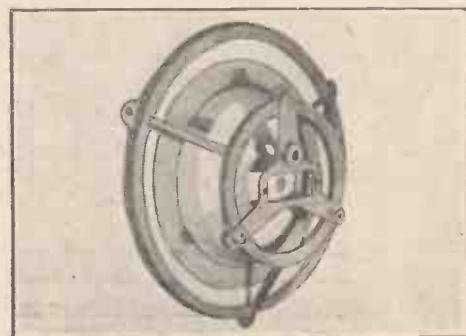
detector or H.F. amplifier. The final valve of the series is the Dario Super-power Bi-volt, having a filament consumption of

Type	Fil. volts.	Fil. amps.	A.C. resistance.	Amplification factor.	Mutual conductance.
Resistron Bi-volt ..	1.8	0.06	102,000	36	0.35
Micro Bi-volt Super-power Bi-volt ..	1.8	0.06	29,000	11.6	0.40
Resistron 4-volt ..	1.6	0.2	4,000	6	1.5
Micro special 4-volt ..	3.8	0.09	100,000	25	0.25
Super-power 4-volt ..	3.8	0.07	22,000	9.8	0.44
Super-power 4-volt ..	3.8	0.12	4,800	9	2

## White Spot Cone Kit

FOR the benefit of those who wish to make up their own cone speakers, the

(Continued on page 149)



White Spot Cone Kit

# PICTURES BY WIRELESS

TEAR THIS PAGE  
OUT AND KEEP IT ★  
FOR REFERENCE

For constructing the Fultograph Wireless Picture Receiver, the following Fultograph components are required :—

- C. 1. Aluminium panel drilled and tapped with screws, insulating bush and two clips.
- C. 2. Ball-bearing pedestals, with ball bearings, fixing screws and cover plates.
- C. 3. Two runner bars and two pillars, with fixing screws.
- C. 4. Double spring clockwork motor (ten minutes) with regulator and handle, guide for handle and fixing screws.
- C. 5. Steel threaded spindle (pitch  $1/64$  inch).
- C. 8. Electro magnetic clutch, with friction plungers and springs, and two gear wheels (fibre and brass) and screws.
- C. 9. Picture roller with paper clip.
- C. 10. Electro-magnet on bracket with winding, switch springs, and fixing screws.
- C. 11. Writing carriage with two runner wheels, small steel wheel, stylus, holder, and fixing screws.
- C. 12. Insulating plate with contact springs and dust cover.
- C. 13. Clutch-cover and brake, and screws.
- C. 14. Milliampere meter (0.5 milliamperes).
- C. 15. Magnetic relay and screws.
- C. 16. 1.6 Transformer and screws.
- C. 17. Resistance 60 ohms.
- C. 18. "On-off" Switch and fixing screws.
- C. 19. 6-way connecting cord with two 6-point plugs.
- C. 20. 5-way battery cords with one 5-point plug, 3 battery plugs, and 2 spade tags.
- C. 21. 6-point socket with cables for instrument, and cable for stylus.
- C. 22. Panel for Relay Unit, bored and drilled, with valve socket.
- C. 23. 5-way socket.
- C. 24. 6-way socket.
- C. 25. (2) input terminal sockets.
- C. 26. .011-mfd. condenser.

**Y**ou can build  
your own receiver  
but . . . you must  
have the **RIGHT**  
components !

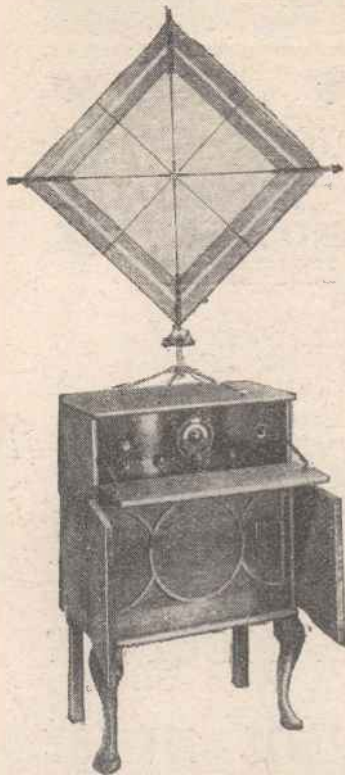
It is possible now to build your own receiver for Pictures by Wireless, but the right components are essential to ensure satisfactory results—components identical to those used in the Fultograph, the only Wireless Picture Receiver.

Details of Fultograph Components are included for the information of intending constructors.

★ We shall be pleased to send you full particulars of the Fultograph, if you will write to : Wireless Pictures (1928), Ltd., Dorland House, 14-16 Regent Street, London, S.W.1.

# Fultograph

## GETTING RESULTS WITH THE "BROADCAST PICTURE FOUR"



NEWS that the B.B.C. is carrying on the present Fultograph arrangement until October 30, and that Wireless Pictures (1928), Ltd., have some special picture programmes in store has greatly increased the appeal of the special picture receiver

designed by the AMATEUR WIRELESS Technical Staff and described in AMATEUR WIRELESS, Nos. 343 and 344.

There are one or two points which will doubtless be of interest to those who have not yet finished the construction of this outfit.

### The Frame Aerial

As mentioned in the first instalment of the constructional details, a frame aerial is used because the usual outdoor aerial and H.F. amplification brings in too much static, and also because it is not easy to get the required selectivity without an aerial having the high degree of directionality possessed by a frame.

The receiver employs dual-range coils, which is already a great convenience and will be almost a necessity as the scope of wireless picture transmissions is increased. It is thus imperative that the frame aerial should be of the dual-range type, and should embody a switching device so that the change-over can be made almost instantaneously. The frame used in the actual tests of the original of this set, and illustrated herewith, is the Igranic. It is really portable, has the windings arranged in four sections and embodies a switch allowing

one, two, three or four sections to be used. A .0005-microfarad tuning condenser is provided in the receiver, and this gives, with the frame windings, a tuning range of from about 240 to 1,800 metres.

It is advisable to keep the aerial about a foot away from the set, for otherwise coupling may occur and the circuit will be unstable. Generally the whole arrangement will be found quite "safe" if the frame is simply stood on top of the cabinet, as shown. Incidentally, it will interest constructors to know that the artistic cabinet which has been used by the AMATEUR WIRELESS Technical Staff in connection with this receiver is a special model manufactured by Messrs. Pickett's Wireless Cabinets, of A. M. Works, Bexleyheath.

In conventional sets it is sometimes safe to leave the choice of a cabinet to the constructor, but in this instance mention is made of this particular model because it fills so satisfactorily the needs of amateurs who use this receiver almost entirely for picture work, as is intended.

It embodies a drop-down hinged lid over the panel, and when this is lowered so that access can be gained to the controls it forms a very handy shelf on which to place the Fultograph apparatus.

## THE Squire

AND

A Plywood Clamping Washer included with each Complete Set.

## LARGE ALUMINIUM CRADLE FRAME CONE KIT No. 97

15/-

For Various Balanced Armature Speaker Units.

The frame is ready to take Blue Spot, Triotron, Bullphone and G.E.C. Units, etc., which are secured rigidly and DIRECT to ALUMINIUM CRADLE or CHASSIS. Setting remains constant and speaker will take full output from set without chatter.

