

Kabon

# The Wireless Constructor

EDITED BY  
PERCY W. HARRIS

6<sup>th</sup>

## CONTENTS.

Vol. 1. No. 3. JANUARY, 1925.

### HOW TO MAKE:

#### THE TWIN-VALVE RECEIVER.

A Loud Speaker Set for the Local Station.

By John Scott-Taggart, F.Inst.P.,  
A.M.I.E.E.

#### A "FOOL-PROOF" CRYSTAL SET. A SIX-VALVE NEUTRODYNE SET.

Both by Percy W. Harris.

#### A LOUD SPEAKER AMPLIFIER FOR YOUR CRYSTAL RECEIVER.

By E. Redpath.

### HOW TO FIT A NEW CRYSTAL HUMORISTS OF THE AETHER.

#### SOME GOOD SINGLE VALVE CIRCUITS.

Hints and Tips for all Crystal and Valve Users.

1/6 Blue Print FREE Inside.



# XMAS NUMBER



**BUY THIS  
SPLENDID  
XMAS  
NUMBER**

□□□□□□□□



**GRAND DOUBLE NUMBER  
NOW ON SALE EVERYWHERE**

Build the great new 4-valve T.A.T. RECEIVER, a brilliantly successful set working on a new system of multi-stage H.F. amplification!

**1/6 PER COPY**

This fascinating article by John Scott-Taggart, F.Inst.P., A.M.I.E.E., the Editor of "MODERN WIRELESS," gives the fullest constructional details of a 2 H.F. set built purely and simply for long-range reception. The fact that this is the first straight 2 H.F. set described by the Author, whose reputation in valve circles is unrivalled, is significant in itself. Six B.B.C. Stations varying from 50 to 350 miles, figures in the detailed test report are giving excellent *loud-speaker* results. Another very important article is a complete account of the Armstrong

Superheterodyne and its recent development by Edwin H. Armstrong the great inventor himself. Mr. Harris, Editor of "THE WIRELESS CONSTRUCTOR," also contributes a very interesting constructional article on a new 3-valve set. Mr. J. B. Barber has an article of great interest dealing with Loose-Coupled Single valve set, while Mr. A. D. Cowper, M.Sc., contributes a very special article on reception on the Ultra Short Waves, a new intriguing field of work almost unknown to many.

**ORDER YOUR COPY IMMEDIATELY.**

(SPECIAL DOUBLE XMAS NUMBER)

**MODERN WIRELESS**

Advt. of The Radio Press, Ltd., Bush House, Strand, London, W.C.2.

**CONTENTS**  
**THE ARMSTRONG SUPER-HETERODYNE.**  
 By EDWIN H. ARMSTRONG.  
**MAKING A 4-VALVE T.A.T. RECEIVER.**  
 By JOHN SCOTT-TAGGART, F.Inst.P., A.M.I.E.E.  
 A Reinartz Receiver for Plug-in Coils.  
 By Percy W. Harris.  
 A Home 3-Valve Receiver.  
 By E. Redpath.  
 A 2-Valve Power Amplifier.  
 By John Underdown.  
 A New Design of Crystal Set.  
 By Stanley G. Rattee, M.I.R.E.  
 A Loose-Coupled Single Valve Set  
 By J. W. Barber.  
 Latest Continental Broadcasting Tables.  
 By Capt. L. F. Plugge, B.Sc., F.R.Ae.S., F.R.Met.S.  
 Reception on the Ultra Short Waves.  
 By A. D. Cowper, M.Sc.

And numerous other interesting and well illustrated articles, hints and tips, etc.

# The WIRELESS CONSTRUCTOR

— Edited by Percy W. Harris —

VOL. I. No. 3.

JANUARY.

## CONTENTS

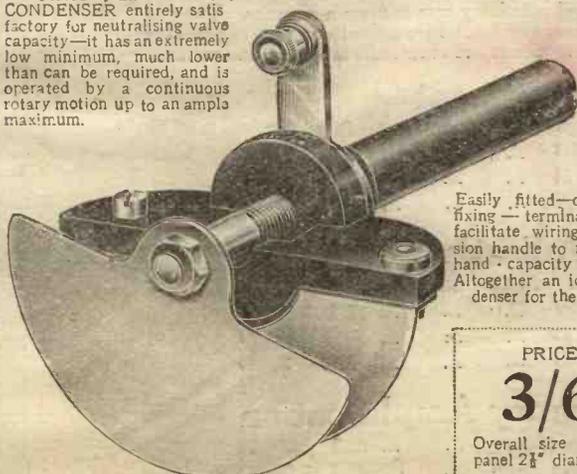
The "Twin-Valve" Loud-Speaker Receiver .. .	183	Through Central Europe with a Portable Set .. .	222
By JOHN SCOTT-TAGGART, F.Inst.P., A.M.I.E.E.		By CAPT. L. F. PLUGGE, B.Sc., F.R.Ae.S., F.R.Inst.S.	
"It's an Ill Weed that Brings Nobody Good" .. .	191	A "Short-Wire" Valve Panel .. .	234
How to Fit a New Crystal to Your Set .. .	192	By A. S. CLARK.	
Humorists of the Aether .. .	194	Test Report on the "Polar Blok" Twin-Valve Receiver .. .	238
By "CARRIER-WAVE."		Readers' Results with "Crusoe" Crystal Set .. .	240
A Fool-Proof Crystal Set .. .	197	More Help for the Home Constructor .. .	243
By PERCY W. HARRIS.		Practical Workshop Hints .. .	247
Soldering Simplified By "HOT WIRE." .. .	200	The Single Valve .. .	252
The "Anglo-American Six" .. .	204	John Anstruther Talks .. .	260
By PERCY W. HARRIS		By R. W. HALLOWS, M.A.	
A Loud-Speaker Amplifier for Your Crystal Set .. .	210		



