**FREE ENCLOSURE: FOLDING MAP & LIST—"CALL SIGNS"**

# Amateur Wireless And Electrics

**BROAD-CASTING NUMBER**

**Specially Enlarged**

**Vol. II, No. 34** SATURDAY, JANUARY 27, 1923 **Price 3d.**

Mr. W. R. Clark's Home-made 3-valve Receiving Set as described by its builder on page 92

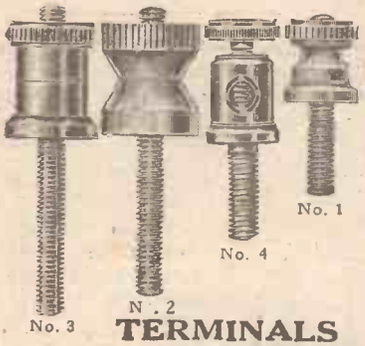
No.1 **FILAMENT RESISTANCES** for Panel Mounting, 3/6

## COIL PLUGS AND SOCKETS

Price

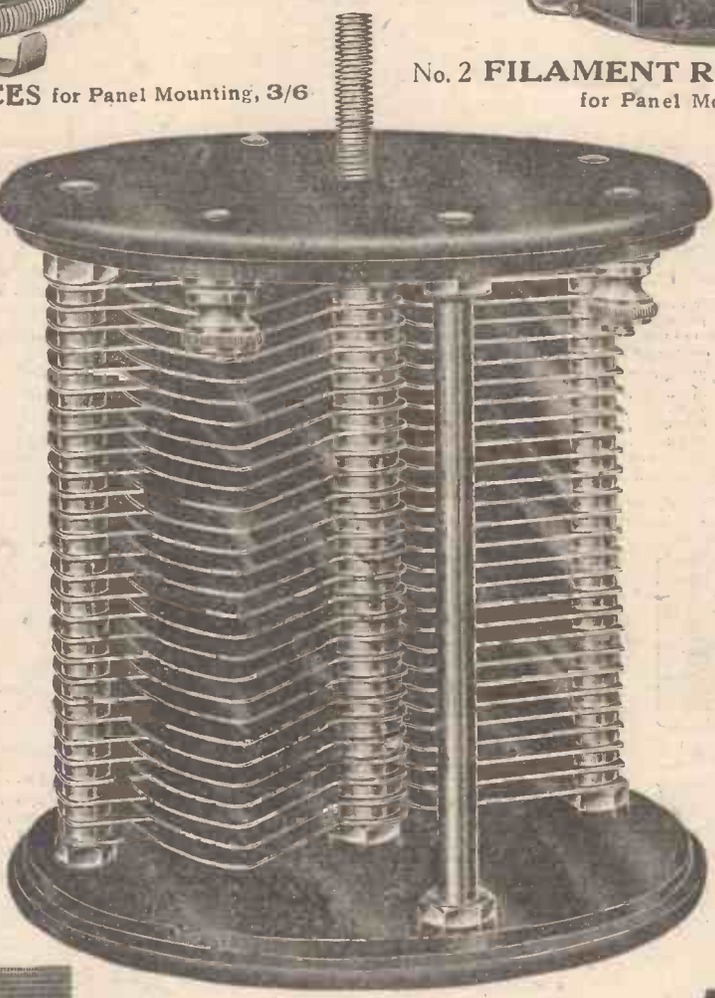
Gross pair ... ... 20/-
7 Gross pair ... ... 16/-

No. 2 **FILAMENT RESISTANCES**
for Panel Mounting, 3/6




## TERMINALS

| | | | |
|---|---|---|---|
| No. 3 | ... ... | per gross | 24/- |
| No. 2 | ... ... | ,, | 24/- |
| No. 4 | ... ... | ,, | 20/- |
| No. 1 | ... ... | ,, | 18/- |

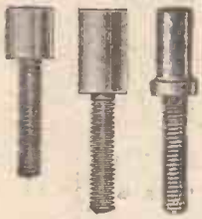


## COIL HOLDERS

Per doz. ... 18/-
Per gross ... 180/-

## CONTACT STUDS

1 gross ... 6/-
7 gross ... 5/-

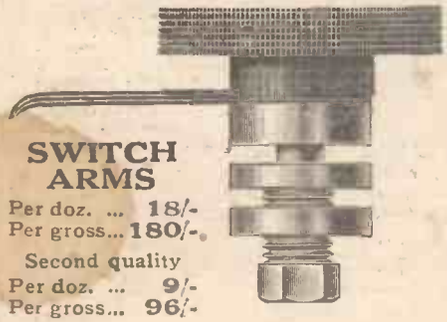


## SLIDER KNOBS

Complete, 8/- doz.

## VALVE LEGS

With nuts and washers
Per gross, 15/-; 7 gross, 12/-



## SWITCH ARMS

Per doz. ... 18/-
Per gross... 180/-
Second quality
Per doz. ... 9/-
Per gross... 96/-

## CONDENSERS

| | Assembled | Unassembled |
|---|---|---|
| .001 ... ... ... | 10/6 | ... ... 6/6 |
| .00075 ... ... ... | 7/6 | ... ... 5/3 |
| .0005 ... ... ... | 7/- | ... ... 4/6 |
| .0003 ... ... ... | 6/6 | ... ... 3/- |
| .0002 ... ... ... | 6/- | ... ... 2/6 |
| .0001 ... ... ... | 5/6 | ... ... 2/3 |
| .00005 ... ... ... | 4/6 | ... ... 2/- |

for the UNASSEMBLED CONDENSER
**TURNED EBONITE PLATES**
1/6 per pair extra.

## DETECTORS

Complete. Polished and lacquered.
Per doz., 30/-; per gross, 324/-

## SPACERS

Large ... 3/- gross
Small ... 2/- gross

# ORMOND ENGINEERING CO., 199, Pentonville Rd. N.1.

Telegrams: "ORMONDENGI, KINCROSS." Telephone: HOLBORN 1812.

Amateur Wireless and Electrics

Vol. II, No. 34 January 27, 1923

# What Set Shall I Buy?

## A Brief Guide for Beginners in Wireless

WITH the extraordinary variety of receiving sets at present on the market, both valve and crystal, the beginner is confronted with the problem of making a choice amongst sets which, as regards efficiency and value for money, seem equally good. Not only does every set present some novel feature, but each in its turn is equally attractive, making the task of singling out one particular set for all-round work particularly difficult.

It may be remarked that all the apparatus referred to is obtainable from advertisers in this journal, and a request for catalogues on a post card, mentioning AMATEUR WIRELESS, will ensure prompt attention.

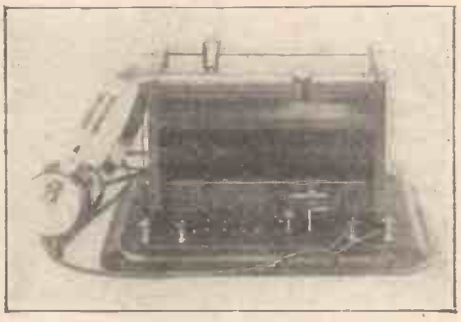
The best way of making a start is to consider first what is required in the way of range and performance, and secondly, how much money is to be expended on the complete installation. Up to a certain point, the more spent on a set the greater will be the range, but after this point has been reached any increase in cost will merely bring refinement in constructional details, finish and super-efficiency. It is proposed to deal with crystal sets first and to describe later the various valve sets, which may be obtained together with the average prices ruling to-day.

### *Crystal Receivers*

The simplest possible receiving set suitable for receiving broadcasting is that consisting of a tuning inductance, a crystal detector, and a pair of telephones. A set on the lines described above was advertised by a firm in AMATEUR WIRELESS recently for 15s. less telephone headgear, which would mean another 25s. to 45s. Although this set is exceptionally cheap, it is quite efficient and capable of receiving broadcasting and all local amateur transmissions.

Naturally, if a better-finished instrument is required it will be necessary to spend a little more than 15s. Exceedingly fine sets, complete in polished wood case, containing tuner, crystal detector, phones, etc., may be obtained from various advertisers at prices ranging from 47s. 6d. to £7 7s. The smaller sets are only suitable for those who wish to get concerts and broadcasting, but the larger sets are capable of not only receiving from considerable distances, but of particularly sharp tuning.

Tuning is, of course, an important point to remember, especially when receiving on the wave-lengths to which amateur experimenters are restricted. Unless the set can be properly tuned it will be found that several stations will be found on the same adjustment, all transmitting at the same time, and without a loose coupler it will be impossible to tune out the stations not required. All the above-mentioned sets are complete in themselves and already connected up internally. For those who desire to purchase component parts and wire up themselves a very large range of instruments are available. Crystal detectors cost anything from 2s. 6d. to 35s., tuning coils from 25s. to £5 5s., condensers varying from a small fixed model at 4s. 6d to a variable instrument at 55s.



**"Ubique" Crystal Set**
*(Grafton Electrical Co., London, W.1).*

**Three-valve Set with Enclosed Loud-speaker**
*(Rogers, Foster & Howell, Ltd., Birmingham).*

A very efficient set may be made up by carefully selecting the components with the aid of an expert friend to advise on the suitability of the different parts for use together. An example of what may be purchased for making an efficient crystal set is given here as a rough guide:

| | | | |
|---|---|---|---|
| 1 double-slide tuning coil ... | £1 | 10 | 0 |
| 1 crystal detector ... ... | 0 | 12 | 6 |
| 1 variable condenser ... | 1 | 5 | 0 |
| 1 blocking condenser ... | 0 | 6 | 6 |
| 1 pair telephone receivers ... | 1 | 10 | 0 |
| | £5 | 4 | 0 |

This set can be further improved by substituting an inductively-coupled tuner for the ordinary tuner given above and adding another variable condenser. The extra cost would amount to £2 5s. It will be noticed that the above prices are, if anything, a little on the high side, it being the writer's intention to show the cost of high class apparatus. Instruments can be obtained as much as 25 per cent. lower than the figures quoted, but the quality is, of course, not of the highest.

### *Valve Sets*

Until the end of the war few amateurs knew of the existence of the "valve" for receiving purposes, and with the exception of those actually in the Signal Services imagined the valve to be a scientist's "toy" beyond their comprehension.

It is really only of recent date that valve sets for amateur experimenters have become common, and up to that time crystal sets were practically universal. To-day a private individual may purchase a valve set costing anything from £4 15s. for a single-valve panel to £100 for a multiple-valve amplifier capable of receiving signals from South America and even greater distances. In addition to ordinary telephone receivers, loud-speakers may be fitted to enable music or other signals to be heard by a large number of people at the same time.

A cheap single-valve set has very little more to offer than a good crystal set costing the same amount; in fact, the crystal set has the advantage of not requiring either high-tension batteries or accumulator.

A very good single-valve set without batteries or phones may be purchased for £4 or even less, the complete set for really good all-round working costing as follows:

| | | | |
|---|---|---|---|
| 1 valve panel ... ... ... | £2 | 5 | 0 |
| 1 valve ... ... ... ... | 0 | 17 | 6 |
| 1 variometer or tuner ... | 3 | 0 | 0 |
| 1 H.T. battery ... ... ... | 0 | 14 | 0 |
| 1 accumulator ... ... ... | 1 | 5 | 0 |
| 1 pair telephones ... ... | 1 | 10 | 0 |
| | £9 | 11 | 6 |

Two-valve amplifying panels may be purchased for £2 15s., or one-valve amplifying panels may be added to an existing valve receiver. Three-valve panels cost anything from £7 10s. to £25 according to the finish and general arrangement, and will bring most stations in for a considerable radius, the distance under which the set will receive clear signals being anything up to 300 miles.

***Accessories***

Accumulators, or filament batteries as they are sometimes termed, vary in price according to their ampere-hour capacity, a 6-volt 20-ampere-hour costing 30s., while a 4-volt 40-ampere-hour may be purchased for 25s. 6d.

With single-valve sets a 4-volt accumulator is quite sufficient, but with a multiple-valve tuner it is necessary to use 6 volts and a regulating resistance to compensate for the voltage drop when all valves are wired in parallel on the same circuit.

Telephone receivers vary in price and quality to an extraordinary extent, and the reader is advised to buy only British instruments from a reputable dealer. Foreign articles are being offered for sale in large quantities, and are inferior in finish, workmanship and sensitivity.

H.T. batteries cost from 3s. 6d. for a 15-volt battery up to 14s. for a 60-volt type with special tappings.

Loud-speakers are becoming deservedly popular, and quite efficient instruments are advertised at prices ranging from 55s. to £25 10s.

A. W. HULBERT.

# 2 L O as Seen from the Air

Here is a bird's-eye view of the very heart of the 2 L O area, showing the present London broadcasting centre (Marconi House, Strand.)

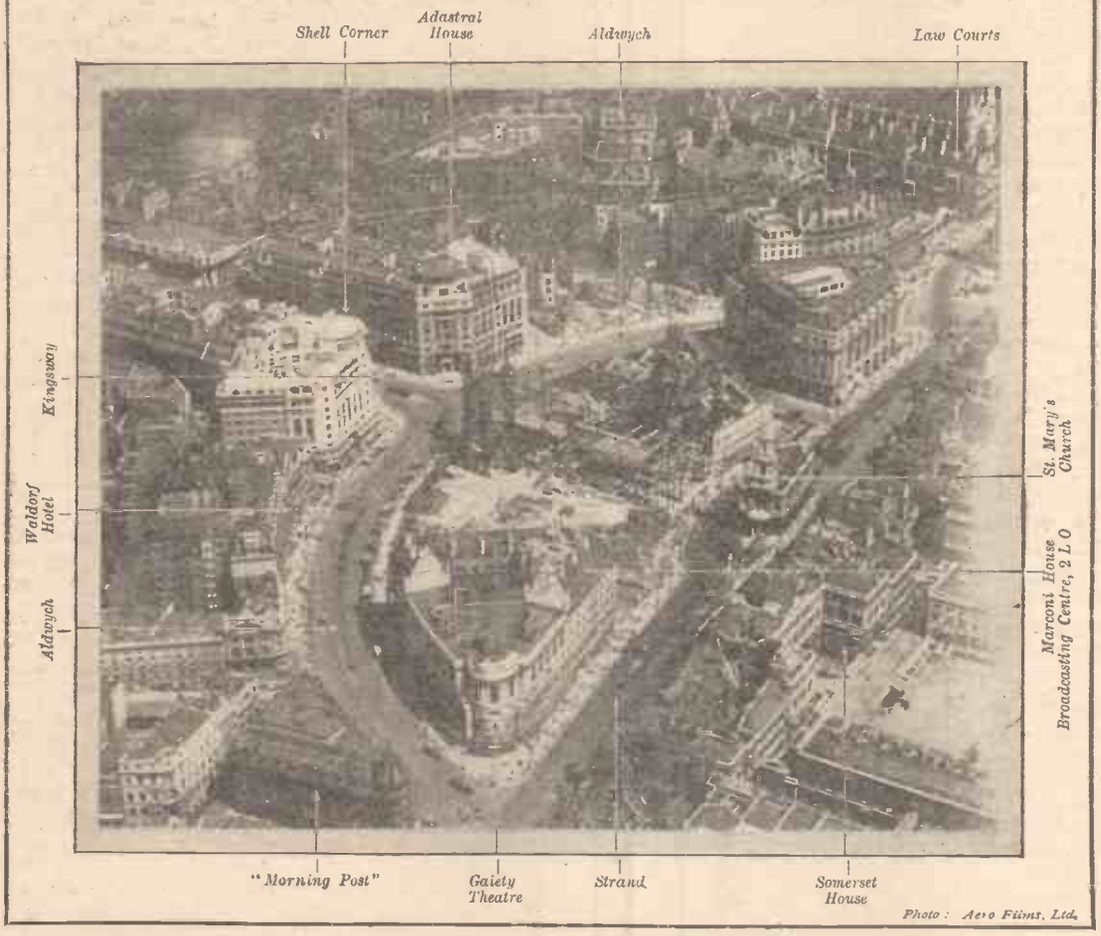



Photo: Aero Films, Ltd.