CRADLE FRAME ONLY, ready to receive various units .. 12/6

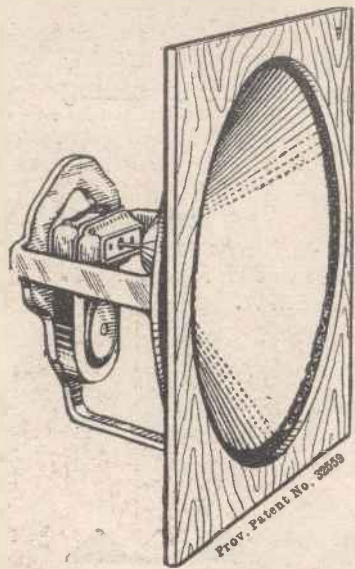
Designed to give easy access to adjusting nuts on Driving Rod of unit.

CONE KIT, comprising 11 1/2 in. Kraft Diaphragm (forming 9 1/2 in. Cone), 4 Suedlin Segments, 1 Card Ring, all cut to size ready for mounting .. 2/6

INSIST ON THE GENUINE SQUIRE CONE KITS, IN LABELLED ENVELOPES.

Guaranteed Moving-coil Speaker Resemblance

FREDK. SQUIRE 24 Leswin Road, Stoke Newington, London, N.16



# FORMO

ARTHUR PREEN & CO LTD

## RADIO PRODUCTS

are specified in

### THE SEASON'S BEST SETS

### "THE CHUMMY FOUR"

AND

### "THE ALL BRITAIN THREE"

Incorporate FORMO variable condenser, valve holders and formo-densers.

The great success of these two sets is due to their careful design and selection of components.

FORMO parts were chosen because they are best. Follow the expert advice and use FORMO in all circuits.

## THE FORMO CO.

CROWN WORKS, CRICKLEWOOD LANE, N.W.2

**"A.W." TESTS OF APPARATUS"**

*(Continued from page 146)*

Wolverhampton Die Casting Co., of 15 Great Hampton Street, Wolverhampton, are marketing a kit of parts comprising a cast aluminium frame and front plate; the latter is highly polished. These are well-turned-out jobs that can be recommended without hesitation. Provision for mounting, either on a stand, also obtainable, or by securing the front plate to a baffle, is made. The frame is designed to use the Blue Spot unit.

The kit we received was already assembled, with the diaphragm in position. The method of suspension used in moving-coil speakers is employed. The appearance is attractive, as the cone paper is blue tinted with a silver pattern, and the special mounting material is gilded. The cost of the parts assembled is 16s., and of the frame alone, 12s. 6d.

In the issue dated December 22, *Bürndept Wireless (1928), Ltd.*, advertised their Screened Ethophone as priced at £9 9s. We are requested to point out that this is not a reduction on the catalogue price of £12 7s., as some readers have thought, but does not include the price of the valves.

**"Wireless — the Modern Magic Carpet"**—Many listeners would like to know how the magic carpet of wireless "works," but, thinking that such knowledge can only be obtained through dry text-books full of formulae and "advanced" mathematics, remain the abject slaves of their receivers. "Wireless, the Modern Magic Carpet," by Ralph Stranger (Partridge and Co., 3s. 6d. net), will enable them to turn the tables. In it the subject, in both theoretical and practical aspects, is dealt with in a lucid manner guaranteed to inculcate knowledge "without pains."

**The "Orchestra Four"**—The further notes on this receiver, described in last week's issue, have unavoidably been held over owing to the demands upon our space. They will be given next week.

**"Amateur Wireless and Radiovision."** Price Threepence. Published on Thursdays and bearing the date of Saturday immediately following. Post free to any part of the world: 3 months, 4s. 6d.; 6 months, 8s. 9d.; 12 months, 17s. 6d. Postal Orders, Post Office Orders, or Cheques should be made payable to "Bernard Jones Publications, Ltd."  
**General Correspondence** is to be brief and written on one side of the paper only. All sketches and drawings to be on separate sheets. **Contributions** are always welcome, will be promptly considered, and if used will be paid for. Queries should be addressed to the Editor, and the conditions printed at the head of "Our Information Bureau" should be closely observed. **Communications** should be addressed, according to their nature, to The Editor, The Advertisement Manager, or the Publisher, "Amateur Wireless," 59-61 Fetter Lane, London, E.C.4.

**FOR VOLUME**

**AND TONE**

**TRIO TRO**

**THE WONDER OF THE WIRELESS WORLD**

**TRIO TRO RADIO POWER VALVE 2 VOLTS**

**SUPER POWER VALVE 7/6**

**YOUR LOCAL DEALER CAN SUPPLY**

## "THE HOUSE PORTABLE" (Continued from page 142)

100—5,000,000 ohms variable resistance (Clarostat "Standard").

Five plugs and sockets (Clix).

Four valve holders (Burton, Wearite, Benjamin, W.B.).

Two single coil holders (Lotus, Lissen, Wearite).

1-microfarad fixed condenser (T.C.C., Dubilier, Lissen).

High-frequency choke (Igranic, Lissen, Polar, Wearite, Burndept).

.0002-microfarad fixed condenser and 3-megohm grid leak (Graham-Farish, Lissen, Dubilier, T.C.C., Mullard).

Resistance-capacity coupling unit and anti-mobo unit combined (R.I. and Varley, type Z, Dubilier, Lissen, Graham-Farish).

Low-frequency transformer (Lissen super, R.I. and Varley, Ferranti, Mullard, British General).

Connecting wire (Glazite or Junit).

Baseboard, 16 in. by 8 in. (Camco).

Three yards of thin flex (Lewcoflex).

One red and one black spade terminal (Clix).

Two red and three black wander plugs (Clix).

Coil of frame aerial wire (Lewcos).

### Construction

The first constructional operation is to lay the components on panel and baseboard in order to get a general idea of the

layout. Moreover, if components other than those specified in the accompanying table are used, this preliminary "laying out" is necessary in case the layout may have to be somewhat modified. A blueprint, No. 168, has been prepared for this receiver and can be obtained, price 1s. 6d., post free, from Blueprint Department, AMATEUR WIRELESS, 58-61 Fetter Lane, London, E.C.4. If the components specified are to be used, then one may at once mount all the components on the baseboard, not forgetting to drill the battery lead hole.

Next, the panel may be drilled, and this can quite easily be done with the blueprint, which shows the exact positions of all drilling points. All the components mounted on the panel are of the one-hole fixing type; do not forget smaller holes for the frame aerial and loud-speaker sockets, and also the small holes through which wood screws are passed, to attach the panel to the baseboard and also to hold the complete assembly in its compartment in the cabinet.

All the panel components can be mounted with the exception, perhaps, of the reaction condenser, the mounting of which is better left till a later stage, when some of the wiring has been done. Those who are not accustomed to soldering, so far as wireless sets are concerned, may also care to com-

plete most of the baseboard wiring, particularly that on the panel side, before the panel is added. No difficulty will be found in doing this, if the blueprint is used as a wiring guide.

### Wiring

Stiff insulated wire, such as Glazite, should be used for all connections, with the exception, of course, of the flexible battery leads, since this prevents the possibility of "shorts." The battery leads are of thin lighting flex, rubber covered, and are taken from the following points: L.T. positive lead from one side of the master filament switch, H.T. negative, L.T. negative, and grid bias positive leads from the H.T. negative terminal of the R.C. coupler, the H.T. positive lead from one end of a wire connected with the H.T. positive terminal on the transformer, and the two G.B. negative leads from the G.B. terminals on the R.C. coupler and L.F. transformer respectively.