## The COLVERN NEUTRODYNE CONDENSER

The present popularity of receivers employing the Neutrodyne principle finds us with a neatly designed instrument with constructional and electrical features specifically for this purpose. Similar in design to the COLVERN General Purpose Vernier which is already well-known—the COLVERN NEUTRODYNE represents utmost efficiency at a moderate price.

Tested by an eminent physicist—who found the COLVERN NEUTRODYNE CONDENSER entirely satisfactory for neutralising valve capacity—it has an extremely low minimum, much lower than can be required, and is operated by a continuous rotary motion up to an ample maximum.



Easily fitted—one hole fixing—terminals to facilitate wiring, extension handle to minimise hand capacity effects. Altogether an ideal condenser for the work.

PRICE  
**3/6**  
Overall size under panel 2½" diameter.

The COLVERN is a desirable unit, properly designed and thoroughly constructed. Its success is assured since its design adheres to that of the COLVERN General Purpose Vernier.

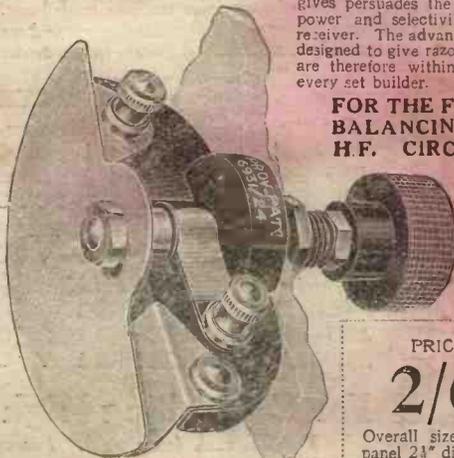
**NO NEUTRODYNE RECEIVER CAN REACH THE HIGHEST EFFICIENCY AT A MODERATE COST UNLESS YOU FIT THE COLVERN NEUTRODYNE CONDENSER.**

For the final balancing of Multi-H.F. Circuits no large tuning condenser is of use. It requires a fine tuning condenser of very low maximum. It is not technically correct that a two or three-plate vernier should be attached to the main condenser as this arrangement considerably defeats the object of fitting a vernier. Fit the

## COLVERN GENERAL PURPOSE VERNIER

which will demonstrate that your set is more sensitive to perfect balance than you have yet experienced. The accurate tuning which the COLVERN gives persuades the utmost range, power and selectivity from your receiver. The advantage of circuits designed to give razor-sharp tuning are therefore within the reach of every set builder.

**FOR THE FINAL BALANCING OF H.F. CIRCUITS**

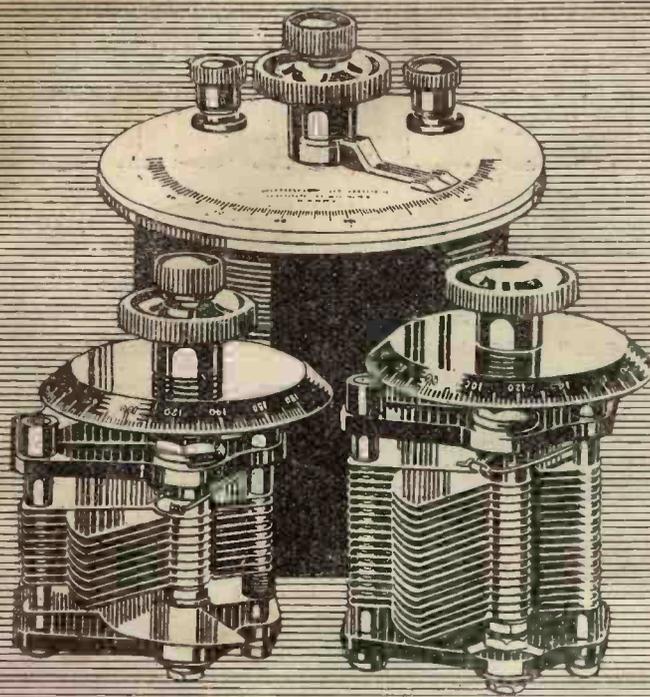


PRICE  
**2/6**  
Overall size under panel 2½" diameter.

If your local dealer cannot supply, kindly send his name and address when ordering.

**COLLINSON'S PRECISION SCREW Co., Ltd.**  
Macdonald Road, Wa'thamstow, London, E.17.  
Telephone—WALTHAMSTOW 532.

Barclay's 411.



# STERLING SQUARE LAW CONDENSERS

## *Finish tuning troubles*

Correctly designed, of superb finish and made from the highest grade materials, these Condensers give consistently perfect results, pass any test or comparison, and unfailingly satisfy radio constructors.