# Blind Spots

ONE of the many problems of the reception end of wireless, as recent correspondence has shown, is to find the cause, or causes, and the cure for blind spots. They are very curious, because in one of the spots it may be possible to pick up distant signals and telephony quite well, whereas a station comparatively close is quite inaudible. Some parts of Cheshire have an unenviable reputation in this respect, and there is a narrow but clearly defined area in the Guildford district where London broadcasting cannot be heard, or only with difficulty, no matter how powerful the receivers.

This problem is having a good deal of attention now that it has become so apparent owing to broadcasting activities; but there is another kind of blind spot that, as yet, has hardly been mentioned. It is possible, using the same aerial and the same coils, to have on instrument that will bring in Birmingham and Manchester very well, and give a deal of trouble when London, the nearest station, is wanted; and another that will bring in Manchester fairly well, London excellently, and Birmingham only by the exercise of the utmost tuning care. And yet, when it comes to the two Paris transmissions, there is nothing to choose between the two sets, both being all that can be desired. On the other hand, one set, which should be the more powerful, will hardly pick up P C G G at all, whilst the other brings it in as clearly and strongly as though it were but fifty miles away instead of two hundred.

These curious effects may be caused by some slight differences in capacity due to the length and arrangement of the internal wiring of the panels, or it may be found that a variable grid-leak will enable both instruments to function equally well on all desirable stations. So far, however, no satisfactory reply has been found to the enthusiast's eternal query, "why?"

ERNEST LANGMEAD.

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Natives are being trained in India as wireless operators aboard ship.

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Swindon is likely to be an important link in the Empire wireless chain.

# Making the Most of One Valve

THERE is something in the surmounting of difficulties that appeals to the national character of the Briton. He scorns, for instance, to shoot sitting rabbits, he likes a rather difficult golf course, and if he rides he prefers a horse that is not simply an animated arm-chair. That is probably why the single-valve receiving set is so popular amongst amateurs. With a big set one can, of course, pick up almost anything that is going in the world of wireless, and there is a vast amount of pleasure in operating five or six valves and in listening to the perfect signals that they bring in. But if you wish to know the real joys of wireless, turn your attention to what the Americans call the "single toob," and experiment with it until you have made it perform feats that are apparently impossible.

Some time ago the writer set himself the task of seeing what could be done with one valve. He intended to make up a 5-valve set, and his idea was to bring the rectifying panel to the highest state of efficiency before adding steps of high- or low-frequency amplification; but so fascinating did the problem become that the single valve remained in use for nearly three months, and during that time a "5-valver," which was lying ready at hand, was hardly ever wired up.

The set is installed in a small country town 30 miles north-west of London, and it is located in the lowest part of a valley whose sides are hills from 200 to 400 ft. in height. Conditions were therefore far from being ideal, and matters were made worse by the fact that it was not possible to erect a really good aerial. The house itself stands on sloping ground, so that the ground floor in front is the first floor at the back. Low telephone wires cross the garden at about 40 ft. from the house. Hence the lead-in end of the wire had to be attached to a pulley fastened to the top of a window-frame only 22 ft. above the garden. The far end is supported by a 28½-ft pole. The aerial is of the single inverted-L type, consisting of 90 ft. of 7/22 silicon-bronze cable with a lead-in of 10 ft. It is badly screened by buildings and trees. The near end is 15 ft. below the highest point of the roof, and the mast at the other end had to be erected close to a large tree. The earth is a biscuit tin buried immediately under the aerial.

But even with this poor aerial the results achieved with the experimental single-valve panel have been little short of marvellous. Croydon, 36 miles away, comes in with a shout; Lympne (90 miles) is often heard quite distinctly, though much more faintly. By quick tuning it is occasionally possible to catch the response of "Beer Harris" or "Beer George" when asked to give their position. Clear speech was received a few weeks ago from a French pilot, whom the operator at Croydon had just told, after taking a bearing, that he was "six kilomètres nord par ouest de Sevenoaks." Marconi House and Writtle are, of course, excellent. But there are greater triumphs than any of these. Paris telephony can be picked up on any afternoon, and the musical items come in so clearly that it is possible to use two pairs of telephones in series; the same applies to the Dutch concerts.

Almost every amateur who transmits regularly in the London district has been heard, and "heard" means that every spoken word or every note of music came in with perfect clearness.

Having got so far it was decided to see what could be done with a small loud speaker without the use of relays of any kind. By careful adjustment and fine tuning all of the stations mentioned above were brought in sufficiently loudly to be heard comfortably in any part of the room, whilst spark and powerful C.W. stations could often be read in the next room.

**Single-valve Set**
*(Telephone Manufacturing Co., Ltd., West Dulwich)*

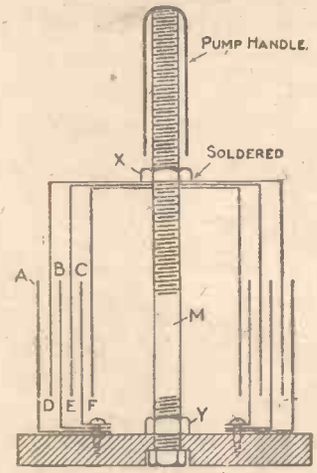
The completed instrument owes its efficiency to the fitting of fixed condensers whose capacity was found by experiments with variable condensers to be the most suitable, to the care taken to keep all wires as short as possible, to the use of a tuned-reaction circuit, and particularly to the careful adjustment of the grid-leak resistance. R. W. H.

*(To be concluded)*

# A Cylindrical Condenser

THE outstanding feature of this condenser is its cheapness and simplicity of construction.

The base of hard wood is first cut and planed to size and a hole drilled and countersunk in the centre to take the bolt M, which is held in position by the nut Y.




Cylindrical Condenser.

The plates are six tin canisters of such sizes that when placed telescopically inside each other each allows a small all-round clearance from the neighbouring one; these are lettered in the diagram A B C D E F. The canisters A B C are first taken and a hole large enough to clear the nut Y cut in the centre of each; they are then placed inside each other with the holes in alignment and screwed down to the base as shown. The remaining canisters D E F are then taken and a hole (larger in diameter than the bolt M and smaller in diameter than the nut X) drilled centrally in each. They are then placed inside each other and soldered.

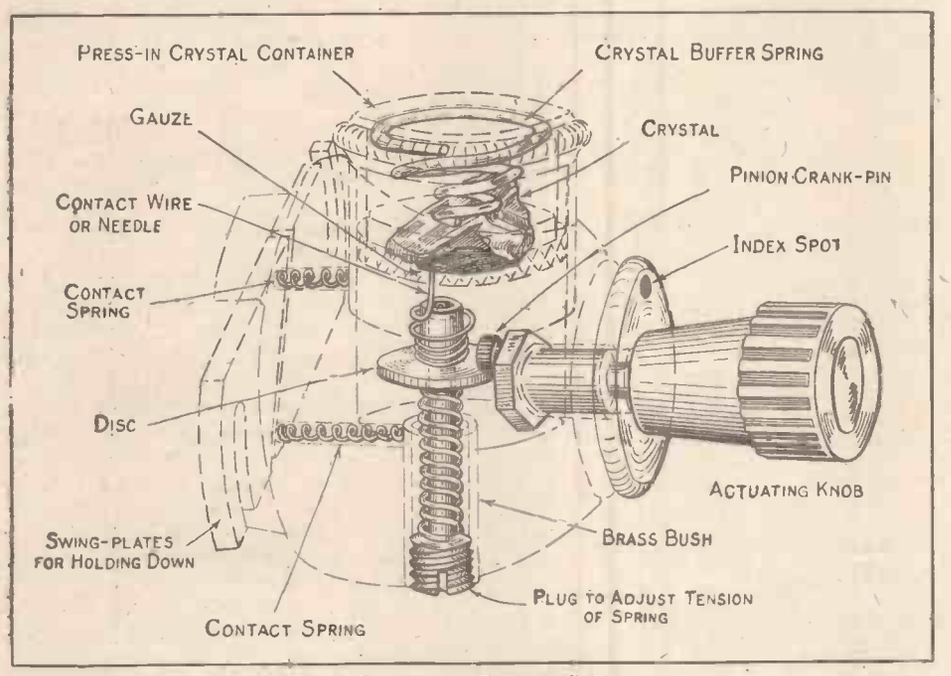
The handle is cut off an old cycle pump so that ½ in. of the brass tubing protrudes for soldering to nut X. When this has been soldered in position the whole can be screwed on to the bolt M. Variations in capacity are made by rotating the pump handle and so raising or lowering the plates D E F. D. R. B.

# Real Novelty in Crystal Detectors

## A Cleverly-designed Semi-automatic Device

THE "Eccentro" detector shown herewith reduces crystal adjustment to the fool-proof operation of turning a knob. It is a French invention, and has been placed on the English market by a firm whose business announcement appears on another page of this issue. It consists of an ebonite casing mounted on two swing plates of the sister-hook variety, by means of which it is attached to the panel. These two swing plates make contact with two light springs, the inner extremity of one pressing on the bush carrying the contact wire and the other on the bush carrying the crystal container. In the bottom of the ebonite case a screw-plug with a fine central needle is screwed. Over this needle is placed a spring, and over the spring a flanged collar to which the contact wire is attached. In the side of the case is fixed an ebonite knob carrying an index disc. On the inner end of the spindle on which the knob is mounted is a small nut, and eccentrically secured to this nut after the manner of a crank-pin is a small fixed pinion. In the top of the case a small brass container is fixed, and in this are placed the crystal itself and a piece of gauze. The container fits into a spring-slotted bush, in which it may easily be rotated by thumb pressure. It will be apparent that by turning the knob the pinion crank-pin at once depresses the flange supporting the contact wire and gives it a part turn. Upon the crank-pin reaching top dead-centre again the spring beneath the flange returns the contact wire through the gauze to a fresh point of sensitivity. We found that it requires five complete turns of the knob to make one complete revolution of the contact wire.

In addition to the adjustments so provided, the crystal container may be slightly rotated in its housing, whereupon many fresh points of crystal contact are made available. It should here be noted that in rotating the container the red index spot on the knob should always be in its lowest position, otherwise the gauze in the container which affords side support to the crystal contact wire would be stripped by the latter. It will readily therefore be apparent that an infinite number of adjustments may be made to the crystal and the latter searched in a positive and easy manner.




**Phantom Sketch of "Eccentro" Detector.**

# The Transatlantic Tests at New Southgate

THOSE of our readers who have sat up until the small hours patiently straining their ears to catch the faint sounds of New Jersey broadcasting station would have been astounded at the experience of the chosen few who were privileged to be present at a demonstration of Transatlantic wireless telephony which was given by the International Western Electric Company at their New Southgate works on Monday morning, January 15.

Following a series of tests which had been carried out in order to obtain engineering information concerning the economic and technical factors involved in a commercial service of wireless telephony between the Old and New Worlds, representatives of the Press were invited to join a party of eminent scientists and engineers at the first attempt to transmit speech from the United States to this country.

Co-operation between the American Telephone and Telegraph Company and the Radio Corporation of America enabled messages spoken into the telephone at the offices of the former company at 195, Broadway, New York, to be re-transmitted by wireless from the Rocky Point station of the Radio Corporation, at Long Island, some 70 miles distant.

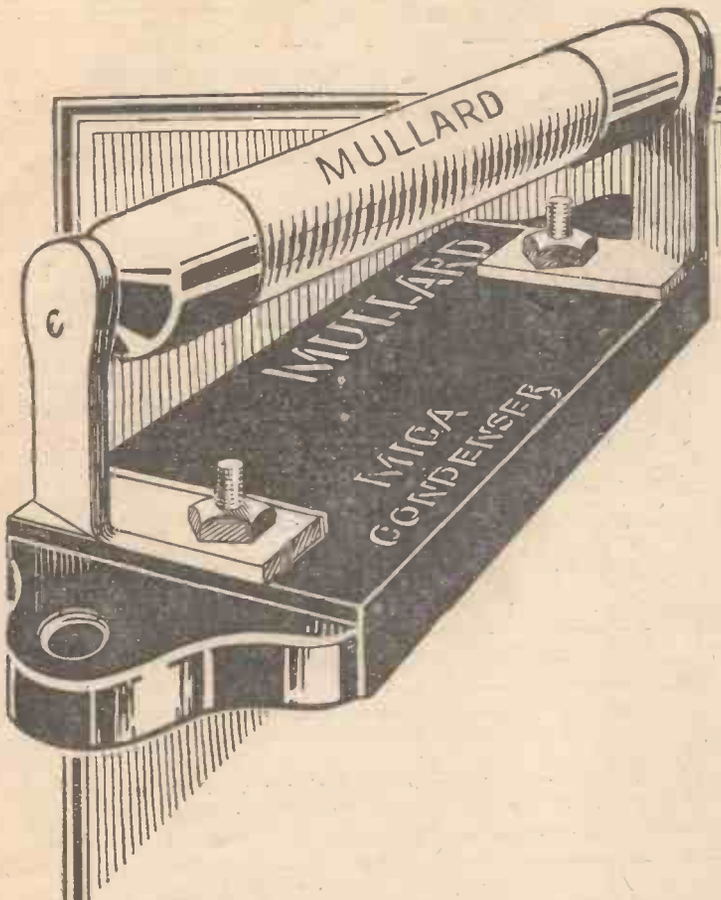
A total power of about 60 kw. on the aerial was used, the wavelength being about 6,000 metres. Arrangements were made to receive the signals on a 6-ft. frame aerial having forty-seven turns. The receiving apparatus employed eight valves, the first being an oscillator to reproduce the carrier wave which was suppressed at the transmitting end. Following the oscillator were three stages of high-frequency amplification, the detector, and a three-valve note-magnifier.