Next week constructional details of the frame aerial will be given, and the operation of the complete receiver will be explained. Constructors in the London district will be interested to know that this set will be on view in the Somerset Street windows of Messrs. Selfridge & Co., Ltd., and that the original of this design can thus be seen in the "flesh."

## "A FRAME AERIAL FOR 1/6" (Continued from page 127)

always be required, but it is very handy to have it, since it is essential in a good many circuits.

The last job is to provide the frame with a suitable pivot mounting. A method that I have found quite satisfactory, despite its extreme simplicity, is illustrated (see p.127). A piece of 1/2-in. square wood about 2 1/2 in. in length is cut off, and in the centre of one end of it a 1/4-in. hole is drilled. Into this an ordinary coil plug is inserted. Most of them are a very tight fit for a 1/4-in. hole drilled in wood, and once driven in they

will "stay put." If, however, the plug is not absolutely tight it is easily fixed by drilling a very small hole right through wood and brass and inserting a pin. The little wood block is now fixed to the bottom of the upright arm by means of a couple of wood screws.

For the stand any kind of small block will do so long as it is big enough and heavy enough to keep the frame steady without upsetting. A switch block of the type used by electricians will be suitable.

Should you wish to mount the frame at

the end of the cabinet which houses the receiving set, you can do so very easily by obtaining from a musical instrument shop a piano candle sconce. Instead of the coil plug, a short length of 1/4-in. brass rod is used at the bottom of the frame. The actual candle socket of the sconce is cut off and a 1/4-in. hole drilled at its base. The sconce is then fixed to the cabinet with wood screws. When the aerial is not in use it can be lifted out whilst the sconce is folded out of the way against the end of the cabinet.

## VALVELESS POWER UNITS



TYPE A3  
for Low-tension Eliminators, output  
9v. 1 amp. D.C. Price 23/6

A CONSTANT AND UNVARYING DIRECT CURRENT SUPPLY  
CAN BE OBTAINED FROM A.C. MAINS IF YOUR ELIMINA-  
TOR INCORPORATES A

**WESTINGHOUSE**  
**METAL RECTIFIER**

Full wave rectification without the use of valves, paste, or liquid.  
No replacements or renewals are necessary. The first cost is the  
last cost.

Have you had your copy of "The All-Metal Way" giving full particulars  
and circuits for the use of these units? Send 1d. stamp with your own card  
address to:—



TYPE H.T.1  
for H.T. Eliminators, out-  
put 200v. 100 m.a. Price 84/-

The Westinghouse Brake & Saxby Signal Co., Ltd.,  
82 York Road, King's Cross, London, N.1



# In Praise of POWQUIP!

## Unsolicited

"I have found your STANDARD Transformer so distinctly superior to any other make on the market, without regard to price, that it seems impossible that a better article can be produced."

**POWQUIP**  
STANDARD  
Model



## Testimonials

"Regarding Pow-quip Transformers I have one that has been in use every day for over two and a half years, and is still giving every satisfaction. All my friends congratulate me on the purity of reproduction."

10/6 each

Above we give just two extracts from recent testimonials received from delighted users of POWQUIP Transformers. The originals of these and many others can be seen at our office. The POWQUIP Standard Transformer was one of the first in the field. Original models are still giving perfect service. Recently re designed—amplification and tone have benefited by 25%. Full particulars on request.

**- POWQUIP -**

## TRANSFORMERS

For Pedigree & Performance

THE POWER EQUIPMENT CO., LTD.,  
Kingsway Works, The Hyde, Hendon, N.W.9

## POLAR CHOKES



Standard Choke ... 4/6  
Short-wave Choke ... 4/-

Polar Chokes are rapidly achieving fame as did Polar Condensers last year. Set makers of the first standing are adopting them. They are highly efficient, neat and compact. Full details as to use are supplied with each choke.

## POLAR POTENTIOMETERS

PREVENT PLOPPY REACTION



Potentiometer ... 2/-

The use of fixed potentiometers for biasing the detector grid correctly is becoming more common. Their use is essential for obtaining easy reaction and eliminating threshold howl. They improve the manipulation of any set.

TRY ONE and SEE

Obtainable from all dealers

**WINGROVE & ROGERS LTD.**  
188/9 STRAND W.C.2

BEST WAY TO ALL STATIONS

THE LATEST RADIO MICRO

**DARIO**

**VALVES**

**-AND THE CHEAPEST WAY, TOO,**

guaranteeing utmost satisfaction. Just look at the prices below—made possible by reason of the biggest valve output in the world. Radio without Dario can never be radio at its best.

SUPERLATIVE FINISH—LOWEST CONSUMPTION

TWO VOLTS		FOUR VOLTS	
General Purpose, .05 amp. ...	5/6	General Purpose, .05 amp. ...	5/6
R.O.G., .06 amp. ...	5/6	R.O.G., .07 amp. ...	5/6
Super-Power, .18 amp. ...	7/6	Super-Power, 1 amp. ...	7/6
Super H.F. & R.O.G., .18 amp. ...	7/6	Super H.F. & R.O.G., .1 amp. ...	7/6
Pentodion, .15 amp. ...	21/-	Pentodion, .15 amp. ...	21/-

From your dealer or direct:

**IMPEX ELECTRICAL, LTD.**

Dept. J.

**5/6** 538, High Road, **7/6**  
Leytonstone, E.11.



# OUR INFORMATION BUREAU

**RULES.**—Please write distinctly and keep to the point. We reply promptly by post. Please give all necessary details. Ask one question at a time to ensure a prompt reply, and please put sketches, layouts, diagrams, etc., on separate sheets containing your name and address. See announcement below. **Address Queries**—AMATEUR WIRELESS Information Bureau, 58/6 Fetter Lane, London, E.C.4

### An Earth Point.

**Q.**—My nearest water-pipe does not run direct to earth, but connects with a cistern. The nearest main water-pipe is roughly 25 ft. away, and I am afraid that such a long lead will not make for efficiency. Do you think it would be better to use the water-pipe which runs to the cistern and so keep the earth lead not more than 6 ft. long?—R. W. (Newcastle).

**A.**—It is no use having the earth lead short when the actual earth connection is likely to be very inefficient. By far your best plan will be to take a long lead to the main water-pipe, or to a sheet of copper 2 feet square buried 3 ft. in the ground. In order to minimise the bad effect of the long lead, we suggest that you strand together four or five lengths of enamelled 7/22 aerial wire and use these for the lead to earth. In this way the resistance of the earth lead will be kept low and at the same time a fairly efficient earth obtained.—L. C.

### Grid Choking.

**Q.**—My receiver has developed a complaint which is difficult to trace. Signals from the local station are received at normal strength, but at regular intervals a crash is heard, and the signals cease for a moment and then come on again with a roar. Can you explain the cause and a remedy? All my batteries have been

tested and are giving full voltage.—O. C. (Weymouth).

**A.**—The trouble is due to the grid of one of

appear to be sound, you might try the use of a different grid leak, as the one you are using may be defective. Breaks in the secondary winding of your L.F. transformer, between the transformer and the valve grid or grid battery would also cause the trouble.—W. S.

## When Asking Technical Queries

PLEASE write briefly and to the point

A Fee of One Shilling (postal order or postage stamps) must accompany each question and also a stamped, addressed envelope and the coupon which will be found on the last page.

Rough sketches and circuit diagrams can be provided, but it will be necessary to charge a special fee (which will be quoted upon request) for detail layouts and designs.