The specially shaped vanes give uniform wave length variation and practically zero minimum capacity. The end plates are arranged for either horizontal or vertical mounting. These Condensers are unrivalled for use in receiving sets and specially recommended for use in the construction of wave-meters and other radio measuring instruments.

### With Vernier Adjustment

Capacity	For Panel Mounting	In Case with Ivorine Dial
.00025 mfd. ...	R.2724 £1 3 0	R.2733 ... .. £2 2 6
.0005 mfd. ...	R.2725 £1 5 6	R.2734 ... .. £2 5 0
.001 mfd. ...	R.2726 £1 10 6	R.2735 ... .. £2 10 0

### Without Vernier Adjustment

Capacity	For Panel Mounting	In Case with Ivorine Dial
.00025 mfd. ...	R.2729 £1 0 0	R.2737 ... .. £1 19 6
.0005 mfd. ...	R.2730 £1 2 6	R.2733 ... .. £2 2 0
.001 mfd. ...	R.2731 £1 7 6	R.2739 ... .. £2 7 0

### For Controlling High Frequency Amplification

R.2740	.0002 mfd. (each unit).	For controlling two stages	... ..	£1 7 6
R.2743	.0002 mfd. (each unit).	For controlling three stages	... ..	£1 15 0

*Your Radio Dealer can supply*

Advt. of **STERLING TELEPHONE & ELECTRIC CO., Ltd.**, Manufacturers of Telephones and Radio Apparatus, etc.  
 210-212, TOTTENHAM COURT ROAD, LONDON, W.1 Works: DAGENHAM, ESSEX.

# The WIRELESS CONSTRUCTOR

*Scientific Adviser:*  
 Prof. G. W. O. HOWE,  
 D.Sc., M.I.E.E.

*Advisory Editors:*  
 Prof. R. WHIDDINGTON,  
 M.A., D.Sc.  
 Prof. C. L. FORTESCUE,  
 M.A., M.I.E.E.

*Staff Editors:*  
 E. H. CHAPMAN, M.A.,  
 D.Sc.  
 A. D. COWPER, M.Sc.  
 R. W. HALLOWS, M.A.  
 G. P. KENDALL, B.Sc.  
 S. G. RATTEE,  
 Member I.R.E.

Vol. 1.

JANUARY, 1925.

No. 3.

## The "Twin-Valve" Loud Speaker Receiver

By JOHN SCOTT-TAGGART, F.Inst.P., A.M.I.E.E.

THE ST.100 receiver has had such a very wide appeal that reflex circuits generally have aroused a very great deal of interest, and justifiably so, in my opinion, in cases where not more than three valves are used.

The great drawback of the ST.100 which most people do not seem to mind, is the crystal. The ideal set, of course, is one which will "stay put," and which will give uniformly good results. When the ST.100 circuit first appeared most people seemed to have a lot of trouble with it, and then suddenly complaints disappeared.

Exactly the same thing has occurred with the three-valve dual set described in *Modern Wireless*.

Confidence and the careful following of the published design is the secret in constructing a reflex set.

Excellent Results obtained  
 The particular new set which I have designed and which is described here is a two-valve reflex

out of adjustment, and if the set is made as described, excellent results will be obtained.

As my home is within 10 miles of 2LO, and as perfect loud-speaker reception was obtained from this station, I decided to take the set out to about 50 miles and to carry out the final tests at this distance. Consequently, on November 5th I took the set in a car to Bedford, which is approximately 50 miles from London. In the presence of Mr. Clarabut, a prominent member of the Bedford Radio Society, tests were carried out on an aerial of Post Office pattern, having an average height of 35 ft., and a much smaller aerial, only 65 ft. long and 15 ft. high.

Very good results were obtained on both these aerials; the London Station 2LO was received on the loudspeaker with both aerials. With

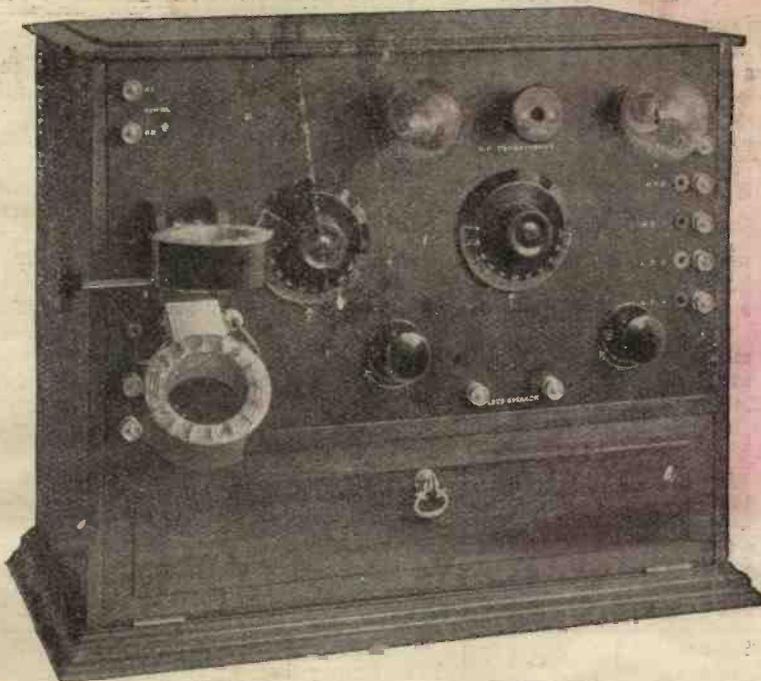


Fig. 1.—This photograph shows the handsome appearance of the completed set.

in which the second valve acts as a detector, no crystal being employed. There is consequently no trouble due to the detector going



the higher aerial very good loud-speaker results were obtained, while with the small aerial the set gave moderate loud-speaker results.