From the receiving hut, about 150 yards from the works, a land line was run to the demonstration room and connected to a bank of about fifty 2,000-ohm double head-gear receivers. A loud-speaker with a change-over switch was also installed.

The guests were ushered into the demonstration room a little before 2 a.m., and after a few introductory remarks from Mr. F. Gill, the chief engineer to the Western Electric Company, head-phones were donned. Promptly at 2 a.m. the first signals were received strongly and clearly —a list of place names and words without context, all easily understood.

Immediately afterwards, Mr. S. B. Thayer, the president of the American

(*Continued on page* 92)




# MULLARD
## COMBINED GRID LEAK AND CONDENSER

THIS useful accessory comprises the well-known Mullard patent resistance neatly combined with a standard Mullard Mica Condenser.

The resistance is of the grid B pattern. It is practically indestructible, perfectly "silent," steady and permanent.

The condenser is well made, compact and easily fitted. Insulation tested up to 1,000 volts.

*Particulars and prices of other Mullard products on application*

The combined unit, like every Mullard product, is thoroughly dependable and the best of its class.

***Specially Reduced Price for 1923***

**5/6** EACH

The demand for this item has been so much increased by the considerable reduction in price that it is advisable to order at once to secure prompt delivery.

**THE MULLARD RADIO VALVE COMPANY LIMITED**
(Dept. A.W.)
**45, Nightingale Lane, Balham, S.W.12**

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*Please send me post free*

| Quantity | Description | Price |
|---|---|---|
| ..... | Telephone Head Sets, Type B ... | 27/6 |
| ..... | "ORA" Valves ... each | 15/- |
| ..... | Grid A Resistances ... " | 3/- |
| ..... | Anode A or B Resistances ... " | 3/- |
| ..... | BA Condensers '0003 mfd. " | 2/6 |
| ..... | Combined Resistance and Condenser ... " | 5/6 |
| ..... | Valve Bases with Terminals " | 5/- |
| ..... | Valve Sockets ... " | 1/3 |
| ..... | Terminal Clips ... per pair | 9d. |

*Name and Address*.....

*Name of usual Wireless Dealer*.....

A.W. 27/1/23

I enclose (Cheque, Money Order, P.O.) ..... value ..... to cover the cost.

SEND THIS TO-DAY

To the MULLARD RADIO VALVE CO., LTD. 45, Nightingale Lane, Balham, S.W.12

EPS 35

# The Perfect Loud Speaker at last

We have acquired the sole manufacturing rights for the United Kingdom of a Wonderful New Loud Speaker, in principle entirely different to any yet placed upon the market. Instead of the unsightly horn, which causes distortion of the music and speech, this instrument comprises a handsome cabinet, the top of which is so designed and manufactured from specially tested timber which is attacked by a volume of air. The principle can be incorporated into any cabinet wireless set, the lid of the cabinet forming the Loud Speaker. It can also be used as a separate instrument, as illustrated.

## The . . . "VIOLINA"

### Loud Speaker de Luxe

(Patented in all Countries throughout the World)

**Price £5-5-0 Complete**

*(Packing and Carriage in U.K., 5/- extra)*

**When once you have heard this instrument you will not tolerate any other make.**

***Ask Your Wireless Dealer for a Demonstration.***

**IT IS NOT LIKE A TROMBONE! IT IS NOT LIKE A KLAXON!!**
**IT IS AS DELIGHTFUL AS A VIOLIN!!!**

With this instrument you can hear the voice of the artist, the notes of any instrument and the words of the speaker faithfully and perfectly reproduced. In addition it is an elegant piece of furniture, handsomely French polished, mahogany finish.

Before buying your Loud Speaker, make a point of hearing this instrument. Agents wanted in all parts. Inquiries from Manufacturers desirous of incorporating the "Violina" into existing Wireless Sets cordially invited.

**If Early Delivery is desired place your order AT ONCE.**

## *Important Notice to all Wireless Manufacturers, Retailers, Experimenters and Amateurs*

## EX-GOVERNMENT WIRELESS APPARATUS

A FEW WEEKS AGO we advertised the purchase of a complete Government Wireless Depot and offered the same for re-sale at astonishingly low prices in accordance with our invariable business rule to

**SHARE OUR BARGAINS WITH OUR CUSTOMERS.**

The immediate response to our advertisement resulted in our being "snowed under" with inquiries and orders from all over the country, and it was only through despatch staffs working night and day at full pressure that we were able to keep faith with our customers in respect of our promise to execute all orders

**WITHIN 48 HOURS OF RECEIPT.**

It was impossible to deal with the thousands of inquiries as expeditiously as we should have wished, and we again take the opportunity of tendering our apologies to all those who were, unfortunately, kept waiting.

WE have now purchased outright for spot cash, the whole of the Wireless Material recently offered for sale at

**WOOLWICH DOCKYARD AND KIDBROOKE, R.A.F. DEPOT**

The work entailed in compiling price-lists of the multitudinous variety is colossal, and it will be two or three weeks before these are available. You can help us considerably by **FILLING IN THE FORM AT THE FOOT OF THIS ADVERTISEMENT**

**You will then receive complete lists as soon as available**

**A STARTLING OFFER**

**Complete 5 Valve Set, 2 H.F., 1 Detector and 2 L.F. The Famous R.A.F. 10, made by The General Electric Co., U.S.A., for the Royal Air Force.**

Ideal for Broadcasting. Can be used with Loud Speaker with indoor aerial within 20 miles of the Broadcasting Station.

**We guarantee this instrument to be as effective as any instrument costing up to £75.**

Brand New, exactly as received from the Manufacturers.

**OUR PRICE (limited quantity only) £15**

Valves and Accessories extra

*Fuller Particulars on Application.*

**FILL UP THIS FORM NOW** and post to us immediately. ½d. stamp only required.

**Messrs. THE CITY ACCUMULATOR CO.**
**Mail Order Department, 79, MARK LANE, LONDON, E.C.3**

*Please include my name on your Mailing List. I am particularly interested in*

.....

*(Signed)*.....

A.W. *Full Postal Address*.....

*Date*.....*19*..... .....

# On Your Wavelength!

**Grand Opera**

**An Appreciation**

**Fading**

2 L O's transmissions of grand opera have been absolutely magnificent. When they announced that they were going to make the attempt one felt more than a little doubtful about the likelihood of its being a success, for a large theatre with its high roof and the great empty space surrounding the scenery is a very different thing from a broadcasting studio, where walls and floors are heavily covered with material suitable for lessening vibration effects, and artistes sing straight into the "spout" of the microphone at a few inches range. But great as they were, the difficulties were overcome in the most wonderful way, and those responsible for the transmissions well deserve the congratulations that they have received from all parts of this country, and even from our neighbours on the Continent.

* * * *

In company with two other enthusiasts, who, by the way, were taking a busman's holiday, since both are professional wireless men, I spent the last two hours of Saturday night and the first three of Sunday morning in listening for short-wave signals from America. Conditions were not good, for we were terribly bothered by the "mush" of harmonics from big stations. Still, we logged eight different Yankee amateurs sending C.W., and twice we caught faint sounds of speech. In both cases, just as our hopes ran high, a flood of "asthmatics" drowned the words before we could properly manage to tune them in.

* * * *

Many thanks to C. L. W. for his letter on the pranks played by wireless waves in his part of the world—South Farnborough. He receives London, Birmingham and Manchester well on one valve. Curiously enough he finds the more-distant 2 Z Y considerably stronger than 5 I T, though rather inclined to fade at times. Personally, though my aerial is a good deal nearer to Manchester than C.L.W.'s, I can never make much of 2 Z Y, though telephony from the Manchester air station is much louder than that from Lympne or Pulham. Another correspondent writing from Cheshire describes a very puzzling state of affairs. Four receiving stations all equally sensitive are situated within a radius of three miles. You might think that their results would be identical. Far from it: What A can hear all over the house is but a faint sound to B, whilst C and D often fail to pick up the signals at all. Curiously enough, nearly all correspondents from Lancashire and Cheshire report good receptions from Königswusterhausen, who is not at all easy to pick up at places lying farther south. Truly, wireless is still full of mysteries great and small.

* * * *

Speaking of condensers and refractory contacts, did you notice at the "Model Engineer" Exhibition that many firms had adopted quite a new design? Instead of a wire running from the lower brush of the spindle, or of a forked spring resting against a boss at its upper end, they are now fitting a very neat little "gadget." A piece of thin sheet copper about $\frac{3}{16}$ in. wide is made into a coil, like the mainspring of a watch. The inner end is soldered to the spindle, the outer to the moving plate terminal. As you rotate the knob the copper spiral simply uncoils itself a little, or curls up more tightly. In this way you obtain a positive and unvarying contact. With a soldering iron, a piece of thin copper, a pair of scissors, and a little patience, anyone can add this fitment to his condensers, thereby saving himself many little worries in the future, for sooner or later all brushing contacts break down and give rise to trouble.

## This Special Issue

**With this special "Broadcasting" Number of "Amateur Wireless"** we present to every reader a plate measuring about 24 in by 22 in. entitled **"Wireless Transmitting Stations and Their Call Signs."** It includes a Map of England and, in addition, a list of call signs with their owner's names and addresses and particulars of the system of transmission. In the nature of things this list can be neither absolutely complete nor absolutely perfect in spite of all our efforts to make it both. We shall welcome additions and corrections from any of our readers and we shall publish them in **"Amateur Wireless"** from time to time, so that readers will have opportunities of keeping their list up-to-date.

**Many features of this number appeal to new** readers and beginners in Wireless. We know for certain that this number of **"Amateur Wireless"** will be read by thousands who will see this journal for the first time. We ask all our readers, old and new, **to register their order with newsagent or bookstall for a copy of this paper to be supplied to them regularly—and to register that order at once!** It is the only way by which they can make certain that they will see **"Amateur Wireless"** week by week without a break.

**We are anxious that our new readers should** understand that our services are at their disposal. We have a highly-organised department for answering queries. We publish but very few of the replies because our space is hard-pressed, but readers can always rely on receiving our help in their technical difficulties. Every querist should send a coupon and a stamped, addressed envelope and he can then be certain that a useful, reliable answer to his question will be sent him without delay.

**Reaction Difficulties**

**Midnight Oil**

**Harmonics**

If your reaction circuit is difficult to control you may find it an advantage to earth the secondary. In single-circuit sets the negative low-tension lead was, of course, to the earth terminal, but where two circuits are used there is, as a rule, no earth connection for the secondary. Try taking a wire from L.T. to earth. Experiment will show whether it is an improvement or not. It is impossible to lay down a hard and fast rule, since individual sets vary so much in their performances. It often pays, again, to earth the telephone transformer when low-resistance phones are used. In some cases an appreciable increase in signal strength occurs. Noisy intervalve transformers may often be hushed into silence in the same way.

* * * *

Some operas are of course better suited than others for broadcasting purposes. *Pagliacci*, for instance, is admirable, but *Figaro* is not quite so good. The latter contains many spoken lines, and since the players move about the stage whilst speaking, their distance from the microphone varies continually, with the result that the words are at times rather hard to follow. It was a good idea to interpolate little comments about the music, but in actual practice some people thought the effect was not at all pleasant. Other people liked it.

* * * *

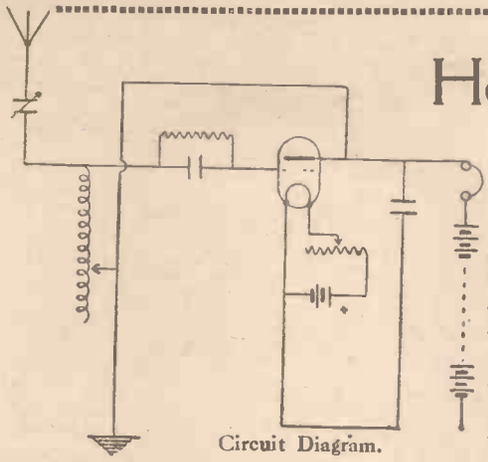
Have you noticed that fading has become much more pronounced of late? The explanation is possibly to be found in the "aerial reaction," of which we spoke a week or two ago. If two aerials are sharply tuned to the same wavelength and neither set is oscillating, the one will help the other to some extent. But supposing that the tuning of one is not quite sharp, or that either set is in oscillation, exactly the reverse will happen, and the phenomenon known as fading will be noticed—probably by both listeners.

* * * *

The small boy was listening for the first time to the bedtime stories from 2 L O. "Hello, kiddies, here's Uncle Geoff," said the voice. "Oh, Daddy," he cried in expectation, "Is there an Uncle Mutt, and will he throw bricks at Uncle Jeff?" What a time the "Uncles" will have when television is an established fact!

THERMION.

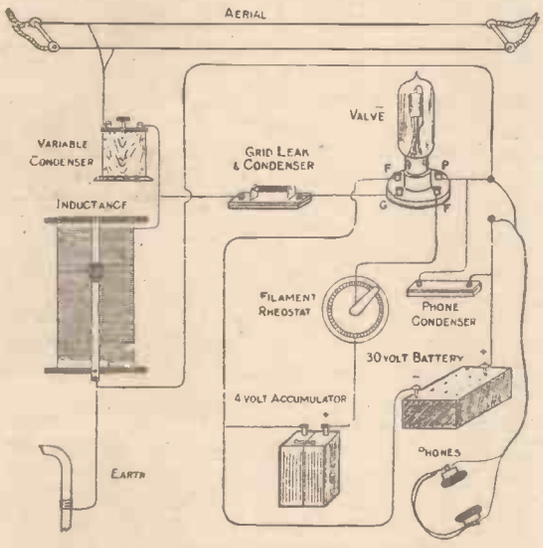
# How to Read a Wireless Diagram



Circuit Diagram.

PRIMITIVE man first began to write by making pictures and symbols of things that he wanted to convey to others who were too far distant to talk to. As these pictures and symbols became well enough known they were standardised and finally simplified to such an extent as to lose completely their resemblance to the objects they represented.

With wireless symbols we go back to very much the same primitive and simple method of conveying the idea of one man to another. The reader who can understand the symbols will easily be able to imagine the objects they represent even though the resemblance is no stronger than the jam to the label on the jar.




Disposition of Apparatus Corresponding to Diagram Above.

As an example we will take the symbol put into a diagram to represent a crystal detector. This looks nothing like the actual thing, but we know it *is* a crystal detector because it is the universally stardardised symbol for such. The heavy line represents the stationary crystal and the point of the triangle the cat whisker or movable crystal.

The chart shows the principal symbols found in wireless diagrams. Wires are always shown running straight and with square corners. In actual practice, however, they can be carried at any angle or curve, but they should be crossed as seldom as possible and kept well separated.

Unlike other electrical work, the wires should not be carried any great distance in parallel or a great deal of trouble will be caused by "induced currents."

A switch is indicated by a break in the line which can be closed at will. Dotted lines represent components not included in the diagram, which may be inserted. Slight variation frequently occurs in the actual forms of symbols, but the similarity is such that they can always readily be recognised. The illustration shows a simple single-valve circuit "decoded" to perspective from the symbolic diagram above it. O. J. R.