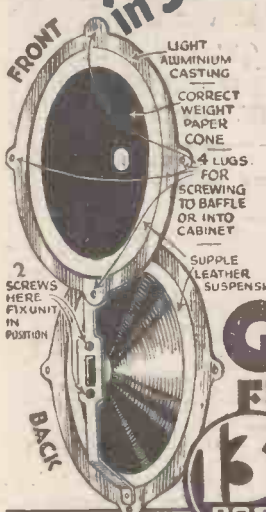
your valves becoming choked up, and you are advised to look to the connections to your grid leak and condenser. If the connections

### Transformer Cores.

**Q.**—Why are not solid iron cores used in the construction of L.F. transformers? Why should it be necessary to build up the cores from thin metal stampings?—J. L. (Edinburgh).

**A.**—When a varying current is flowing through any conductor a varying magnetic field is set up around that conductor, and varying currents are induced in any other conductors which the varying field may happen to cut. This is, of course, the principle by which currents are induced in the secondary winding. The core, however, is also composed of conducting material, and if precautions are not taken, a considerable loss of energy may occur through currents being induced in the core, where they are not wanted and where they can do no useful work. Making the cores of thin laminations and insulating each lamination from its neighbour greatly restricts the "eddy-currents," as these stray currents in the core are called.—W. S.

**BLUE-SPOT USERS!!**  
Get the Floating Cone that makes a perfect Loud Speaker in 5 minutes—TO-DAY!



**THIS IS NOT A KIT OF PARTS, BUT AN EFFICIENT, COMPLETELY ASSEMBLED FLOATING CONE.**

Simply two screws and the unit is in place—and the whole ready to screw on to a baffle board or into a cabinet, making a first-class loud speaker that will reproduce with fascinating realism at infinitesimal cost! A sound job, too—perfectly assembled—light aluminium casting, correct weight paper cone, a specially manufactured pure rubber suspension, post paid and ready for fixing at once. 16 in. power model also available at 22/6 post paid.

**GILMAN'S FLOATING CONE**

Send P.O. for 13/- to-day to Manufacturers, J. S. Gilman, Portland House, 73 Basinghall St., E.C.2. Orders in strict rotation. "Blue-Spot" unit (adjustable type 88K) supplied at 2/1. extra if desired. Phone: London Wall 9892.



OR FROM YOUR DEALER



## D. X.

Here is the famous D.X. Transformer which is setting a standard in value for money and is already known wherever radio is heard of. A really first-class piece of workmanship, conscientiously made in accordance with modern scientific principles at a price that places it within reach of all.

Write to us for leaflets and particulars of this transformer and give one a trial. You cannot fail to be delighted.

Ask for particulars of our new circuit, the D.X.3.

8/- Retail  
Ratio 3 to 1

D.X. COILS LTD., 542 Kingsland Road, E.8

## TO HOME CONSTRUCTORS!

Build the Peerless "Resonic 2"

Anyone can build this set in 60 minutes. No drilling. No soldering. All Wires cut and bent. JUST ASSEMBLE and then immediately enjoy the radio entertainment which is of splendid tone, and comes in at good loud-speaker volume. Circuit allows use of standard valve (1 H.F. & 1 Power). Blueprint and easily followed Diagram of Connections included with every set. Cabinet and full Kit supplied in Carton.

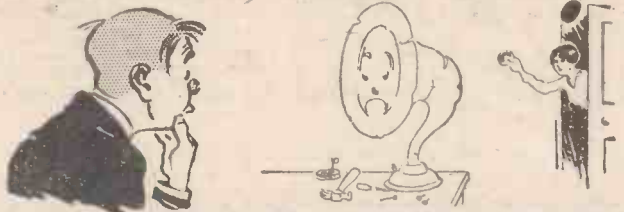


£3.15.0

Obtainable from all dealers or THE BEDFORD ELECTRICAL & RADIO CO., LTD., 22 Campbell Rd., BEDFORD.

Regd. No. 456002

**NEVER SAY DIE**



**UP MAN AND TRY**



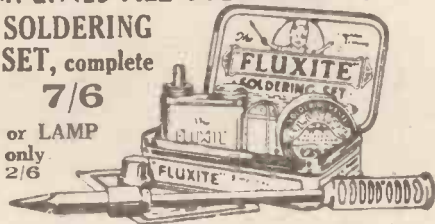
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IT SIMPLIFIES ALL SOLDERING

FLUXITE is sold in tins, price 8d., 1/4 and 2/8. Another use for Fluxite: Hardening Tools and Case Hardening.

Ask for leaflet on improved methods. **FLUXITE LTD.** (Dept. 326) Rotherhithe, S.E.16

**SOLDERING SET, complete**  
7/6  
or LAMP only 2/6



**BURTON**



REGD DESIGN



**FOUR FLOATING POINTS • NO RIGIDITY EVERY VALVE SOCKET GIVES FLOATING ACTION**

SELF LOCATING FLOATING ACTION

*Anti-Phonic*  
**Valve Holder**



**C.F. & H. BURTON PROGRESS WKS. WALSALL**

RUPERT COLLINS SERVICE

**BURTON**  
MICRO-LOG DIAL



With Special Logging Strip situated on the front of the Dial, supplied complete with Drilling Template and Fixing Screws, slow Motion only.

This model with Special Logging Strip gives Fast and Slow Motion, by the simple turning of 1 knob for the fraction of a turn, Fast and Slow Motion.

5/6

6/-

**C.F. & H. BURTON PROGRESS WKS. WALSALL**

RUPERT COLLINS SERVICE

Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

*Edison Bell*

**PICNIC Portable**

The Pride of the Wireless World

PRICE  
**£17 : 17**

including Valves, Speaker, Batteries, etc. (Marconi royalties extra)



**Specification:** The Set is built into a well-made folding cabinet measuring 13½ in. by 13½ in. by 10 in., covered in dark blue grained Leatherola, with patent carrying handle.

There are 5 Valves, comprising 2 H.F., Detector, and 2 L.F. stages, and is fitted with first-class quality cone speaker of original design, Non-spill accumulator, Grid Bias, and 108-volt standard size H.T. Battery. Inclusive weight, 26 lb.

Leads are clearly marked with aluminium tags. There are only two controls, Tuning and Reaction, making the working of the Set simplicity itself.

A switch is fitted for changing from high to low wavelengths and independent connections for outside aerial, earth, and speaker, for use if desired.

SEND FOR COMPLETE CATALOGUE.

**EDISON BELL, LTD., LONDON, S.E.15**

# Building?



Range 250-2000 metres

By Change-over Switch

**The PANEL PLATE UNIT** consists of Double Wave-band Tuner, Slow Motion Tuning Condenser, Change-over Switch, assembled on antique brass plate, the whole mounted on handsome wood panel. **PRICE 35/-**

## THE BASEBOARD UNIT

4 wires from a condenser and a coil, to these 4 terminals—COMPLETE a 3-VALVE RECEIVER!



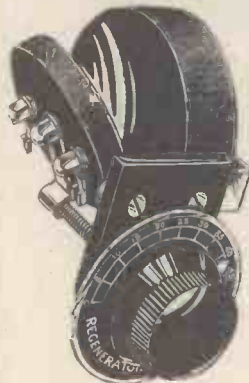
No radio constructor can afford to be without this unit, which eliminates all the uncertainty of Base-board layout and wiring.

2 Valve Transformer 37/6  
3 " " R.C.C. " - 58/-  
3 " " R.C.C. " - 23/-

All Lamplugh radio products are guaranteed for 12 months.