Bournemouth, Glasgow and Birmingham were all received on the loud-speaker, which was used throughout for tuning purposes.

For a two-valve set these results may be considered as very good, but for nearby work the ST.100 set gives louder results, this being inevitable because the ST.100 has two stages of low-frequency amplification, which cannot be achieved with two valves without a crystal detector.

From my own experience I should say that the results are the best that could be obtained with a two-valve set using the reflex principle, without a crystal detector. The signals are louder than those obtained with a resistoflex circuit (which principle, by the way, has just been incorporated into their sets by one of the largest electrical firms in the country).

The reason is obvious, for in the resistoflex the low-frequency coupling is effected by means of a high resistance, and it is well known that this method of coupling is not as efficient, from a signal-strength point of view, as a transformer.

The present set, however, required a considerable amount of preliminary design work before it took the form given in this issue.

**Valves Used**

The constant aerial tuning condenser was used throughout, the aerial being connected to the top terminal on the left of the set. A No. 50 Tangent coil was used in the aerial circuit, but no special significance must be attached to the use of this coil, which, however, is of excellent design, although the results of all the different makes of coils are very much the same, as regards signal-strength.

In some cases, as the table of results shows, no reaction coil was

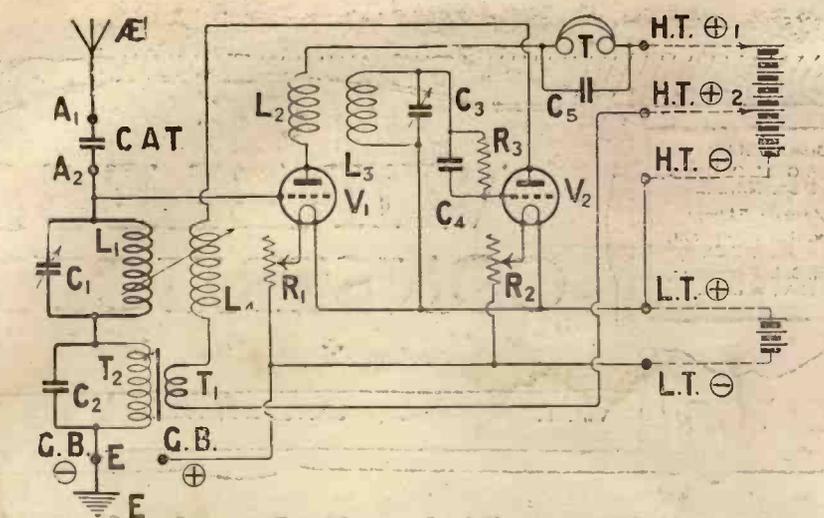


Fig. 2.—The theoretical diagram of the circuit.

needed, in which case the shorting plug was inserted where the reaction coil would normally go. In some cases the reaction coil, which is a No. 35 Lissen coil, was reversed so as to assist in stabilising the operation of the set.

A good control of reaction could be obtained by adjusting the filament rheostats, so that because the table shows the reaction coil shorted, it must not be assumed that no reaction effect was used.

As regards high-tension voltage using general purpose valves, the voltage on the H.T. +1 terminal was 100 volts, while the voltage on the H.T. +2 terminal was 42 volts. The correct voltage on the second valve is rather important because if the voltage is too high the set is inclined to buzz. This buzzing trouble, of course, is the great snag in reflex sets, and very considerable attention has been given to this in the design of this set. As far as my knowledge goes, this is the first description of a two-valve reflex using no crystal which gives good stable results, excepting the three-valve dual set which I described in the April issue of

*Modern Wireless*, and which may be adapted to be used as a two valve reflex set.

**Stable Working**

The use of constant aerial tuning, the value of the condenser across the secondary of the intervalve low-frequency transformer, the use of separate H.T. voltages (tapped off the same high-tension battery) all contribute to the efficient working of the set without buzzing. Another very important point is the low-frequency transformer and the method of connecting it. Other types of transformer may be used than the one mentioned, but some experiment may be necessary to find out which way round the primary and secondary terminals should be connected to give stable results. In the present case if the primary windings were reversed the set would undoubtedly buzz very readily, and this fact was found out during the construction of the set. In its present form, however, perfectly stable results are obtainable without buzzing.