Conventional Wireless Symbols.

# Renew Your Own Valve Filaments

I PRESUME that others in common with the writer have experienced the soul-racking experience of burning out a perfectly good and practically new valve. Generally it is the best detector one has had for a considerable time, and it takes a diabolical pleasure in committing suicide. On a recent occasion I was lucky enough to hurl two tubes to destruction on two separate occasions. The valves were Telefunken type, E V E 173, with a horizontal filament support in the same manner as in the R-type valve.

I gave the matter some very careful thought. The result of this very unusual process is eminently satisfactory, and has saved me some pounds on renewals. It is so absurdly obvious and simple that I am sure that others will wish to be put *au fait.*

The success of the operation depends upon one point only, and that is that the break in the filament does not leave any appreciable diminution in the length of the filament. Generally, this condition is fulfilled, but there are certain cases where there is a spring tension on the filament keeping it taut when incandescent. In this case when the fllament breaks the two halves are widely separated and nothing can be done.

The renewed filament costs you nothing. The apparatus required is one 6-volt accumulator, two hands, and a little patience. As these may be found in every experimenter's equipment the idea seems worth while. Connect the accumulator across the filament pins of the valve, take it in your hand and give the glass portion some enthusiastic taps with the tips of your fingers. This vibrates the two portions of the severed filament, and if you once see a tiny spark at the break—keep at it—your valve is saved. One of the taps, sooner or later, will cause the filament to overlap at the break, and it will fuse into a complete whole. Result—a new valve for nothing.

The writer puts eight volts across the filament while performing this valvular cautery, as the filament more readily fuses together, but it is not recommended, as in the case of a much-worn and fragile filament there is the danger of a second destruction. A new filament will generally stand it, and it saves time.

In conclusion, I want to say that this is not a freak idea, but quite a practicable proposition which I have had good cause to bless on five separate occasions.

Try it on that old valve. T. B. R.

# The Beginner Asks Questions
## AND IS ANSWERED

***What Purpose does the Aerial Serve?***

IT serves as a collector of the electro-magnetic waves necessary to operate the receiver. It is usually placed at a height above the receiver, and is carefully insulated so that all the received energy will pass to the apparatus.

***What is a Frame Aerial?***

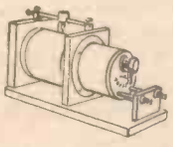
One in which the wire composing the aerial is wound on a frame of symmetrical proportions. Chief advantages: Portability and freedom from jamming by reason of its directional properties. Signals will be received only from those directions in which opposite sides of the frame are facing.

***What is the Lead-in?***

It is a conductor joined between the aerial proper and the aerial terminal of the receiver. As its name implies, it "leads in" the oscillating currents from the aerial.

***Why is a Tuner Necessary?***

In order to receive signals from a given transmitting station the receiver must be adjusted to the wavelength of the transmitter. This adjustment, or tuning, is effected by varying the amount of inductance and capacity in the receiver circuits. The values of inductance within the receiver will depend on the size of the inductance coil, and the number of its turns included in the circuit, and the amount of capacity (in the form of a variable condenser) in series or parallel with the coil. A fixed inductance coil, that is, one in which the number of turns is not variable, will only tune to wavelengths allowed for by variations in the capacity of the condenser.

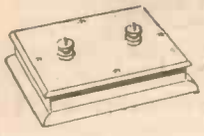


A loose-coupler is employed where two tuning circuits, aerial and closed, are used for the purposes of reducing jamming. The two circuits are wound on separate cylindrical formers, one of which slides within the other, thus allowing for differences in the percentage of coupling. The three-coil tuner contains mountings for three coils, one in the aerial circuit, one in the closed circuit, the third one being the reaction coil. Coupling between the circuits is effected by varying the distances between the coils.

***What is the Purpose of a Variable Condenser?***

It is employed in circuits, usually in conjunction with a coil possessing inductance, to enable the wavelength of that circuit to be varied within fine limits.

***Why is a Telephone Condenser Used?***



To store signal currents from a detector and discharge them through the telephone. It also acts as a by-pass for high-frequency currents, flowing in the plate circuit of a valve which might otherwise be damped out by the impedance of the telephone windings.

***Why and When is a Crystal Detector Used?***

Usually in commercial services where an expert operator is not employed, or where great strength of signals is not required. It is now used extensively as a detector in broadcast receivers for use within a short distance of a broadcasting station. The crystal detector may be used for rectification in conjunction with valve amplifiers.

***What are Telephones?***

Instruments employed for converting electrical variations into sound waves of audible frequency. They usually consist of coils of fine wire round a magnet, in front of which is mounted a diaphragm. Electric impulses through the coils impart a movement to the diaphragm by magnetic attraction, thus setting up sound waves which affect the human ear.

***What is a Buzzer and Why Used?***

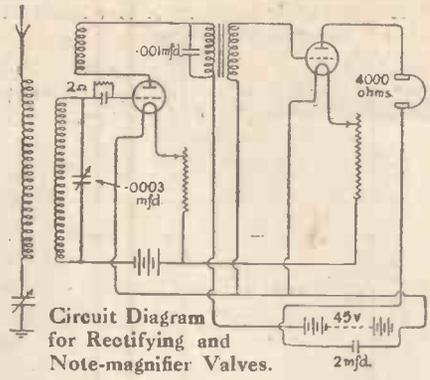
This consists of a coil of wire round a soft-iron core, near which is placed a steel reed or armature. Currents flowing in the coil from a small battery magnetise the core and attract the armature, which automatically breaks the circuit, allowing the armature to return to its normal position. This action again closes the circuit, and once more the armature is attracted, and the vibratory action continues as long as the battery is connected in the circuit. The vibration of the armature sets up sound waves, which are heard as a musical note. In wireless it is used for testing crystal detectors, the buzzer being allowed to function while the crystal is being adjusted. When the buzzer sounds at its loudest in the phones the crystal is ready for reception.

***What is a Valve and How Used?***

The valve is a vacuum tube of glass containing a filament, grid, and plate. The grid is usually a wire spiral surrounding the filament, and the plate consists of a metal cylinder surrounding both filament and grid, neither component touching the other. For detecting purposes the tuner is connected to grid and filament; and the telephone or plate circuit, which contains the telephones and high-tension battery, is joined to plate and filament of the valve. An accumulator of four or six volts is connected to the filament in order that the latter may be made hot. When the filament is glowing it throws off particles of negative electricity (electrons) which are attracted by the plate, this being at positive potential by reason of its connection to the positive pole of the high-tension battery. This flow of electrons between filament and plate constitutes a conducting path for currents from the high-tension battery, which currents pass through the telephones and impart a movement to the diaphragm when the current starts and stops. Incoming oscillations, which take the form of a wave, of which the upper half is positive and the lower negative, come on to the grid from the tuning circuits. The positive half of a wave charges the grid positively and thus assists the plate in its attraction of electrons from the filament, consequently a current flows in the plate circuit. The negative half of a wave charges the grid negatively, which means that the electrons, or negative particles of electricity, are repelled from the grid, on the principle that "like repels like," and thus no electrons are able to make their way to the plate. Under these conditions no current flows in the telephone circuit. Thus, at each half wave a passage of current from the high-tension battery produces a click in the telephone, and as these occur in rapid succession, sound waves are set up.

(*To be continued in a later issue*)

# Ensuring Good Results




Circuit Diagram for Rectifying and Note-magnifier Valves.

Aerial :: Earth :: Tuner
Phones :: High-tension
Battery :: Accumulators
Condensers :: Adding
Valves :: Low- and High-frequency Amplification
General Hints

THIS article is intended for the beginner, and contains many tips that are not to be found in text-books. Wireless enthusiasts are advised not to set up any apparatus at all until they have a fair theoretical understanding of how it works. A little theory will save much time and trouble to the inexperienced experimenter. If he has read his AMATEUR WIRELESS every week he should by now have a fair knowledge of the fundamentals of wireless.

### *Aerial and Earth*

Perhaps the most important part of the receiving station is the aerial, as the whole of the efficiency of the set depends on it. Time and trouble spent in erecting the best possible aerial under the existing conditions will be amply repaid. The aerial should be as high as possible, well-insulated, and on the whole, including the lead-in, kept well away from all obstructions which cause capacity effects and subsequent loss of signal strength. Stranded phosphor-bronze wire will usually be found to be best. All connections of the lead-in to the aerial should also be well soldered.

Careful attention should also be paid to the earth, which is usually a water-pipe; the connection should be well cleaned and soldered.

### *Tuners*

The tuner next demands consideration. For short-wave work simple home-made basket coils are very satisfactory. Whatever type of tuner is used, however, it is most important that no excess of wax or shellac be placed on the wire, as this produces detrimental capacity effects. Double cotton- or enamel-covered wire will be found quite satisfactory, although silk-covered is preferable. For longer waves single-layer or honeycomb coils may be used, although the latter are rather difficult to make satisfactorily. The construction of tuners depends a great deal on personal taste and the capabilities of the maker.

### *Telephones*

Money spent on good phones is well invested, as they are absolutely necessary to obtain the best results. High-resistance phones of about 4,000 ohms will usually be found to give louder signals than low-resistance phones and a transformer.

### *H.T. Battery*

A high-tension supply of 45 volts will usually be sufficient for most valves, although a few require 60 volts for efficient working. The batteries should be kept in a cool place and well insulated from earth. When not being used, the battery should have both its poles disconnected. This preserves the life of the battery to a considerable extent.

### *L.T. Battery*

Good accumulators only should be used for the low-tension supply, as cheap ones never cease to cause bother and annoyance to the owner. The beginner will be well advised to purchase a large capacity 6-volt accumulator at first.

### *Tuning Condenser*

The tuning condenser should be bought from a dealer, as home-made ones have a nasty habit of frequently going wrong unless made by a person with some experience. The most useful capacity is .001 microfarad, as a .0005 microfarad only gives short wave-lengths.

### *Grid Condenser*

The best value for a grid condenser is subject to some controversy, but .0003 microfarad is generally held to be a good value for work in most cases. The grid-leak should be of about 2 megohms resistance, and should be obtained from a reliable source, as a badly-made one always proves itself a nuisance.

### *Amplification*

Having set up and experimented with some apparatus on the lines set out above, the experimenter will in time naturally wish to add more valves. At first he is strongly recommended to leave high-frequency amplifiers well alone until he has gained a fair knowledge of wireless in general, and to be content with a low-frequency amplifier, or note-magnifier, as they are more usually termed. The circuit for a note-magnifying valve after the rectifier is given in the illustration.

The chief point to notice is the importance of the condenser across the primary of the transformer. It should be of about .001 microfarad capacity. If two note-magnifiers are to be used, and it is not advisable to use more owing to their noisiness, the transformers should have their axes at right angles to reduce inductive effects to a minimum. If much trouble is produced by A.C. mains, etc. it may be necessary to screen the transformer with an earthed lead shield, and the wiring can also be covered with earthed lead-foil. In many cases this has effectively put a stop to all howling and other troublesome noises. It is advisable to earth the core of the transformer in any case. When working amplifiers it should be remembered that the valves must function on the middle of the characteristic to give the best amplification, and the filaments need not be as bright as those of the rectifying valves. Each valve should be provided with a separate filament resistance to obtain the best results.

### *H.F. Amplification*

The problem of high-frequency amplification is a difficult one for the beginner to tackle. Undoubtedly the best method is that known as "reactance capacity" method, where there is a tuned coil in the plate circuit. This is expensive, however, and requires a critical adjustment to obtain the best signals. The next best method for all wavelength ranges seems to be a "choke amplifier." Very fine wire of high-resistance when wound on a bobbin and about eight tappings taken off will give good results on all wavelengths. This is better than the ordinary "resistance" type, as the resistance of the choke can easily be varied. Transformers are also very good for the wavelength for which they were designed.

### *General Hints*

A few general hints may be helpful. All joints should be soldered, and connections to terminals must be cleaned frequently. Dust can be wiped off the plates of variable condensers by means of a pipe-cleaner. Ebonite should be kept in a cool, dry place. All leads should have a distinctive colour, otherwise one finds oneself putting the H.F. across the filaments when starting. Above all, do not be in a hurry. Before you decide on anything, carefully consider all the advantages and disadvantages. The motto of every experimenter should be, "Make haste slowly."

F. S. T.

# The Broadcasting of Opera

## The Editor Tells How It Was Done

WIRELESS history has been made during the last three weeks. Opera broadcasting was an ambitious experiment never before attempted, and there can only be one opinion as to the result—it was wonderfully successful. The British Broadcasting Company, which had the courage to undertake it, can be enthusiastically congratulated on its result, and in particular do we felicitate Mr. Arthur Burrows, of the B.B.Co., and Mr. W. J. Crampton, consulting electrical engineer to Covent Garden Opera House. It is estimated—on what definite grounds we do not know—that thirty thousand people listened-in each evening to the broadcast opera. It was heard quite clearly in Norway and Switzerland, and as far south as a line between Madrid and the southern coast of Spain, and in all probability it was heard at even far greater distances, as to which we shall know in due course.

We suppose the experiment has been a costly one, but there can be no gainsaying that it has given pleasure and renewed interest to an immense number of wireless amateurs and listeners-in. Already it is becoming obvious that those in charge of broadcasting will have to keep themselves well alive to the necessity of a change of programme. Broadcast opera came at the right moment. It is the first successful experiment of its kind, but the day cannot be far distant when any public event in which speech and music play a large part will be broadcast to countless thousands of listeners-in just as a matter of course.

### *Opera House to 2 L O*

The idea of broadcasting opera originated, we believe, in the very fertile brain of Mr. W. J. Crampton, M.Inst.E.E., a consulting engineer who happens to be electrical engineer to Covent Garden Opera House, and whose name is well known in both the electrical and automobile worlds. It was Mr. Crampton who suggested to the directors of the British National Opera Company that they should approach the British Broadcasting Company. They acted on his suggestion, and as a result the B.B.Co. enthusiastically fastened on to the idea and immediately obtained the assistance of the Post Office, whose engineer succeeded, in the course of only four days, in connecting the Opera House and Marconi House, Strand, by means of a lead-sheathed four-strand cable, which they drew through the conduits, the distance, in a straight line, between the two places being just a quarter of a mile.

The B.B.Co. employed the Western Electric Company, Limited, to undertake the transmission of the opera to 2 L O, and well was the work done. The Western microphone, whose receiver is a mere 3¼ in. in diameter, was placed centrally on the stage, level with the footlights and hidden from the audience by the usual vertical board that shields the audience from the footlights. From the microphone there was a three-wire connection to a multiple-valve amplifier, of the Western Electric type, placed in a small room in the basement. In this small compartment were two of the real heroes of the occasion—Mr. Rickard and Mr. Wright—who for the best part of three hours every evening stuck to a job which, in itself, was not particularly interesting in spite of the small frame aerial and a pair of phones by means of which they became a part of the army of listeners-in. From this "cellar cool" a pair of the wires in the conduits conducted the current to the 2 L O studio, where the B.B.Co. took charge and ultimately passed the current through the control valves of their transmitting plant. Preliminary tests had been made with the object of obtaining proper modulation, and much of the success of the experiment is due to the highly efficient way in which the input to the valves was controlled.