# LAMPLUGH

(Pronounced: LAMP-LOO)



## THE QUALITY TUNER

An ideal Aerial Tuner for professional and amateur Radio set builders. Covers the entire Broadcast wave-band from 250-2,000 metres, only requires Push-Pull Switch to effect the change. Circuit diagram is supplied with each. **PRICE 12/6**

Send for Lists and Wiring Diagrams from

**S. A. LAMPLUGH, LTD.,**  
KING'S ROAD, TYSELEY, BIRMINGHAM

# BROADCAST TELEPHONY

(Broadcasting stations classified by country and in order of wavelengths)

Kilo-Metres	Station and Call Sign	Power (Kw.)	Kilo-Metres	Station and Call Sign	Power (Kw.)	Kilo-Metres	Station and Call Sign	Power (Kw.)
<b>GREAT BRITAIN</b>								
25.6	11,750 Chelmsford (5SV) 20.0		305	982 Agen		275	1,090 Turin (test)	0.5
248.9	1,230 Newcastle (5NO) 1.5		322.6	931 Vitus (Paris)	2.0	333	901 Naples (Napoli)	1.5
260.9	1,150 *Legis (2LS) 0.2		336.3	892 Le Petit Parisien	0.5	387	775 Genoa	3.0
273	1,100 *Sheffield (6LF) 0.2		354	846.7 Algiers (PTT)	2.0	443.8	676 Rome (Roma)	3.0
288.5	1,040 *Bournemouth (6BM) 1.5		370	811 Radio L.L. Paris	1.0	456	658 Bolzano	0.3
288.5	1,040 *Bradford (2LS) 0.2		382.7	784 Toulouse (Radio)	0.0	504.2	595 Milan	7.0
288.5	1,040 *Edinburgh (2EH) 0.2		414	724 Radio Maroc (Rabat)	2.0	<b>JUGO-SLAVIA</b>		
£94.1	1,020 *Dundee (2DE) 0.2		416.6	720 Grenoble (PTT)	1.5	308.3	973 Zagreb (Agram)	1.25
204.1	1,020 *Liverpool (6LV) 0.2		449.8	668 Bordeaux (Radio Sud-Ouest)	2.5	578	518 Laibach	5.0
204.1	1,020 *Stoke-on-Trent (5ST) 0.2		449.8	668 Paris (Ecole Sup., PTT)	0.7	<b>LATVIA</b>		
204.1	1,020 *Swansea (5SX) 0.2		468.8	640 Lyons (PTT)	5.0	528.2	568 Riga	2.0
204.1	1,020 *Hull (6KH) 0.2		1,080	277.6 Strasbourg	5.0	<b>LITHUANIA</b>		
303	991 Belfast (2BE) 1.5		1,488.15	202 Eiffel Tower	8.0	2,000	150 Kovno	15.0
311	954 Aberdeen (2BD) 1.5		1,744	172 Radio Paris	8.0	<b>NORWAY</b>		
323	928 Cardiff (5WA) 1.5		<b>GERMANY</b>			212	1,240 Rjukan	1.0
358	898 London (2LO) 3.0		14.83	20,230 Nauen (AGAI)	20.0	297	1,010 Notodden	0.7
378	793 Manchester (2ZY) 1.0		37.65	7,968 Doeberitz (AFK)	5.0	297	1,010 Porsgrund	1.0
396	757 *Plymouth (5PY) 0.2		41.50	—		305.9	820 Bergen	1.0
401	748 Glasgow (5SC) 1.2		51	5,882 Bergedorf (AFL)	3.0	387	775 Fredriksstad	1.0
482	622 Daventry Ex. (5GB) 24.0		219	1,370 Flensburg	1.5	456	658 Aalesund	1.6
1,502.5	192 †Daventry (5XX) 25.0		240	1,250 Nurnberg	4.0	496.7	604 Oslo	1.5
* Relay stations. † Relays 2LO.			250	1,200 Kiel	0.7	500	600 Tromsø	1.0
<b>AUSTRIA</b>			250	1,200 Cassel	0.7	566	350 Hamar	0.7
219	1,370 Klagenfurt	1.5	250	1,200 Cologne	4.0	2,041	142 Bergen	5.0
250	1,200 Linz	0.5	263.2	1,140 Muenster	1.5	<b>POLAND</b>		
277.8	1,080 Salzburg (under construction)	0.5	265.5	1,130 Kaiserslautern	1.5	314	955 Cracow	1.5
283	1,060 Innsbruck	0.5	272.7	1,100 Koenigsberg	4.0	343	873 Posen (Poznan)	1.5
354.2	847 Graz	0.5	283	1,061 Berlin (E)	0.7	418.1	721 Kattowitz	10.0
510.2	577 Vienna	15.0	283	1,061 Stettin	0.7	427	703 Wilno	1.5
<b>BELGIUM</b>			283	1,061 Magdeburg	0.7	1,415.1	242 Warsaw	10.0
220	1,360 Chatelineau	0.25	321.2	937 Breslau	4.0	<b>ROUMANIA</b>		
275	1,090 Ghent	0.5	326.4	919 Gleiwitz	6.0	396.3	757 Bucharest	4.0
320.7	910 Schaerbeek-Brussels	0.5	361.9	829 Leipzig	4.0	<b>RUSSIA</b>		
511.9	586 Brussels (also testing on high power)	1.5	374.1	802 Stuttgart	4.0	825	363.5 Moscow (PTT)	25.0
<b>CZECHO-SLOVAKIA</b>			387.1	776 Dresden	0.75	925	323 Homel	2.5
265	1,130 Kosice	2.4	387.1	776 Bremen	0.75	1,000	300 Leningrad	20.0
277.8	1,080 Bratislava	0.5	391.6	766 Hamburg	4.0	1,485.1	202 Moscow	30.0
343.2	874 Prague (Praha)	5.0	421.3	712 Frankfurt	4.0	1,875.9	179 Kharkov	15.0
432.3	694 Brunn (Brno)	2.4	453.9	654 Aachen	0.75	<b>SPAIN</b>		
<b>DENMARK</b>			455.9	654 Danzig	0.75	277	1,083 Barcelona (EAJ13)	2.0
339.8	883 Copenhagen		402.2	649 Langenberg	25.0	278	1,080 Cartagena	1.0
1,153.8	862 Kalundborg	7.5	475.4	631 Berlin	4.0	310	968 Oviedo (EAJ19)	0.5
<b>ESTHONIA</b>			536.7	559 Munich	4.0	324	926 Almeria (EAJ18)	1.0
403	735 Reval (Tallinn)	2.2	566	530 Augsburg	0.5	335	895 Cadiz (EAJ3)	0.5
<b>FINLAND</b>			566	530 Hanover	0.7	350.5	856 Barcelona (EAJ1)	3.5
374	800 Helsingfors (Helsinki)	1.2	577	520 Freiburg	0.7	369.9	811 Seville (EAJ5)	0.5
1,503	199 Lahti	20.0	1,048.3	182 Zeesen	20.0	400	750 San Sebastian (EAJ8)	0.1
<b>FRANCE</b>			1,048.3	182 Norddeich	10.0	405	740 Salamanca (EAJ22)	0.55
45	6,666 Agen	0.25	<b>HOLLAND</b>			426.7	703 Madrid (EAJ7)	3.0
200	1,500 Fecamp	0.3	16.83	— PHUHI Huizen	50.0	<b>SWEDEN</b>		
211.3	1,420 Beziere	1.0	38.8	— Kootwijk		200.1	1,153 Hoerby (testing)	10.0
230.8	1,300 Mont de Marsan	0.4	(PCLL) 32.0 (Wed. 12.40 G.M.T.)			281	1,067 Trollhattan	0.4
236.2	1,270 Montpellier		31.1	— Eindhoven		315.7	950 Falun	0.5
252.1	1,100 Juan-les-Pins	0.7	(PCJJ) 25.0			346.8	865 Goteborg	6.0
254	1,181 Rennes (PTT)	1.5	300	1,000 Huizen (until 5.40 p.m.)	5.0	438	655 Stockholm	1.5
267	1,123 Lille (PTT)	0.8	1,071	280 Hilversum		545.5	550 Sundsvall	1.0
273	1,100 Limoges (PTT)	0.5	1,552	161 Huizen (after 5.40 p.m. and on Sundays)	5.0	720	416 Ostersund	2.0
287	1,044 Bordeaux-Lafayette	0.5	1,950	154 Scheveningen-haven	5.0	1,190	252 Boden	2.0
291.3	1,030 Radio Lyons	1.5	<b>HUNGARY</b>			1,351.3	222 Motala	30.0
305	932 Marseilles (PTT)	0.5	554.5	541 Budapest	15.0	<b>SWITZERLAND</b>		
			<b>ICELAND</b>			406	739 Berne	1.0
			<b>IRISH FREE STATE</b>			489.4	613 Zurich	0.6
			222.2 1,350 Cork (5CK) 1.5			680	441 Lausanne	0.6
			411 730 Dublin (2RN) 1.5			760	395 Geneva	0.5
						1,034	290 Basle	0.25
						<b>TURKEY</b>		
						1,200	250 Stamboul	5.0
						1,818	165 Angora	5.0