The notes regarding the reaction coil which are given in the table

**TESTS ON THE "TWIN-VALVE" REFLEX SET CARRIED OUT AT BEDFORD.**

Station and Wavelength.	Name and Distance.	Aerial Condenser.	H-F Transformer Condenser.	Reaction Coil.	Results.
2 LO ... 365 metres	London ... 50 miles	57°	13°	Reversed No. 35 or shorted.	Very good loud-speaker results.
6 BM ... 385 metres	Bournemouth ... 110 miles	70°	15°	Loose-coupled No. 35 reversed.	Good loud-speaker results.
5 SC ... 420 metres	Glasgow ... 300 miles	78°	22°	Shorted.	Moderate loud-speaker results.
5 IT ... 475 metres	Birmingham ... 65 miles	90°	29°	Shorted.	Very good loud-speaker results.

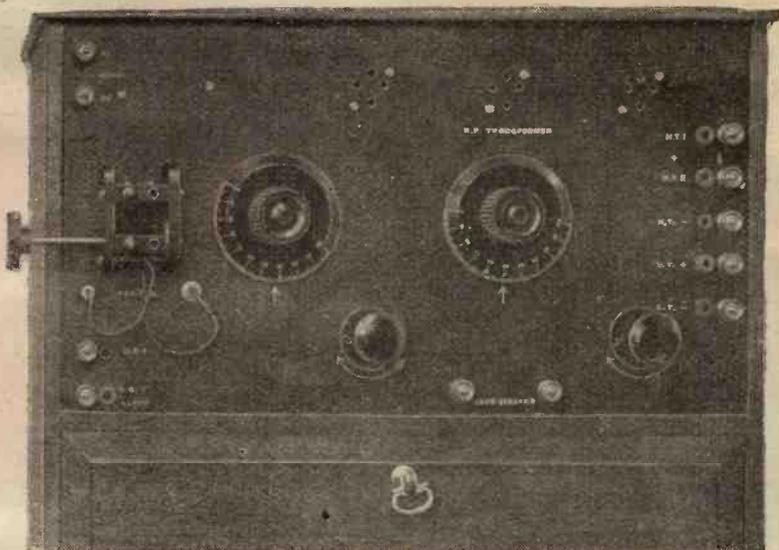


Fig. 4.—A view of the receiver with coils and valves removed.

do not necessarily apply to all conditions, as different changes in components and different aerials would modify the conditions, and the experimenter should try shorting the reaction coil socket, and also inserting a reaction coil and reversing the leads going to it.

#### Separate H.T. Important

As the four-valve T.A.T. receiver, as described in the Christmas Number of *Modern Wireless*, was being tested at the same time, there was not very much opportunity of extending the list of stations heard, but the possibilities of the set are indicated by the list of results given.

Adjusting the high-tension voltage is a point which must not be overlooked by the experimenter, who should, under no circumstances, connect the two H.T. terminals together, and work the valves off the same high-tension voltage. In all cases the anode voltage of the second valve should be less than that of the first, at least, this is my experience, and most constructors of this set will find that this is a safe rule to follow.

#### The Layout

Fig. 1 is a photograph of the completed instrument with valves and coils in position. Four terminals may be seen on the left of the panel, these being marked A1, A2, G.B. +, and G.B. - Farth, reading from the top. On the same side of the panel may be seen a two-coil holder, by means of which variable coupling between the two coils mounted in its sockets is possible. Provision is made for reversing the connections to the moving coil by

means of two Clix terminals seen below the coil holder.

The valves with the plug-in H.F. transformer between them are seen at the top of the panel, and below these may be seen the knobs controlling two variable condensers. The two knobs near the lower edge of the panel are those controlling the filament brilliancy of the valves, and the two terminals between them are for the telephones or loud-speaker.

The high-tension and low-tension battery terminals are placed in a row on the right-hand side of the panel, and reading from the top are, H.T. +1, H.T. +2, H.T. -, L.T. + and L.T. -. A small distance to the left of these terminals,

holes are drilled in the panel through which rubber-covered leads are taken from the terminals to the batteries which are used within the cabinet. With this arrangement the receiver presents a very handsome appearance, requiring no outside connections to batteries which do not generally synchronise with their surroundings. Apart from considerations of appearance, however there is no objection to placing the batteries outside the receiver should the constructor so wish, and this, in fact, is preferable if an accumulator is to be used for filament heating.

#### The Circuit Arrangement

A diagram of the circuit of the receiver is given in Fig. 2. The aerial is tuned by the coil  $L_1$  and variable condenser  $C_1$  of  $0.0005\mu\text{F}$  maximum capacity, the high frequency oscillations in  $L_1$   $C_1$  being applied to the grid of the valve  $V_1$ , which acts as a high-frequency amplifier. In the anode circuit of this valve is the primary winding  $L_2$  of the high-frequency transformer  $L_2$   $L_3$ , and the telephones shunted by the fixed bypass condenser  $C_5$  of  $0.002\mu\text{F}$  capacity.

The high-frequency variations across  $L_2$  are transferred to  $L_3$ , which is tuned by  $C_3$  of  $0.0003\mu\text{F}$ , and are impressed upon the grid of  $V_2$  which acts as a detector. The grid-leak  $R_3$  has a resistance of 2 megohms, while  $C_4$  has a capacity of  $0.0003\mu\text{F}$ .