It has been stated that four strands of wire had been drawn through the conduits; two of these were required for an ordinary telephone system. Mr. Stanton Jefferies, of the B.B.Co. (who stood at the prompt side of the stage), the engineer in charge of the amplifier in the basement, and Mr. Arthur Burrows and his assistant, Captain Lewis, in the 2 L O studio, had telephone instruments all connected in parallel, so that all three could be in communication at any moment. This arrangement enabled the prompter to inform the officials at 2 L O exactly what was about to happen, guide them as to their announcements, and give them such working instructions as might be found necessary.

### *The Second Microphone*

So highly efficient were the technical arrangements that the broadcasting was as wellnigh perfect as it could be. The rustling of programmes, the tuning up of the instruments, the rich fullness of the glorious singing, the dying-away of the singers' voices, the thunderous applause—especially on the two Melba evenings, Wednesday and Saturday of last week—all these were as real to the listeners-in as though they had been present in the theatre. Even the loss of the enchantment that a view of the stage would have brought the unseen audience was largely compensated for by the quiet asides of the prompter, such as "Rudolf enters," "People are coming from the tavern," "Mimi opens her eyes," etc. These asides were superimposed upon the music, and listeners-in must have wondered as to the technique involved. A second microphone, placed at the prompt side of the stage, was used for the purpose, and it was fitted with a switch which had to be held open while transmitting, the object being to avoid the accidental transmission of noises incidental to the stage business but which had no place in the rendering of the opera itself.

The great success of the experiment opens up wondrous possibilities as to what will be done one of these days by means of "wired wireless." The four or five hundred yards of cable between the Opera House and 2 L O made not the slightest difference to the quality of the transmission. In America last week seventy or eighty miles of cable seemed to have made no appreciable difference; and, indeed, it is thought that in practice—whatever theory has to say on the subject—there is no reasonable limit to the length of the metallic path between the microphone and the transmitting valves.

We congratulate everybody concerned on the success of the first experiment of its kind and can assure them that the wireless public have had their appetite whetted and will soon be asking for more.

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At the conclusion of the performance on the last night of the season (Jan. 20) many thousands of readers of AMATEUR WIRELESS, ourselves included, heard Mr. Paget Bowman make his well-phrased speech of congratulation and thanks to Dame Nellie Melba. They heard him address himself to the thirty thousand listeners-in and acknowledge the messages of appreciation which he had received from many places in nearer Europe.

Among the countless floral tributes Dame Melba received on this occasion was one, from forty listeners-in, representing an electrically-lit house with a large aerial of flowers across it.

2 L O broadcast the suggestion that many of the listeners-in during the past fortnight would care to send, in appreciation of the pleasure broadcast opera had given them, a donation to a fund which Dame Melba had agreed to employ for the benefit of a charity near to her heart—a charity by which opera itself would benefit. Donations may be addressed to The Melba Fund, British Broadcasting Company, Limited, Magnet House, Kingsway, London, W.C.

# Building Broadcast Receivers

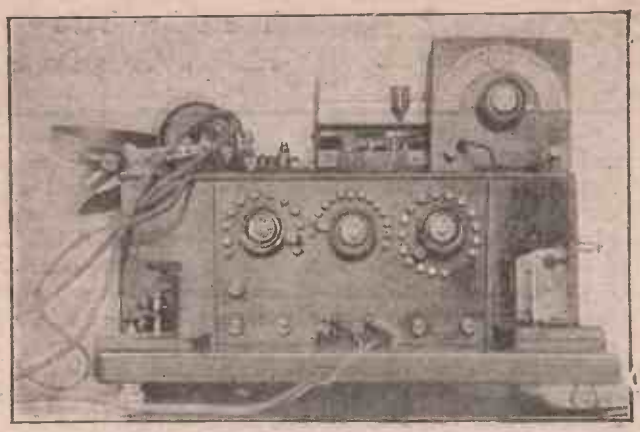


Fig. 1.—Photograph of Complete Tuner.

Fig. 3.—Photograph of Pa

THIS article is the commencement of a series which will in clear and non-technical terms describe and illustrate in easy stages the construction of a complete crystal and valve receiving station, every stage of the construction being dealt with in detail. All the apparatus described has been in operation, and the photographs will show perhaps more clearly than sketches the details of wiring, construction and general arrangement. The approximate ruling prices of materials will be quoted throughout the articles, so that the experimenter will know approximately to what expense he will have to go before commencing work on the different stages.

### *Single-coil Tuner*

*A tuner with crystal rectification. Range of wavelengths with average amateur aerial* 130-1,000 *metres.*

A photograph of the completed tuner is shown by Fig. 1. That portion to be described in this issue does not include the secondary circuit, but provision is made for its incorporation in the present set. The secondary circuit is not essential for receiving purposes and can be dispensed with if desired, but its use permits of finer and more selective tuning, and therefore the constructor is advised to include it in his instrument. The bar-switch, studs, and two terminals shown in the photo graph on the extreme right of the instrument illustrate that portion of the arrangement relating to this secondary circuit, and will be dealt with in a subsequent article.

Should the constructor decide to embody the secondary circuit in his set (the extra cost will be small) he should prepare the panel for its reception according to the sketches, etc., as to do so later will necessitate dismantling the set.

The material detailed does not include the material for the closed circuit, which necessitates a further 12 studs, 2 terminals and bar-switch.

### *Panel*

As a commencement the construction of the panel which carries the tuning switches will be described, and a sketch showing the lay-out is given in Fig. 2.

First take the ebonite and smooth off the rough edges to the dimensions specified, that is, 8¾ in. by 5¼ in. Prepare a sheet of paper marked with the required dimensions and gum it to the ebonite. The holes required for two sets of 10 contact studs, etc., can now be bored. The sizes of the holes and distance apart are not given, as these must be bored to the dimensions of the material obtained. The positions of the contact studs will vary according to the area of their bearing surface, but they should be placed so that the bar-switch cannot fall between them. When boring holes for screw-threads a drill must be put through of the dimension of the inside of the thread, for which the hole is intended. Care must be taken when working on ebonite not to exert too much pressure, as the material is very easily broken, and also the ebonite might be torn away on the under side, leaving an ugly, uneven edge. When all the holes are drilled, those which are intended for screw-threads should be tapped according to the size for which they are intended.

A photograph of the completed panel is shown in Fig. 3, and this incorporates the bar-switch and studs and terminals for the secondary coil. After the insertion of the contact studs and terminals (the threads of which should be previously dipped in shellac) in their respective positions, the bar-switches should be mounted and the tip of the switches adjusted so as to give equal contact on the centre of each stud. Ensure, by means of

### *MATERIALS FOR INSTR*

| | £ | s. | d. |
|---|---|---|---|
| ¼ lb. No. 28 S.W.G. double-cotton-covered wire ... ... | 0 | 1 | 6 |
| A cardboard cylindrical former 3½ in. diameter and 5 in. long. (Should a former of these dimensions not be procurable a Horlick's Malted Milk dummy will meet requirements) ... | 0 | 1 | 2 |
| 2 bar-switches with two nuts and spring washer ... ... ... | 0 | 4 | 0 |
| Small quantity of shellac varnish | 0 | 1 | 6 |
| Crystal cups, crystals, and sundry brass-strip and screws ... ... | 0 | 5 | 6 |
| 2 terminals with large bearing surfaces between the nuts ... | 0 | 0 | 6 |
| 2 binding-post terminals (for telephones) ... ... ... | 0 | 0 | 6 |
| 1 pair of high-resistance phones (total resistance of 4,000 ohms) | 1 | 10 | 0 |
| 1 fixed telephone condenser .003 microfarads ... ... ... | 0 | 3 | 6 |
| 1 sheet of ebonite 8¾ in. by 5¼ in. thick ... ... ... ... | 0 | 4 | 6 |

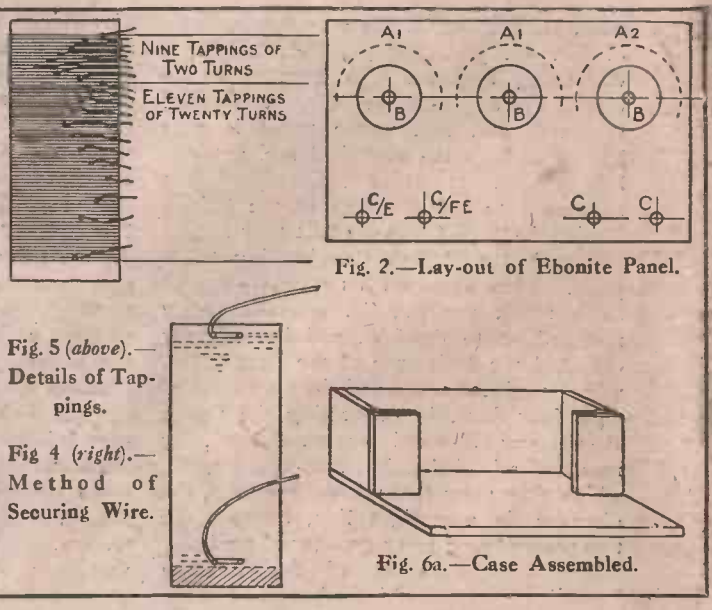


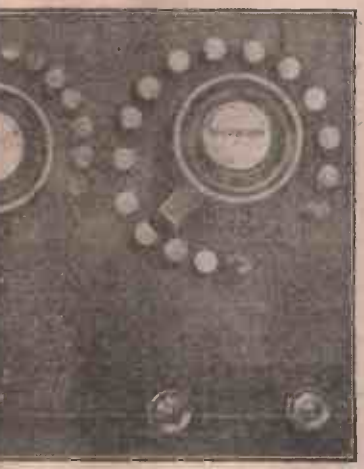

Fig. 2.—Lay-out of Ebonite Panel.

Fig. 5 (*above*).—Details of Tappings.

Fig 4 (*right*).—Method of Securing Wire.



Fig. 6a.—Case Assembled.



# *Type No. 1*

# Crystal Set with Tapped Single Coil

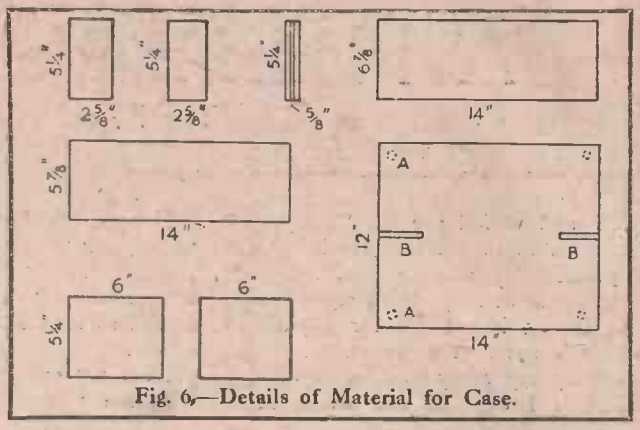



Fig. 6.—Details of Material for Case.

ıel and Tuning Switches.

*UMENT AND AERIAL*

| | £ | s. | d. |
|---|---|---|---|
| 20 contact studs at 1½d. each ... | 0 | 2 | 6 |
| Wood for case, quantity specified in diagram, Fig. 6, ⅝ in. thick (this wood should be very well seasoned) ... ... ... ... | 0 | 7 | 6 |
| 4 small china insulators (feet for instrument) ... ... ... | 0 | 0 | 4 |
| Say 100 ft. of 7/25 bare or insulated copper wire ... ... | 0 | 6 | 0 |
| 8 2-in. china "reel" insulators with ½ in. diameter hole in centre ... ... ... ... | 0 | 2 | 0 |
| A pole or poles not shorter than 22 ft. if possible (short poles of 20 ft. can be purchased at about 5s. each, and a shorter length, say, 10 ft. long, lashed on the end—it may be convenient to attach the lead-in end of the aerial by the means described later to the house and save the expense of two poles) ... ... ... ... | 0 | 15 | 0 |

pinning or soldering, that the nuts on the back of the panel on these bar-switches will not work loose.

***Tuning Coil***

Should the coil former be of cardboard it should be put into a moderately hot oven for five minutes and then shellac varnished; the process drives out any moisture which might be in the cardboard. If the former is of ebonite, paxolin or any other specially-prepared material, this process need not be resorted to.

Shellac varnish may be made by dissolving about 4 oz. of shellac in half a pint of methylated spirit.

Now take the former and cut out a disc of wood ⅝ in. in thickness to fit exactly in one end and glue it in position. Two holes of about $\frac{1}{16}$ in. should be made about ½ in. apart on this end of the former and the end of the No. 28-gauge wire inserted and made fast in these holes, being wrapped round as shown in the sketch Fig. 4, leaving a free end protruding from one hole about 12 in. long. Proceed to wrap the wire round the former, taking off tappings every twenty turns for the first 200 turns, and then every two turns for another 18 turns.

The method of making the tapping is to take the wire and turn a length of about 12 in. back on itself, twisting it two or three times between the finger and thumb and leaving a loop of 6 in. When the winding of the coil is completed, thoroughly clean the cotton covering from the wire where it is twisted, apply some powdered resin and solder it. When the soldering is completed, one side of the wire loop can be cut, and this will result in a lead of about 12 in. long being left, which is subsequently soldered to the contact stud.

An alternative method of making the tapping leads is to leave the wire twisted and to bare the end of the loop and solder this to the contact stud, but this method is not so neat or efficient. A loop of 9 in. should be taken if this method is used in order to allow sufficient wire to reach the contact stud.

Finish off the winding in the same manner as it was commenced, leaving a free end of 1 ft. On completion of the winding and the soldering the coil should be given two or three good coats of shellac. The tappings are illustrated in Fig. 5.

***Case***

The next operation is to prepare the case for the reception of the coil and the panel. This should be of ⅝-in. hard wood. Mahogany, teak or oak is to be preferred, but ordinary white wood or pine can be used if it is well seasoned. The case may be french-polished or stained and varnished, according to taste. Prepare the case according to the dimensions and lay-out given in Fig. 6, and use only screws in its construction. The right-hand side and top and bottom should be easily removable, otherwise the constructor can carry out the work according to his skill in joinery, providing the dimensions given are adhered to. The case when finished should appear as in Fig. 6a.

A photograph of the coil with wires soldered is given by Fig. 7.