## CHIEF EVENTS OF THE WEEK

<b>LONDON AND DAVENTRY (5XX)</b>	
Jan. 28	Vaudeville.
" 29	Wife to a Famous Man, by Martinez Sierra.
" 30	The Golden Cocherel, an opera by Rimsky-Korsakov.
" 31	Gloucester Orpheus Society.
Feb. 1	B.B.C. Symphony Concert from the Queen's Hall.
<b>DAVENTRY EXPERIMENTAL (5GB)</b>	
Jan. 27	Military-band concert.
" 29	You're Through, a radiophonic revue.
" 31	Royal Philharmonic Society

## CARDIFF

Jan. 28	The Countess of Plymouth's concert.
" 31	"The Merry-makers."

## MANCHESTER

Jan. 28	Two revues.
" 29	It May Come to This, a novelty entertainment

## NEWCASTLE

Jan. 28	Relay from H.M.S. Helicon
---------	---------------------------

## ABERDEEN

Jan. 28	Round Scotland in music.
" 31	Darkness, by Mannin Crane

## BELFAST

Jan. 28	Upstream, by Clifford Bax.
Feb. 2	Military-band concert.

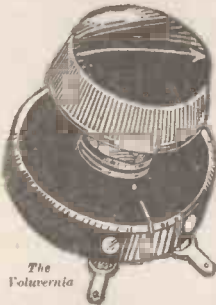
# QUALITY COUNTS

The fact that the GAM-BRELL NEUTRO-VERNIA is chosen for inclusion in so many receivers described in the technical press is proof that it is a real quality component and one which does its duty as Reaction Control, Balancing Condenser or Neutralising Condenser with perfect efficiency.

Here are a few of the well-known sets in which it has been included:

- SUNSHINE FIVE—ATTACHE PORTABLE
- FOUR-VALVE "Q" COIL RECEIVER—
- COMPANION PORTABLE—DAVENTRY PORTABLE—CATARACT FIVE—SUMMERTIME DX THREE—BIRTHDAY FOUR—MAINS-FED FOUR—DAVENTRY LOUD-SPEAKER PORTABLE.

The Neutrovernia has proved its worth among those in radio. That is why it is always to the fore. **PRICE 5/6**



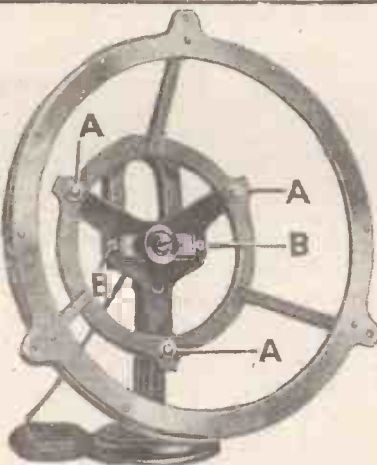
## The Gam-brell Voluvern

A small, neat, compact and efficient Volume Control. The movement is smooth and velvety, and gives a continuous and evenly variable control of volume from full strength right down to nothing. Its resistance value makes it also suitable for use with Gramophone Pick-ups.

**PRICE 6/9**

## GAMBRELL RADIO LTD.

6 Buckingham Street, Strand, W.C.2



GET MOVING-COIL RESULTS FROM YOUR "BLUE SPOT" UNIT BY USING THE "WHITE SPOT" FRAME.

The whole made of solid castings, and front ring highly polished. THE UNIT can be attached by two screws B, which are provided, in one minute, and centred by means of the three screws A.

Frame, complete with diaphragm assembled and suspended as in moving coil practice, price 16/- This can be fitted to either a cabinet or baffle by means of the three lugs provided.

Frame only, complete with front ring and all screws, 12/6.

Stand extra to either of above, 2/6. All post free.

BLUE SPOT UNITS SUPPLIED AT LIST PRICES

WOLVERHAMPTON DIECASTING CO., 15, Great Hampton Street, Wolverhampton.

## BLUEPRINTS

Full-size blueprints are available of the following sets. Copies of the "Wireless Magazine" and of "Amateur Wireless" containing descriptions of all these sets can be obtained at 1s. 3d. and 4d. respectively, post free. All Post Free

**CRYSTAL SET (6d.)**

"Best-yet" Set .. .. .	AW114
1929 Crystal Receiver .. .. .	AW165

**ONE-VALVE SETS (1s. each)**

Ultra sensitive Hartley One .. .. .	AW103
Beginners' One-valver .. .. .	AW140
Special One .. .. .	WM116
Reinartz One .. .. .	WM127

**TWO-VALVE SETS (1s. each)**

Oceanic Short-wave (D, Trans) .. .. .	AW91
DX Headphone Two (HF, Det) .. .. .	AW134
Ace of Twos (D, Pentode) .. .. .	AW143
Home Two (D, Trans) .. .. .	AW140
Globe DX Two (SG, D) .. .. .	AW157
East to West Short-wave Two (D, Trans.) .. .. .	AW159
"Q"-coil (D, Trans) .. .. .	WM62
Crusader (D, Trans) .. .. .	WM69
Two Daventry Two (D, Trans) .. .. .	WM07
Key-to-the-Ether Two (D, Trans) .. .. .	WM107
Metro Two (D, Trans) .. .. .	WM114