Reaction is obtained by coupling  $L_4$  in the anode circuit of  $V_2$  to  $L_1$  in the aerial circuit. The primary winding  $T_1$  of the low-frequency

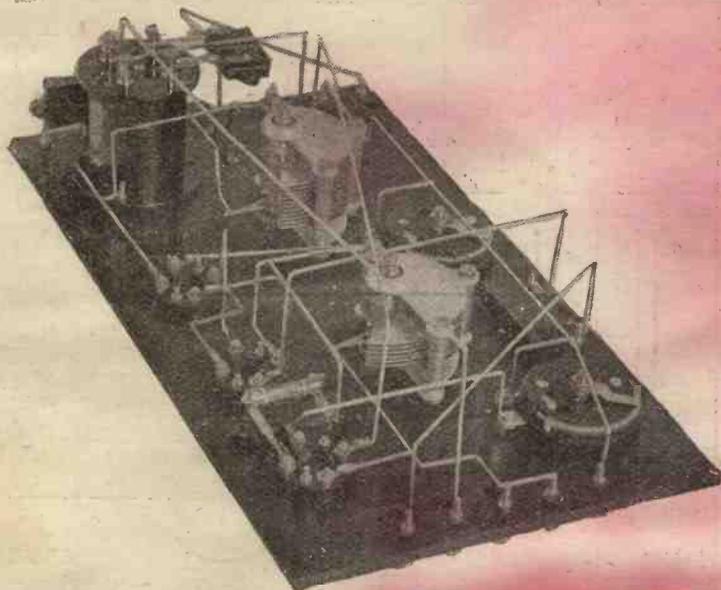


Fig. 5.—This under-panel view shows simplicity of the wiring.



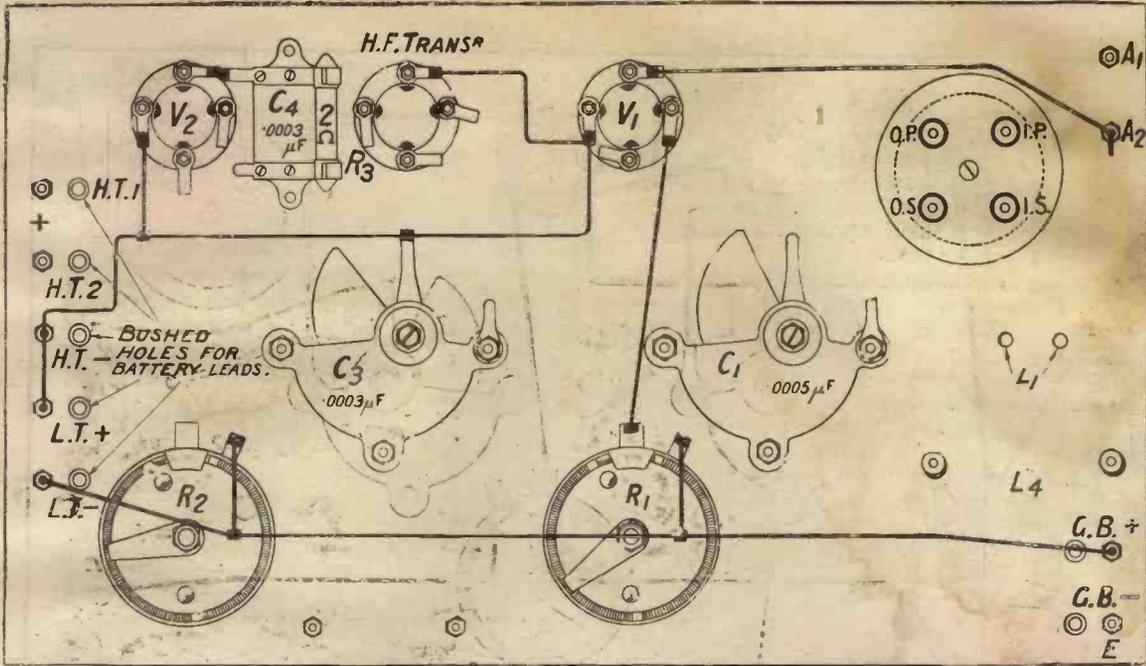


Fig. 8.—The first stage in wiring up is shown above. These are the connections that are nearest to the panel.

The drilling diagram is shown in Fig. 7, which gives all the necessary measurements for finding the positions of the holes to be drilled, and also gives a clear idea as to the layout of the components.

It is a good plan to have all components at hand before drilling the panel, as it is then easy to determine the correct sizes for the various holes.

Many readers prefer to work from a full-size blue print, and this is obtainable from the Sales Department of Radio Press, Ltd., price 1s. 6d. post free. Blue Print No. C 1004 A should be quoted.

**Mounting the Components**

Having drilled the panel, the mounting of the components may be commenced, reference being

made to the photographs and diagrams if in doubt over any point. The fixed condensers are not placed in position until the wiring-up stage is reached.