A. J. C.

*(To be continued)*

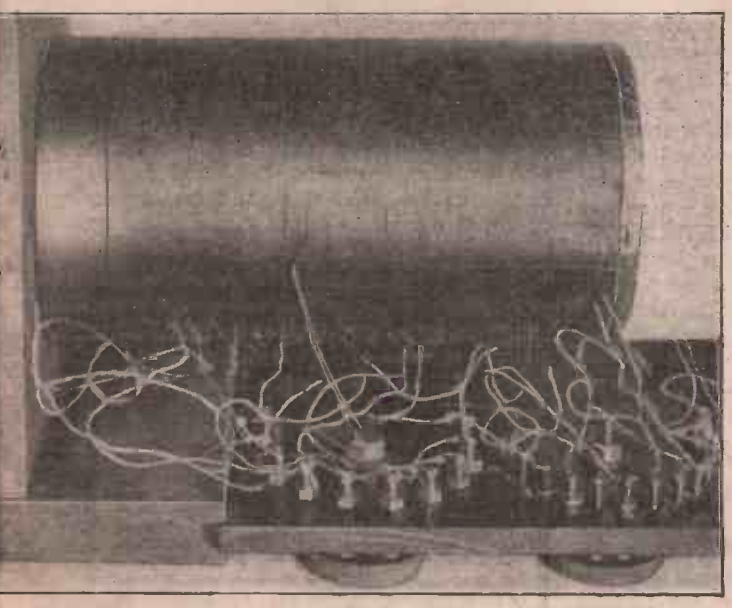


Fig. 7.—Photograph of Coil Connected to Panel.

**"How to Keep Electric Bells in Order"** is an important article in the current issue of "Work" (3d.). Other articles include "A Scale-model Toy Motor-car," "A Tremolo for Reed Organ," "Garden Seat made from an Oil Barrel," "Adapting Scullery Shelves to Meat-safes," "The Lathe Dividing-headstock and How it Works," "A Useful Marking-off Tool," "The Making of a Dulcimer," etc.

# A Home-made Three-valve Set

## The Record of a Personal Experience

MANY and varied are the "hook-ups" resorted to in wireless receiving circuits, particularly when valves are used for the purpose of amplifying signals, and so it is almost impossible for anyone to say which is the best arrangement. This is invariably my reply to friends when I am asked if I consider the arrangement of my circuits the most satisfactory for general purposes. Many factors enter into a question of this kind, and, generally speaking, in the long run one's own inclinations and knowledge of the subject decide the matter.

### *Handicaps*

In my own case I started my "career" as a wireless enthusiast with an initial handicap, as I had no alternative but to erect my aerial in a position which was not conducive to good results. When I first decided to put up my aerial I expected difficulties, as I am situated just over the brow of a hill which is between my station and the south and south-east.

After trying my aerial at various heights, angles and directions without any appreciable difference to signal strength, I accepted defeat in this direction and turned my attention to the instrument.

### *Circuit Experiments*

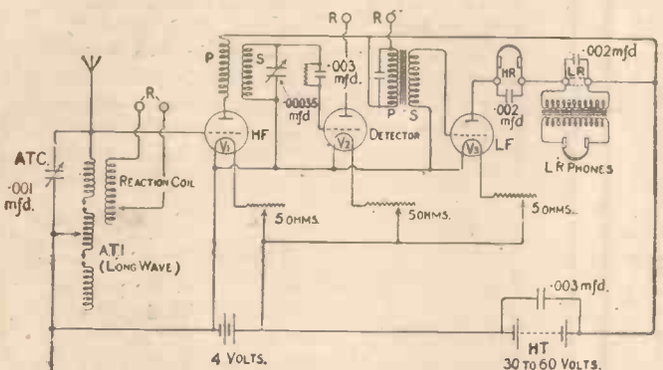
One-, two-, three- and four-valve circuits have all been experimented with, utilising low-frequency, transformed high-frequency, resistance-capacity high-frequency and impedance-capacity high-frequency methods of transferring the energy from one valve to another. These have been used in different combinations, such as two-valve H.F. resistance-capacity, two-valve low-frequency, two-valve H.F. transformer, three valves—one H.F. transformer, impedance or resistance-capacity, one detector and one low-frequency, etc. etc.

Many experiments were made and much valuable information acquired, and at the present time, using three valves, I have almost ceased to think about my inefficient aerial, so loud and clear are the signals I obtain.

I am not exaggerating when I say that with the phones on the table (no loud-speaker in use) signals are not only audible but in some cases actually readable thirty feet away.

### *The Present Set*

Referring now to the photograph on the cover, which illustrates the three-valve set referred to, and the diagram on this page, it will be observed that the amplifier proper consists of two panels, the larger one to the right being a two-valve low-frequency unit, with separate filament control to each valve, the first valve acting as a detector, the second as a note magnifier. The smaller panel to the left carries the high-frequency valve, also with separate filament control and the high-frequency pin-type transformers, which I find superior to any other method of H.F. amplification.




**Circuit Diagram of Three-valve Set shown shown by the Photograph on the Cover.**

In front of the amplifier can be seen two variable condensers, the larger one, which has a capacity of .001 mfd., being the aerial-tuning condenser, while the smaller one with a capacity of .00035 mfd. serves to tune the particular high-frequency pin transformer in use.

To the left of the amplifier are the tuning inductances, the tall one at the back of the table being a long-wave tuner, having a range of 1,000 to 16,000 metres extending to 25,000 metres with the A.T.C. in parallel. This inductance has nineteen tappings and two "dead-end" plugs for cutting out sections of the coil not actually in use.

A reaction coil which swings out from the left-hand side of the tuner provides variable coupling. The coil is fitted with a 5-point switch for varying the number of turns in use.

The box in front of the long-wave tuner contains a short-wave inductance, range 300 to 1,000 metres, with fixed-valve spherical reaction coil and small variable condenser of .00025 mfd. capacity for fine tuning.

To the right of the amplifier is the high-tension battery with switch (hidden by accumulator) for changing the voltage from 30 to 45 or 60 volts as required.

Normally I use high-resistance (8,000 ohm) Brown headpieces, but I have also a pair of low-resistance (120 ohm) Brown headpieces, which I can substitute and use in conjunction with a valve to phone transformer; this is to be seen on the table between the accumulator and high-tension battery.

Results almost equal to those described have been obtained when using a 5-ft. square frame aerial in place of the outdoor aerial, and this despite the fact that the instruments are on the ground floor.

W. R. C.

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"THE TRANSATLANTIC TESTS AT NEW SOUTHGATE" (*continued from page* 80).

Telephone and Telegraph Company, and other officials spoke for a considerable period. The reception was so good that the speeches were taken down in shorthand with the greatest ease by listeners who had had little previous experience of headphones.

Not only were the clearness and power astonishing, but interference by atmospherics was very small. It is true that there were parasitic noises at first, but they were not noticeable during the latter part of the demonstration. Whether they died down naturally, were modified at the receiving end, or whether the listeners became used to them it is difficult to say.

An interesting feature of the experiments was the reserving of the Transatlantic cable of the Western Union Cable Company and the provision of special facilities for confirming by cable the results of the test. At the conclusion of Mr. Thayer's first speech at six minutes past 2 a cablegram was dispatched from New York, and typed copies were distributed in the demonstration room at eight minutes past 2, just two minutes later.

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# CORRESPONDENCE

### Condenser Capacity

SIR,—In issue No. 18 a formula for capacity, where C = mfd., is given as:

$$C = \frac{K \times A \text{ cm.}}{11{,}300{,}000 \times d \text{ cm.}}$$

which is, of course, correct for two plates.

In issue No. 31 the formula is given as:

$C = \frac{K \times A}{4 \pi d}$ the "$9 \times 10^5$" being omitted in the denominator. Capacity thus calculated would not be in mfd.

Your contributor further states that with N plates $C = \frac{N K A \text{ mfd.}}{4 \pi d}$

This should, of course, be:

$$C = \frac{(N - 1) K A}{4 \pi d \times 9 \times 10^5} \text{ or } \frac{(N - 1) K A}{11{,}300{,}000 d}$$

—J. C. (Ealing).

### Mineral-water Stoppers as Knobs

SIR,—I am persuaded that you little thought that in inserting in your issue of January 6 the advice of a contributor that "mineral-water screw stoppers should be utilised as knobs for switches and condensers" you were really suggesting that your readers should do that which is illegal. The stopper is an integral part of the bottle—without it the bottle is useless. The bottle is the property of the mineral-water manufacturer. So careful is he to retain his property in that bottle that he does not (ordinarily) sell it outright with the beverage. He exacts a deposit upon it, and thus, as the Court of Appeal has held, safeguards his property in it. The bottle and the stopper therefore are only loaned.

I am convinced that the matter need but be mentioned to the devotees of wireless for them to refrain from putting the stoppers to such a use, as they would not desire to get their tuning knobs at our expense.—Yours faithfully,—TOM A. CUDLIPP,
Parliamentary Secretary, Mineral Water Manufacturers' Association.

---

**Series-Parallel Device.** The inscriptions of Figs. 3 and 4 on page 63 in No. 33 should be transposed, Fig. 3 being "Parallel" and Fig. 4 "Series."

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**Tool Catalogue.** We have received a copy of the handy-sized catalogue of small tools issued from the house of George Adams, High Holborn, London, W.C. Besides the usual range of metal-worker's tools we notice several cheap sets of B.A. stocks and dies, soldering outfits, small files, screwed and plain brass stock, nuts and bolts, of a type and size particularly suited to the needs of the wireless worker. The catalogue may be had on application, mentioning AMATEUR WIRELESS.

---

*[Owing to very heavy pressure on our space we are obliged to hold over the instalment of "Notes for the Novice."]*

## BROADCAST TELEPHONY

*Some of these transmissions are commercial or official. Wave-lengths and times are liable to alteration without notice.*

**London B.B.C. Station** (2 L O), 369 metres. Daily, 5 p.m. to 5.45 p.m., children's stories; 7 p.m. to 10.30 p.m., concert and news.

**Manchester B.B.C. Station** (2 Z Y), 385 metres. Daily, 4.30 p.m. to 5 p.m., concert; 6 p.m. and 6.15 p.m., kiddies' corner; 6.30 p.m. to 7 p.m., reproducing-piano recital; 7 p.m., news bulletin; 8 p.m. to 9.10 p.m., concert; 9.15 p.m., second news bulletin; 9.30 p.m. to 10 p.m., miscellaneous concert.

**Birmingham B.B.C. Station** (5 I T), 420 metres. Weekdays: 6.30 p.m., children's stories; 7 p.m., concert; 7.30 p.m., news bulletin; 8.30 p.m. to 9 p.m., interval; 9 p.m., concert; 9.45 p.m., second news bulletin; 10 p.m., final announcements. Sundays: 8 p.m., news bulletin; 8.10 p.m. to 9.45 p.m., concert; 9.45 p.m., second news bulletin; 10 p.m., final announcements.

**Newcastle B.B.C. Station** (5 N O), 400 metres. Daily, usually 6.30 p.m. to 10 p.m.

**Croydon** (G E D), 900 metres. Daily.

**Writtle** (2 M T), 400 metres. Tuesdays, 8 p.m.

**Eiffel Tower** (F L), 2,600 metres. Daily, 6.20 p.m. to 7 p.m., concert, and 10.10 p.m. to 10.20 p.m., concert (weekdays only).

**The Hague** (P C G G), 1,085 metres. Sundays, 3 p.m. to 5 p.m.

**Paris.** Concerts Radiola. 1,506 metres. Daily, 5 p.m. to 6 p.m., concert. Sundays, 2 p.m. to 5 p.m., concert.

**Rome** (I C D), 3,200 metres. Daily, 10 a.m.

**Königswusterhausen** (L P), 2,800 metres. Daily, 4 p.m. to 5.30 p.m.

**Amsterdam** (P C A), 1,800 metres. Daily, 1.10 p.m.

**Haren** (O P V H), 900 metres. Daily, every hour from 11.20 a.m. to 4.20 p.m.

# OUR INFORMATION BUREAU

## Expert Replies to Readers' Questions. Hundreds of Replies are sent by Post.

TO ENSURE A PROMPT REPLY PLEASE OBSERVE THE FOLLOWING RULES

**Write distinctly, give all necessary details and keep to the point. Ask one Question at a time—never more than two. Send a Stamped and Addressed Envelope. Send the Coupon cut from page 98.**

**Reactance-capacity Coupling**

Q.—May I employ the long-wave tuner, described on page 164 of "Amateur Wireless," as a tuned-plate or reactance-capacity coupling —L. F. (Folkestone) (6,255).

A.—The long-wave tuner, as described, may be quite suitably used for reactance-capacity coupling between the H.F. and rectifying valves of a multi-valve receiver. The reactance coil at the base may be retained and used as an actual reactance coil coupled from the plate circuit of the rectifying valve to the tuned-plate coil of the reactance-capacity coupling. This method of using reactance, instead of coupling the reactance coil to the secondary tuning coil, eliminates practically all possibility of re-radiation and interference to other local amateurs. It is advisable to employ a variable condenser across the main coil for fine tuning on the short wavelengths, and when it is desired to increase the range of tuning omit the variable condenser entirely.—L. C.

# Radiograms

FIFTY thousand wireless sets are now licensed in France.

▪ ▪ ▪

Arrangements are being made to broadcast from 2 L O "The Last Waltz," the musical comedy at the Gaiety Theatre, in which Miss José Collins appears.

▪ ▪ ▪

A Launceston amateur states that he has received American broadcast on one valve.

▪ ▪ ▪

The permanent offices of the B.B.Co. Ltd. are situated at Magnet House, Kingsway, W.C.2.

▪ ▪ ▪

A wireless set is to be presented to the Duke of York.

▪ ▪ ▪

5 M S (Manchester Wireless Society) has at last been heard in America.

Sixty persons at Southgate listened-in to persons speaking at 195, Broadway, New York, 3,200 miles away. The apparatus used was a four-valve receiver and a frame aerial. London had to make its answers by cablegram.



The callsign of the Cardiff station is 5 W A and the wavelength 395 metres.

▪ ▪ ▪

A London taxi-cab is plying for hire fitted with a portable receiver.

▪ ▪ ▪

The Manchester Licensing Justices are trying to decide whether "listening-in" comes under the heading of entertainment or not, as a publican has asked permission to install a receiver on his premises.

▪ ▪

2 L O's special programme for the evening of Australia Day (Friday, January 26), will open with an Australian fairy tale. The concert will include items by an all-star company, some of the artists being: Ada Crossley (organ obligato by Arthur Mason); Florence Austral and Gertrude Johnson (by kind permission of the British National Opera Company); Harold Williams, Malcolm MacEacharn, Daisy Kennedy; O'Shea (tenor); Amadio (flautist); and William Murdoch (pianist). During the evening the High Commissioner for Australia will give an address.

▪ ▪ ▪

Croydon aerodrome is to be enlarged so as to make it an important transcontinental air station, and it is proposed to equip it with all the latest wireless devices for controlling air-traffic.

A receiver that is entirely automatic has been introduced by the Radio Corporation of America.