**THREE-VALVE SETS (1s. each)**

"Q"-coil 3 (D, RC, Trans) .. .. .	AW84
British Station Three (HF, D, Trans) .. .. .	AW122
Adaptable Three (D, 2 Trans) .. .. .	AW139
All-wave Mains Three (HF, D, Trans, Rectifier) .. .. .	AW144
All-purpose Short-wave Three (D, RC, Trans) .. .. .	AW147
Screen-grid Q Coil Three (HF, D, Trans) .. .. .	AW150
All-Round Three (D, RC, Trans) .. .. .	AW155
James Special Three (HF, D, Trans) .. .. .	AW156
All-Britain Three (HF, D, Trans) .. .. .	AW158
Bantam Three (D, RC, Trans) .. .. .	AW160
Hartley Dual-range Three (D, RC, Trans) .. .. .	AW166
Everyday (D, 2 Trans) .. .. .	WM52
Pole to Pole Short-waver (D, RC, Trans) .. .. .	WM89
Inceptor Three (SG, D, Pentode)—1s. 3d. with copy of "Wireless Magazine" .. .. .	WM105
All-wave Screen-grid Three (HF, D, Trans.) .. .. .	WM110
Gramophone Three (D, 2RC) .. .. .	WM115
Standard Coil Three (HF, D, Trans) .. .. .	WM117
Festival Three (D, 2LF-dual Imp.) .. .. .	WM118
Wide-world Short-waver (SG, D, Trans) .. .. .	WM120
New Year Three (SG, D, Pentode) .. .. .	WM123
The Q3 (D, RC, Trans) .. .. .	WM124

**FOUR-VALVE SETS (1s. 6d. each)**

Overseas Short-waver (HF, D, 2Trans) .. .. .	AW133
The Ranger (SG, D, RC, Trans) .. .. .	AW145
Facility Four (HF, D, 2RC—Q-Coil) .. .. .	AW154
Broadcast Picture Four (HF, D, 2RC) .. .. .	AW163
Orchestra Four (D, RC, Push-pull) .. .. .	AW167
"Q"-coil 4 (HF, D, RC, Trans) .. .. .	WM71
All-from-the-Mains Four (HF, D, 2 LF) .. .. .	WM80
Five-pounder Four (HF, D, RC, Trans) .. .. .	WM91
Symphonic Four (HF, D, 2 LF) .. .. .	WM98
Touchstone (HF, D, RC, Trans) .. .. .	WM109
Reyner's Furzehill Four (SG, D, 2Trans) .. .. .	WM112
Economy Screen-grid Four (SG, D, RC, Trans) .. .. .	WM113
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# RADIOGRAMS

CONSIDERABLE use is made of wireless by the New York police, most of the stations and "fixed points" for traffic control in the city being equipped with radio apparatus. By this method important communications made by the Commissioner of Police put out through WNYC, the official transmitter on 526 metres, are made without delay.

On the occasion of the annual dinner of the Dickens Fellowship at the Piccadilly Hotel on February 7 the speech of the Lord Chief Justice of England (Lord Hewart) will be relayed to 2LO and 5XX.

On February 12 and 13 listeners to London and Daventry 5GB will hear an Indian drama written at the very beginning of the Christian era. It is a translation from Sanskrit of Khalidasa's *Sakuntala* by Sir M. Monier-Williams.

Julian Rose makes a further appearance at the 2LO studio on January 23; the vaudeville programme on that evening also includes Clarice Mayne, Patricia Rossborough, and Deslys and Clark in synco-pated numbers.

*You're Through* is the title of a new "radiophonic revue in twelve wrong numbers" from the pen of Charles Brewer; it is to be relayed to 5GB from the Birmingham studio on January 29. On the same evening Manchester presents an original entertainment constructed on novel lines. The scene is laid in a Listeners' Exchange, an imaginary innovation which permits any licence-holder to ring up the studio and request that his favourite item be sandwiched in the programme. The entertainment is subject to many interruptions, but the result is an amusing one.

*Upstream*, a thriller by Clifford Bax, is down for transmission from the Belfast station on January 28; it is a mixture of

"madness, nigger driving and grim murder," a combination which should provide some strong dramatic moments.

The England v. Ireland rugger match taking place at Twickenham on February 9 will be the subject of a running commentary relayed to 2LO and 5XX.

On February 1 Daventry 5GB will broadcast a comedy by Roland Pertwee, entitled *Postal Orders*, in which the postal staff is cleverly satirised.

On February 2 the Manchester group of stations will take three short scenes from *Cinderella*, the pantomime now being performed at the Theatre Royal, Leeds. It will be followed, after orchestral music from the studio, by a play, *Without Publicity* by J. C. Spence, produced by the Liverpool Radio Players and relayed from that station.



George Gee—according to Lissenden

Polskie Radio, the Warsaw broadcasting company, has submitted a proposal to the Polish Government to install in the neighbourhood of the capital a 120-kilowatt station, which would enable its programmes to be heard by most listeners in the territory governed by this Republic. In the event of the plan being accepted by the authorities the present Warsaw high-power transmitter would be transferred to Wilno.

The world's largest broadcasting "net" has been formed by an arrangement arrived at between the National Broadcasting Company and the Columbia system. The National Broadcasting Company possesses fifty-eight transmitters scattered throughout the States, and the Columbia have contributed a further thirty. Listeners on both the East and Pacific coasts of the United States are now able to hear New York programmes daily.

According to an official report, the Berlin broadcasting station now possesses a network of some forty-five different outside relay points at which permanent microphones have been installed; these include fifteen theatres, five educational centres, five hotels (for dance music or concerts), seven sports arenas (comprising racecourses), and the balance in cathedrals, churches, museums, the Berlin Town Hall, the Reichstag Buildings and—the Municipal Crematorium!

The call sign GKT, previously used by the short-wave station at Burnham, is now transferred to the Portishead station, which uses it for short-wave C.W. transmissions on 17.81 and 36.54 metres.

The Malmo (Sweden) broadcasting station has been replaced by a more powerful transmitter recently officially opened at Hoerby. The broadcasts are still effected on 261 metres, the station devoting its full time to the relaying of the Stockholm programmes. Malmo will continue to operate on a common wavelength with other smaller Swedish transmitters.

A number of experiments recently carried out on the Berlin-Hamburg express have proved the practicability of wireless telephone conversations between the train and various European capitals. Conversations have been held with the Hague, Stockholm, Copenhagen, and Budapest.

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## LETTERS TO THE EDITOR

The Editor does not necessarily agree with the views expressed by correspondents.

Without Fear or Favour

SIR,—Sextets, octets, chamber music, symphony programmes and the like are always, in the opinion of Mr. Moseley, magnificent, but when it comes to Charlot, de Courville, Clapham and Dwyer, etc., it's "Bah!" In this week's issue he refers to his "usual broad-mindedness." Ye gods! The "critic" with a bias.

A. A. (London, N.).

The "Bantam Three"

SIR,—I feel that I must write and tell you of my experience with the "Bantam Three." "Little, but Lusty!" I must thank you for publishing such a compact set.

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(Continued on next page)

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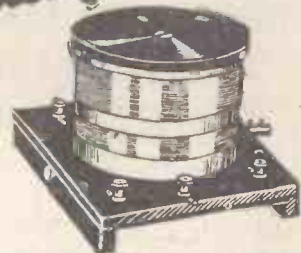
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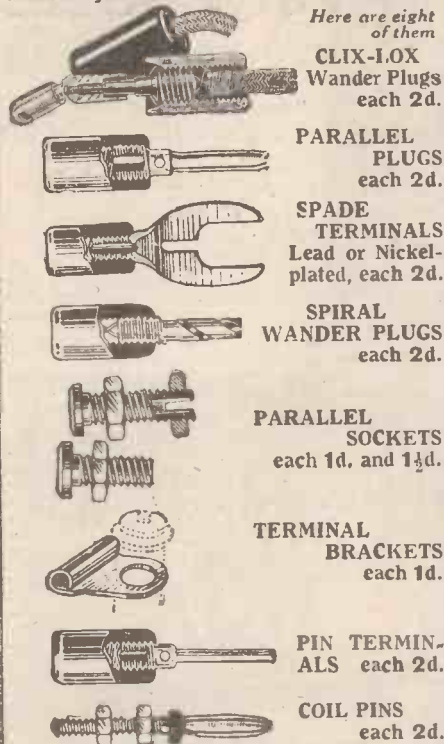
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**LETTERS TO THE EDITOR***(Continued from preceding page)*

get any reaction. I suspected all kinds of things, and went so far as to take my set to a friend's house, where we tried the method of substitution, but without the desired result. At last I have cured the trouble!