**Wiring**

A full-size blue print, showing the whole of the wiring of the receiver is presented free with this issue, and is so clear that it should

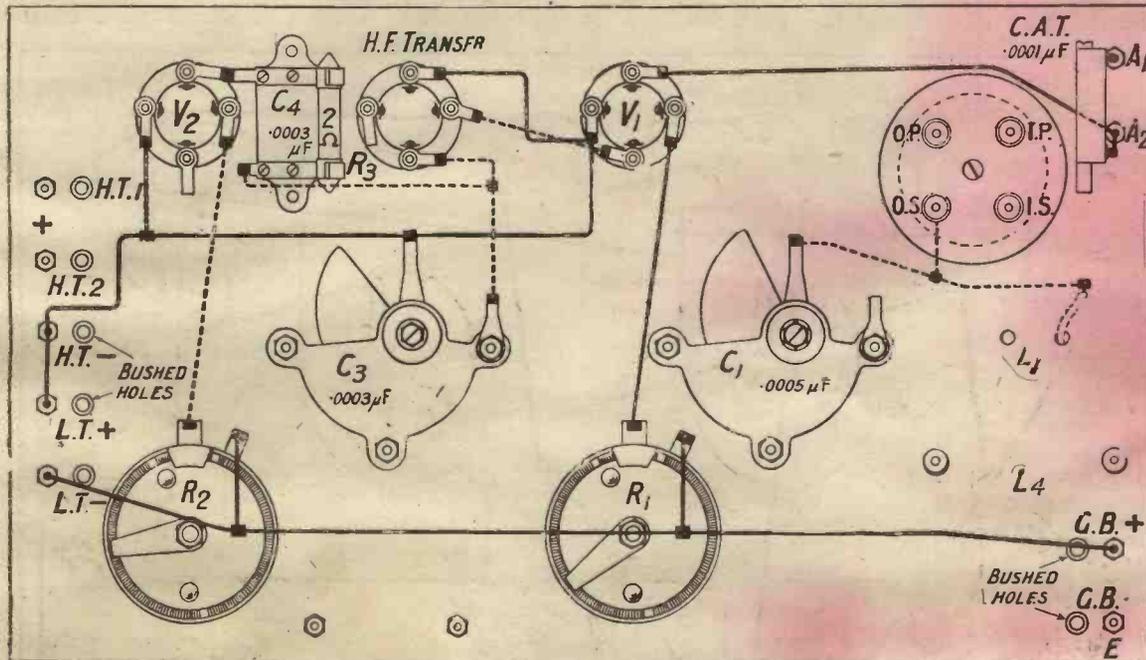
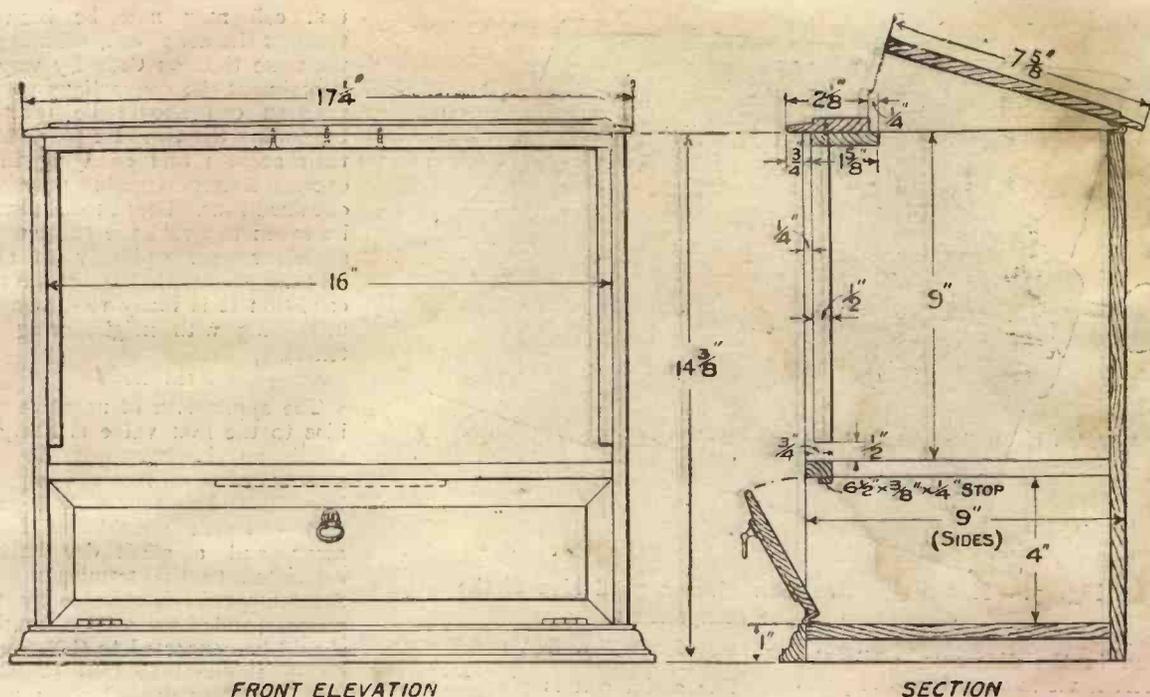


Fig. 9.—The next set of connections that go just above those first made are shown as dotted lines.





NOTE: - ALL WOOD  $\frac{3}{8}$ " THICK UNLESS OTHERWISE MARKED.