▪ ▪ ▪

Unexpected delay is taking place in connection with the establishment of the Glasgow broadcasting station. It is understood that a fine site had been selected, and everything was in readiness to set up the apparatus when a hitch in the arrangements occurred. As a result, another site will have to be found—not an easy matter in a congested city area.

▪ ▪ ▪

Dame Melba was heard by wireless on Jan. 17, when she sang in "La Bohème" at Covent Garden.

▪ ▪ ▪

The scheme for direct wireless service between Australia and Great Britain proposes the following scale of charges: full rate messages, 2s. a word; deferred rate, 1s. a word; week-end, 6d. a word (minimum 10s. a message); press messages, 5d. a word; deferred press messages, 3d. a word.

▪ ▪ ▪

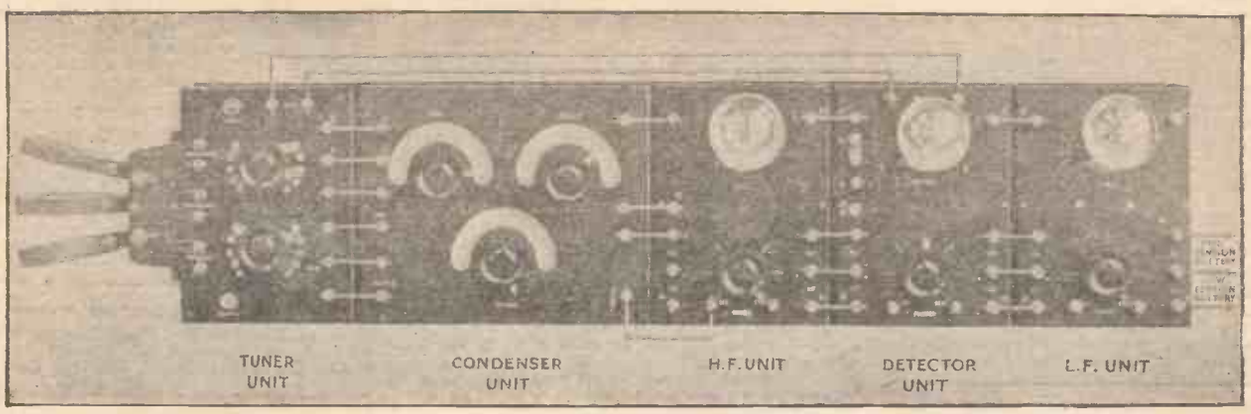
French amateurs, besides having to pay an annual tax of 10 francs, have to comply with more than seventy State regulations.

▪ ▪ ▪

The breakdown at the Newcastle broadcasting station on Jan. 18 was due to the bursting of a "sprinkler" water-pipe, which flooded the premises.

## American Telephony for British Amateurs

WE learn that, due to the special offices of Mr. W. J. Crampton, a message is to be sent from America by Mr. Henry Edmunds on Saturday, January 27th. In response to Mr. Crampton's request the following cable has been received: "Through courtesy, American telephone, next Saturday, 9.10 p.m. American time, speech ten minutes from New York, W.E.A.F., 400 metres from Henry Edmunds to wireless amateurs of England." The times of transmission will be 9 p.m. to 9.10 p.m. and 10 p.m. to 10.10 p.m. Saturday, the equivalent British times being 2 a.m. to 2.10 a.m. and 3 a.m. to 3.10 a.m.




# Use a stage or two of H.F. and a Frame Aerial

## —you'll get the long-distance Stations just as well but with less interference and without atmospherics

The man who cannot erect an outside Aerial or who wants to move his Set from room to room need not despair. A good Frame Aerial of the type illustrated will give clear telephony when used with sufficient H.F. amplification from all stations within a wide area.

Further, because it is directional, it cuts out a lot of interference from near-by Stations together with most of the atmospherics.

The Peto-Scott standardised Unit System provides the only sensible way of adding just as many stages of H.F. amplification as you may need at the least possible expense.

Our illustrated Booklet, "Radio," describes the whole System and shows how each Unit is built up—price 6d., post free.

**PRICE LIST OF SETS OF PARTS**

| | | |
|---|---|---|
| No. 1. | Tuner Unit ... ... | 27/6 |
| No. 2. | Condenser Unit ... ... | 42/- |
| No. 3. | H.F. Amp. Unit ... ... | 13/6 |
| No. 4. | Dectector Unit ... ... | 17/6 |
| No. 5. | L.F. Amp. Unit ... ... | 33/6 |

Mahogany Cabinets to fit Nos. 1, 3, 4 and 5, 3/6. To fit No. 2, 7/-.

Postage 9d. per unit extra, but paid on all orders over £2

**THE PETO-SCOTT CO.**

Featherstone House

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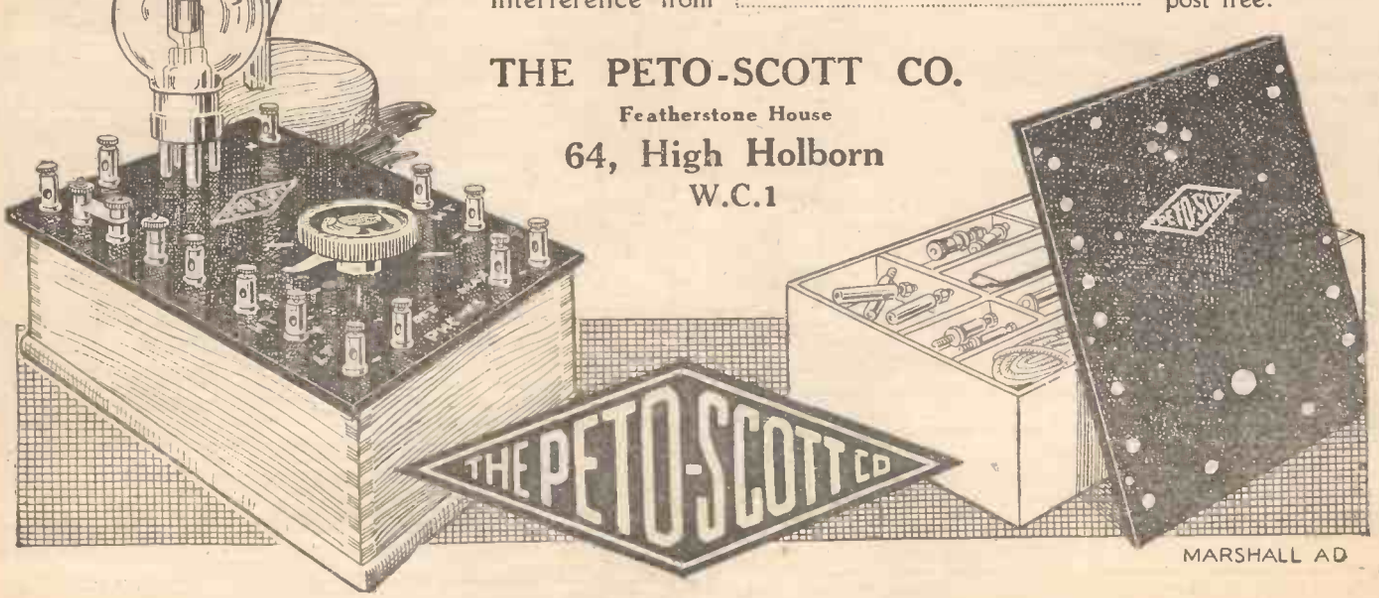



MARSHALL AD

# CLUB DOINGS

### The Warrington Radio Association.

*Hon. Sec.*—W. WHITTAKER, 68, School Brow, Warrington.

ON Jan. 11 a lecture was given by Mr. W. Whittaker on "Morse Reception," following which Mr. B. Nadin lectured on "Hints on Set Making," both of which proved very instructive.

### Streatham Radio Society.

*Hon. Sec.*—S. C. NEWTON, Compton, 5, Pendennis Road, Streatham, S.W.16.

ON Jan. 10 Mr. Gibbon, of the G.P.O., in conjunction with Mr. F. O. Read, of Messrs. Burndept, Ltd., gave an extremely interesting lecture and demonstration on some of the uses to which wireless was put during the war. He passed quickly through the stages of wireless from the invention of the telephone by Graham Bell and Thomas Edison. He described the first practical wireless in existence when communication was established and maintained between a lighthouse and the shore by means of Preece's electro-magnetic induction system. Passing rapidly through the various stages of development, he soon came to the most wonderful invention—the valve. Circuits were shown and explained by means of lantern slides. Many interesting slides were shown illustrating various high-power stations in existence. It was amusing to hear the great sigh which went up upon the mention of the G.P.O. station at Leafield. The lecture coming to a close, Mr. Read started the demonstration part with a Burndept ultra IV—truly a magnificent piece of apparatus. The Covent Garden Opera, which was being transmitted from Marconi House, was made audible all over the room with the aid of an Amplion loud-speaker.

### Tottenham Wireless Society.

*Hon. Sec.*—R. A. BARKER, 22, Broadwater Road, Tottenham, N.17.

ON Jan. 10 the chairman, Mr. F. A. Bourne, gave a very excellent lecture on the subject of "Crystal Detectors." Mr. Bourne not only fully explained the theoretical side of the question, but also fully explained the construction of a crystal set that everyone could make for themselves. Presentations were made to the society of a crystal set, a set of coils, and coil-holder, and a battery of accumulators.

### Proposed Winsford (Cheshire) Wireless Society.

PERSONS living in the above district interested in wireless are asked to communicate with Mr. S. Oakes, 188, Weaver Street, Winsford, Cheshire.

### Swansea and District Radio Experimental Society.

*Hon. Sec.*—H. T. MORGAN, 218, Oxford Street, Swansea.

THIS society has a very interesting programme for the season, and all interested in wireless are invited to join.



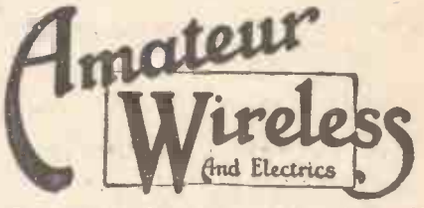
## ANNOUNCEMENTS

**"Amateur Wireless and Electrics."** Edited by Bernard E. Jones. Price Threepence. Published on Thursdays and bearing the date of Saturday immediately following. It will be sent 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 the Proprietors, Cassell & Co. Ltd.

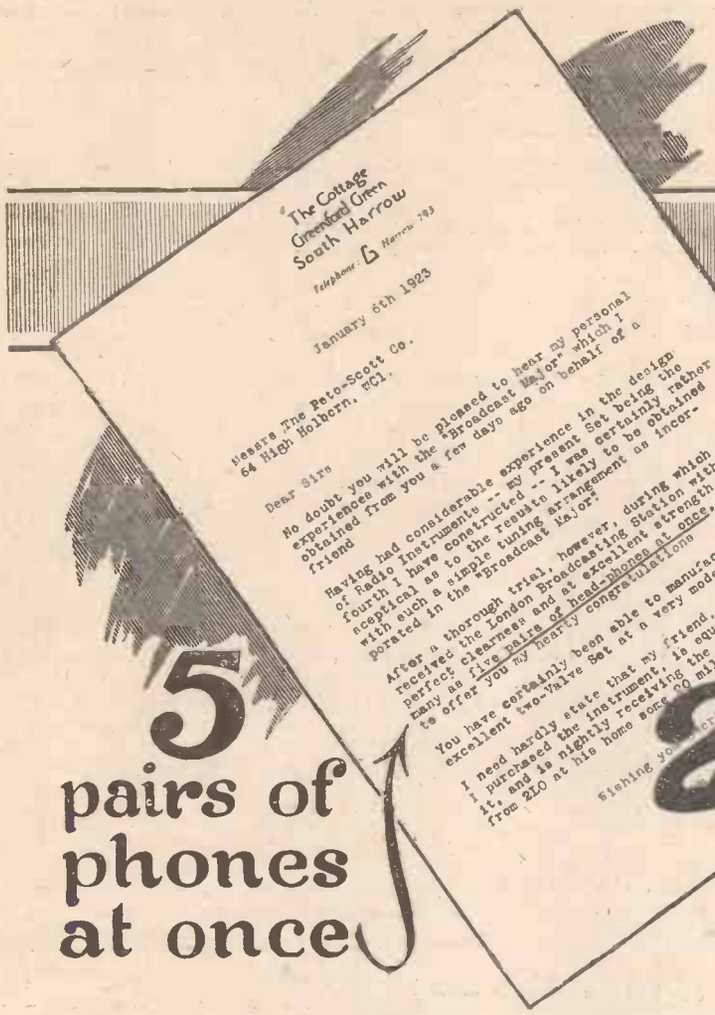
**General Correspondence** is to be brief and written on one side of the paper only. All sketches and drawings to be on separate sheets.

**Contributions** are always welcome, will be promptly considered, and if used will be paid for.

**Communications** should be addressed, according to their nature, to The Editor, The Advertisement Manager or The Publisher, "Amateur Wireless," La Belle Sauvage, London, E.C.4.




**Querist's Coupon Available until Saturday, Feb. 3, 1923**




# 5 pairs of phones at once

# An Excellent 2 Valve Set

BEFORE introducing this Set, we have put it to exhaustive tests and are now satisfied that for simplicity of operation, clearness, purity and volume of tone, it is absolutely without a rival. If you are situated within 25 to 30 miles from any of the four Broadcasting stations—London, Birmingham, Manchester and Newcastle — you cannot purchase a better instrument, although you may be asked to pay very much more.

Remember every Instrument is tested on our Aerial before being issued, and bears a certificate to that effect; further, every Instrument carries our full guarantee of complete satisfaction after a seven days' trial in your own home or money willingly refunded.

¶ **Ready for immediate use**
**Absolutely nothing more to buy**

## The BROADCAST MAJOR

*(Passed by P.M.G.)*

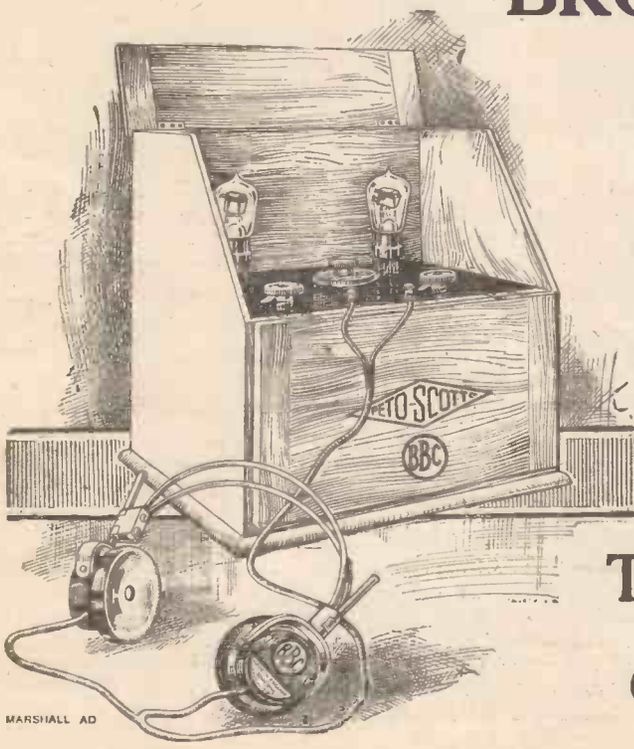
***Cabinet made from solid mahogany, hand polished throughout and fitted with hinged top and drop-down front***

The tuning is controlled by one rotating dial and is very selective on all wave lengths between 350-550 metres—the Concert Wave lengths. Two filament rheostats are provided for regulating the filaments of the two valves. The L.F. Transformer is the MAX-AMP—our own design and manufacture. Included with the Set is an accumulator (6 volt 40 amp. hours), an H.T. Battery (60 volts), both of best British manufacture, and a pair of Western Electric Head-phones. A complete Aerial outfit, including 150 feet of Aerial wire, together with necessary insulators, is supplied with the Set without extra charge. With the exception of the Valves, which owing to risk of breakage should be purchased locally, nothing more is required.