In case other constructors have experienced the same difficulty, I advise them to purchase a T.C.C. .0001 fixed condenser and include C.A.T. in the set.

In conclusion, I should like to say that the "Bantam" now crows untiringly and I foresee many hours of entertainment from it.—W. (Wolverhampton).

**Too Much Dance Music**

**SIR**,—Your correspondent's remarks on this subject in the issue dated January 12, cannot, I think, be questioned. The proportion of London listeners who make use of these transmissions for the purpose of dancing must be very small. But in the provinces the proportion must be still smaller!

I suggest that dance music transmissions be confined to London and 5XX, while provincial stations close down and use the money saved in working expenses to provide better programmes

H. F. (Jersey).

**SIR**,—I think that W.O.'s letter in your January 12 issue regarding dance music is wrong, he thinks we get too much and also that that type of music is intended for dancing only. If he will only look through a whole week's programme and work out the percentage of dance music broadcast against orchestras, trios, etc., he will find that the amount of dance music sent out is very small indeed against the latter type of music.

Again, dance music is not altogether intended for dancing. From my point of view we do not get enough dance music; we are living in 1929 and we want 1929 music.—J. C. (Aylesbury).

**Linen-diaphragm Speakers**

**SIR**,—I feel that I must write and tell you of the great success I have had in building the "Double Linen-diaphragm Loud-speaker," described in *AMATEUR WIRELESS* dated November 3.

I followed the directions exactly, using the Hegra Unit, and the result is all you claimed for it, and more. I have heard the bass drum in broadcast dance music for the first time, and the bowing of the double basses in orchestral music is very pronounced, as are the pedal notes of organ music. All the reproduction is very pure and true.—P. P. (London, S.W.).

G2UA complains that some amateur transmitter is using his call sign, his own apparatus being dismantled at present.

[Owing to the demands upon our space in this issue, we regret that it has been necessary to hold over a number of letters.]

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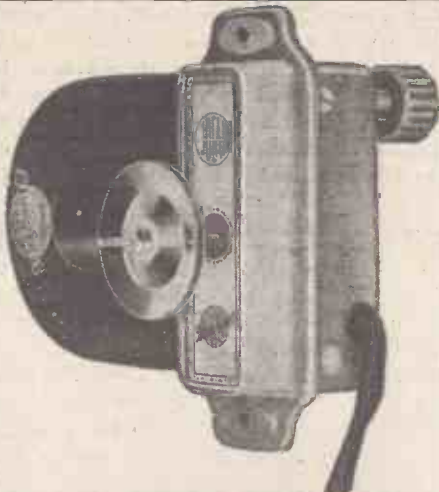
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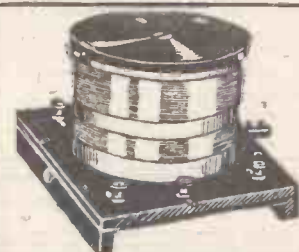
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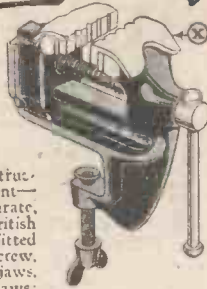
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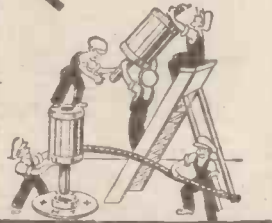
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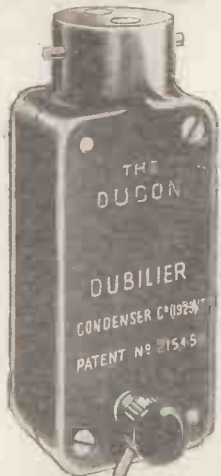
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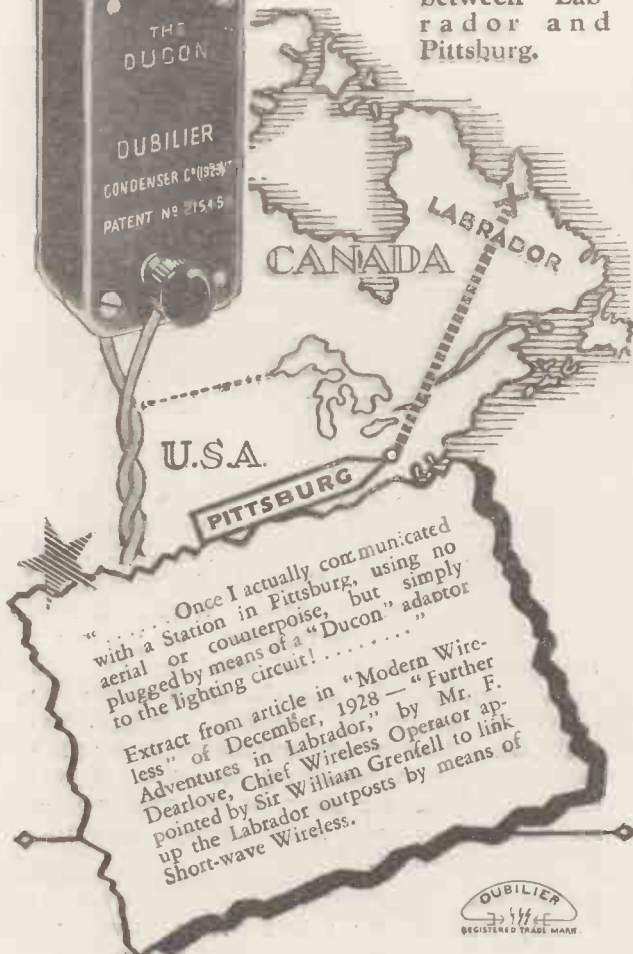
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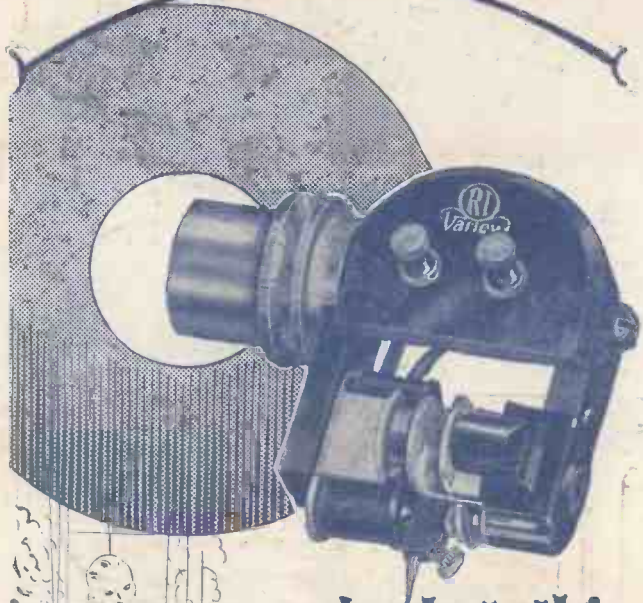
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