¶ When this Set is required for use with Broadcast Licence a B.B.C. royalty of 35s. must be paid at time of purchasing. The royalty of 25s. due to the Marconi-Co. is being paid by us.

**£9 9 0**

***Valves, 15/- each extra***




MARSHALL AD

## THE PETO-SCOTT CO.

*Featherstone House*

**64, HIGH HOLBORN, W.C.1**

# T·M·C WIRELESS

## for football results

A T.M.C. Wireless Set will enable you to follow your favourite team and hear the results of each match practically as soon as the game is over.

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You can have all these, enjoyably and pleasurably, in the comfort of your own home with a T.M.C. Wireless Receiver.

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T.M.C. Wireless Receivers, which are fully approved by the Postmaster-General, bear the seal of the British Broadcasting Company.

The wide variety of models are entirely British made.

**from £4 5s.**

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***London, Birmingham, Manchester and Newcastle are Broadcasting now.***

Come and listen to them any evening up to 10 p.m. at our showrooms in London, Birmingham, Belfast, Bristol, Cardiff, Dublin, Glasgow, Leeds, Liverpool, Manchester, Newcastle, Sheffield.

***Write to us for our nearest address.***

The "Everset" Crystal.
No adjustment necessary.
Fits any crystal receiver.
**10/- each.**

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Makes Wireless
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EBS
51

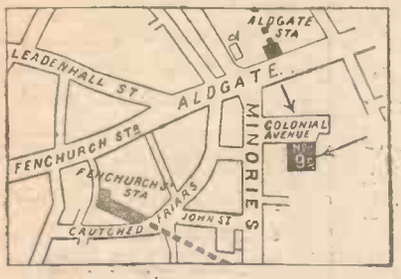
# TELEPHONE MFG. CO. LTD.

## HOLLINGSWORTH WORKS, DULWICH, LONDON, S.E.21.

# ELECTRADIX RADIOS

**Best for *all* equipment. Everything for Wireless. Dynamos and Insulated Wires below cost**

**RELAYS, RELAYS,** Siemens and Western Electric Co., complete with contacts, 10/6. Small type for remote control, minus contact, 2/6. Ordinary M.C. Weston Relays, 20/-.
**RIGID BASKET COILS,** set of 7, 200/1800, 7/6. 3 coil holder for same, 7/6.
**LADIES' 'PHONE,** cord and handle L.R., 5/-; H.R., 9/6.
**FIXED CONDENSERS,** '0001 to 2 m.f., 2/-. Grid leaks, 2/-.
**MURDOCK VARIABLE,** ditto, all sizes. Lowest prices.
**WAVEMETERS** for transmission and reception, from 300/3000, £4. 130/9000, £6 10s. Few only.
**ANGLE PLOTTERS,** in leather case, 8/6.
**TEAK PANELS,** 13 by 12 by 5, ebonite top, 10/-.
**3-VALVE AMPLIFIERS, £5**




## LESLIE DIXON & CO.,

**9, COLONIAL AVENUE, MINORIES, E.1**

**Near Aldgate Station, Metropolitan Railway**

**Finest Quality Money can buy**

## Wireless HEAD-PHONES

**10/6 per pair. 150 Ohms. each.**

**Jacks 6/- doz. Not less than 1 doz.**

Postage 6d. extra. Special Quotation for Quantities.

**HYAMS, 25-26, King St., Camden Town, N.W.**

Mention paper. Estab. 80 years. **Phone 2832 North**

## EASY TERMS OR CASH

Startling Advertisement Offer, for fourteen days only. Complete Single Valve Set of parts for **99/-, 33/-** with order, balance **11/-** a fortnight.

Specification:—Ebonite Panel 10 × 8 drilled, Mullard Ora Valve, Variable Condenser '0005, Filament Resistance, Grid Leak and Condenser, Two Honeycomb Coils No. 35 and 50 and Holders, Variable H. T. Battery 30 volt, Accumulator 4 volt 30 amps, One pair Mullard's Double Headphones 4,000 ohms, 100 ft. Aerial Wire, Lead In Tube, 4 Insulators, Wire for wiring and sleeving, Terminals, Valve-holder and diagram. Delivered Carriage Paid. Money returned in full, if you are not completely satisfied, within seven days after delivery; full allowance made for parts not required.

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| | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|
| 8 × 1 ... ... | | 7 | 12 × 10 ... ... | | 7 | 6 |
| 4 × 4 ... ... | 1 | 3 | 17½ × 8½ ... | | 9 | 6 |
| 17 × 5½ ... ... | 6 | 8 | 18 × 18 ... ... | 12 | 10 | |
| 10 × 6 ... ... | 3 | 9 | 36 × 18 ... | 1 | 3 | 0 |
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*Postage Free—Any Size Cut*

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***N.B.*—*Mr. Portland Stocks 200 Wireless Parts***

# HALL'S

# WIRELESS ACCESSORIES

**HIGHEST QUALITY**

**LOWEST PRICES**


*THE WELL-KNOWN*

**French "BRUNET" HEADPHONES**

**22/6**

*(POSTAGE 9d.)*

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**21/-**

*(POSTAGE 9d.)*

## GUARANTEED GOODS

*"Dispatch by return."*

CANTERBURY, 8/12/'22

Messrs. Halls.

DEAR SIRS,

. . . "I wish to thank you for your kind and prompt attention to this matter and to my previous orders, and you may be assured of my recommendation and future custom." G. W. Y

SOUTHWICK, *Nov.* 1922

Messrs. Halls.

DEAR SIRS,

. . . "parcel received quite safely and am very pleased with both contents and promptness of dispatching." Yours A.H.

GRAVESEND, 21*st Dec.* 1922.

Messrs. Halls.

DEAR SIRS,

. . . "I shall have great pleasure in recommending you to anyone requiring accessories.

Yours truly, S. H. G.

PINXTON, NOTTS, 14*th Dec.* 1922

Messrs. Halls.

DEAR SIRS,

. . . "I am quite delighted with their quality. Wishing you every success." Yours truly J. A. C.

All originals are at our office, and can be seen on request.

**"Dispatch by return"** is no idle boast.

Our Stock of Wireless Equipment and Accessories is such that we can supply every Wireless need at once and at lowest prices. If you do not see what you want in our list, please write us.

## BRITISH HEADPHONES

4,000 ohms. Very Light. Beautifully Finished. Stalloy Diaphragms. Complete with Cords. Adjustable Earpieces.

*(Sold elsewhere almost exclusively at 35/-)* **19/6** *(POSTAGE 9d.)*

## VARIABLE CONDENSERS:

| Capacity | Complete Parts | Assembled for Panel Mounting |
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| .001 ... ... .. | 6/6 ... ... | 12/6 |
| .0075 ... ... ... | 5 6 ... ... | 12/- |
| .0005 ... ... ... | 4/6 ... ... | 10/6 |
| .0003 ... ... ... | 3/- ... ... | 7/6 |
| .0002 ... ... ... | 2/3 ... ... | 6/- |
| .0001 ... ... ... | 2/- ... ... | 4/9 |

Top and Bottom Circular Drilled Ebonite Plates, 1/3 extra
Vernier, 3/-

**Intervalve Transformers,** Ratio 4 to 1, finest manufacture 12,9; 5 to 1 ... ... ... ... ... ... ... 14/-
**Crystal Sets** ... ... ... ... ... ... from 15/- to £3
**"Royal Phone" Loud Speakers,** 4000 ohms resistance, ebonite horn, giving clarity of tone and freedom from distortion. Orders in strict rotation ... ... each 30/-
**Aluminium Condenser Vanes,** fixed and moving, 22/24 gauge ... ... ... ... ... ... pair 1d
**Spacers,** true to .001 ... small, doz. 2d; large, doz. 3d
**Ebonite Knobs,** tapped 2 B.A. with brass nut—1st quality, 4d; 2nd quality 2d
**Aerial Wire,** 7/22 hard drawn copper, in 100 ft. lengths ... 2/9
**Valve Legs,** with nuts and washers ... 1d each; doz. 9d
**Two Coil Holders,** solid ebonite mounted on mahogany ... 4/9
**Three** ,, ,, ,, ,, with long arms to avoid capacity effects ... ... ... ... ... ... ... 9/6
**Crystal Detectors,** adjustable in every way ... ... 2/6
,, ,, enclosed in glass case ... ... ... 4 6
**Engraved Ivorine Scales,** 0-180° ... ... ... ... 4½d
**Filament Resistances,** extraordinary value, velvet action 2/6 & 3/6
**Switch Arms,** complete with knob, collar, washers, bush nuts, etc. ... ... ... 1st quality, 1 6; 2nd quality 1/-
**Valve Holders,** turned ebonite, complete with nuts, 1.3; 2nd qual., 9d
**Crystal Cups** ... ... plain 1d.; one, two, or three screw 3d
**Large Terminals,** complete with nut and washer ... each 1d
**Basket Coils,** set of 7 ... ... ... ... ... 5-
**Contact Studs,** ½-in. × ½-in., complete with nut and washer ... ... ... ... ... ... ... ... ...doz. 6d
**Insulators,** 2-in. reels—1d each; white egg, 3d; green egg, 4d; green shell, each 4d
**Brass Nuts,** 2, 3, 4, 5, 6 B.A., doz. 3d.; Washers, doz. 2d
**Ebonite Sheets.** ⅛, ¼, ½ ... ... ... ... lb. 4-
**Fixed Condensers,** any capacity ... ... each 1/3
**Grid Leak and Condensers combined** ... ... each 3/6
**Slider Plunger** complete ... ... ... ... ... each 4d
**Slider Rods,** 12-in. or 18-in. ¼-in. square brass, drilled both ends 4d
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**Screwed Brass Lengths,** 12-in. 2 or 4 B.A. ... ... each 3d
**Inductances,** wound 22/24 enamelled wire ... ... each 3·3

**Orders under 30/- kindly remit ample postage**

*Balance refunded if excess sent. Send for FREE Catalogue*

TRADE SUPPLIED **HALL'S** DISPATCH BY RETURN

**'PHONE: REGENT 1282**

## 71a, Beak Street, Regent Street, London, W.1

*Between Piccadilly Circus and Oxford Circus*

*'Buses 3, 6, 12, 13, 15, 32, 51, 53, 59 and 88 pass*

# EVERYBODY

The articles offered are *real value* for money. Prices low; quality, the best. To satisfy you I must satisfy myself—therefore you need not worry as regards anything purchased here. I have lots of imitators, but *no equals* in the goods I sell. You get a square deal with me. There is a decided ramp going on at present in a lot of manufactured goods, but I am not taking advantage of the demand. My customers know that and that's why I do the business. "'Nuff Sed!"

## IMPORTANT NOTICE.

**Owing to the enormous demand for goods, and the difficulty in obtaining sufficient supplies at the moment for postal replies, I ask your kind indulgence *re* same.**

**ALL ORDERS DESPATCHED AT THE EARLIEST POSSIBLE DATE.**

***Cash returned if not absolutely satisfied.*** ***No Catalogues Issued.***

## ALL FOLLOWING GOODS POST FREE AT THE SPECIAL POST PRICES ATTACHED

**Aerial Wire.** Genuine 7/22 bare copper stranded. 100 ft. hanks, daily market prices (postal supplies uncertain at present).

**Switches.** Not common rubbish on fibre, but a real good article, brass on ebonite. S.P.S.T., 1/6 (by post, 2/-); S.P.D.T., 2/- (by post, 2/6); D.P.S.T., 2/6 (by post, 3/-); D.P.D.T., 3/- (by post, 3/6).

**Filament Resistances.** I have 3 types, all highest quality. For 1 valve, 2/6 (by post, 3/3); for 2 valves, 3/- (by post, 3/6); and for 3 valves, 3/6.

**Insulators,** green or white, egg type, **2d.** each (not sent by post).

**Lead-in Tubes.** Ebonite, with brass ends. Best quality. 6 in., 1/-; 9 in., 1/2; 12 in., 1/4 (not sent by post).

**Crystal Detectors on Ebonite.** Well made, two designs. 2/6 (by post, 3/3) and 3/3 (by post, 3/9). And they are worth it!

**Crystal Detector.** Dust proof, glass covered, horizontal type. Very handsome design; our own pattern. 4/6 (by post, 5/3).

**Perikon Detector.** Complete with 2 crystals. Perfectly designed. Compact pattern. 4/- (by post, 4/6).

**Grid Leak and Condenser,** .0003. Absolutely perfect in design and quality. It is not cheap, but does the work. Price 3/9 (by post, 4/3).

Large stocks of **Hertzite** (1/-, 1/3, 1/6, 2/-), **Zincite** (9d. and 1/-). Other crystals, 3d. (No post orders.)

**Terminals,** with hole for telephone leads. Beautifully finished, complete with nut and washer. **2d.** each (not less than 1 doz. sent by post, price 2/6).

**Ebonite Valve Holders,** with 8 nuts. 1st quality, 1/3 (by post, 1/8); 2nd quality, 1/1 (by post, 1/5).

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**Terminals.** Extra good quality, small size, 4 B.A., W.O. pattern. 8 for 1/- (by post, 1/4).

**Our goods sell themselves. We don't need pictures!**

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I can supply you with Terminals, various designs, all really good and cheap. No rubbish supplied.

**Intervalve Transformers,** low frequency, 5-1. On approval. **14/-** (by post, 15/-).

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**Knobs.** Bushed 2 B.A., specially good quality, 4½d. each (by post, 7d.).

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**Fixed Condensers.** First-class value, .0003, .0005, .001, .002, .003. Scientifically constructed. 1/3 each (by post, 1/6); also .004, 1/6 (by post, 1/9). These are with terminals on ebonite.

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**Terminals.** First class, good size, complete with nut and washer. 1/3 doz. (by post, 1/9).

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"Received Condenser parts to-day, and they surpass all my expectations."

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