Fig. 12.—This shows the construction of the cabinet together with all necessary dimensions.

dashes, and this merely implies that it is the topmost wire of all. The inclusion of this wire and the other dotted connections, and the condensers  $C_2$  and  $C_3$ , concludes the wiring.

An entirely new departure has been made in the wiring diagrams. The usual symbols indicating "no connection" where lines cross, have been omitted, and at each point where a join occurs, this is indicated by a distinct black mark (generally a square).

In following the diagrams, therefore, it must be remembered that joins are to be made *only* where indicated by a black mark. Where wires cross without being joined together they are shown exactly as they appear upon looking down on the actual set.

It is considered probable that readers will prefer this to the more usual method of drawing semi-

circles all over the diagram, and reports on the subject will be welcome, as these will decide its continuance or otherwise.

The value of each fixed condenser is clearly marked, and the method of mounting them is also obvious. The stiff wiring and good soldered joints supply adequate support for these light components.

Two rubber-covered flexible leads are seen passing through two holes in the panel, and are connected on the other side to the screw terminals on the fixed socket of the two-coil holder, as shown in Fig. 7. In the same figure are seen the connections from the moving socket to the Clix plugs.

**H.F. Transformer Connections**

It is an unfortunate fact that different manufacturers of high-frequency plug-in transformers have not agreed upon a standard method

of making the connections to the four pins which plug into an ordinary valve socket. In some cases the "filament" pins form the ends of the primary winding, while in other cases the secondary winding is connected across the same pins. The H.F. transformer mentioned in the components list, is suitable for use with the receiver, as are those of McMichael and Bowyer-Lowe.

**The Cabinet**

In many cases the reader will prefer to purchase this ready-made, many dealers being willing to undertake this work.

For the benefit of those who wish to construct the cabinet themselves, however, special diagrams have been prepared, and are seen in Fig. 12. No directions as to the constructional work are required, all the necessary dimensions being

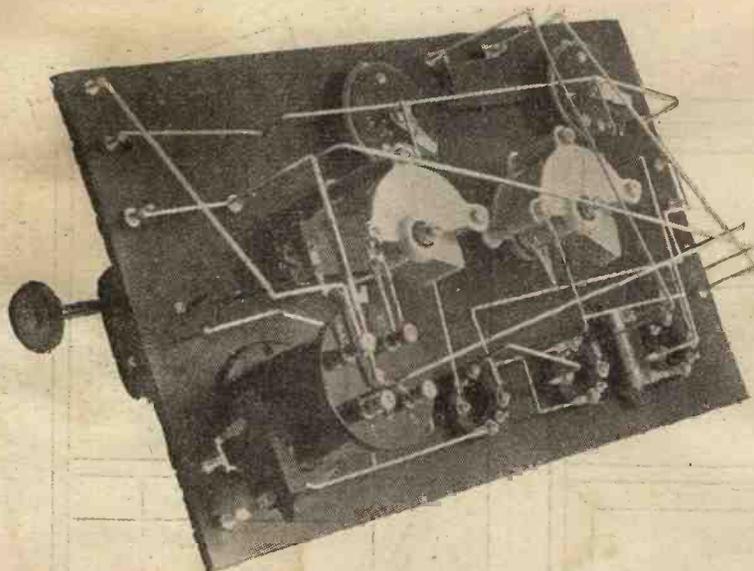


Fig. 3.—This perspective view gives a good idea of the disposition of the components.

given in the diagrams, while the different views show how the parts are arranged. An excellent idea as to the appearance of the finished cabinet may be gathered from the photograph in Fig. 1. The small door in the front of the cabinet opens to admit insertion and periodic inspection of the battery or batteries. The two hinges provided for this purpose may be seen on the lower edge of the door.

#### Connecting the Batteries

The various accessories may now be fitted to the set in preparation for working. The batteries, as previously mentioned, may be placed either outside or inside the receiver; in the latter case the wires from the battery terminals pass through the bushed holes in the panel, and are then connected to their respective batteries.

For the sake of simplicity when first working, the two terminals G.B.+ and G.B.—Earth may be connected together with a piece of wire. The valves and H.F. transformer may now be inserted (the latter in middle holder), the rheostats having first been turned to the "off" position. It may also save much mortification if an inspection of the battery connections is made before switching on the current by means of the rheostats. With the aid of these, the valves should be given a suitable brilliancy.

As regards the voltages applied to H.T.+1 and H.T.+2, the directions given by the makers of the valves used should be observed. In general, however, 40-50 volts for H.T.+2 and 70-90 volts for H.T.+1 is quite suitable.

#### Coils

The aerial coil is placed in the fixed socket of the two coil holder, and the reaction coil in the moving socket.

Using constant aerial tuning, the following sizes of aerial coils for the broadcast wavelengths will be correct. For the wavelengths below 420 metres a No. 50 coil should be used, while for those above 420 metres a No. 75 coil is more suitable. Different sizes should always be tried for the reaction socket. The plug-in transformer should be of a size suitable for covering the broadcast range.

If ordinary parallel tuning is employed, Nos. 35 and 50 should be tried for the aerial coil, while the H.F. transformer should be as before.

Parallel tuning should be used if it is desired to tune in Chelmsford. A No. 150 coil will be required in the aerial socket, while different sizes of reaction coil should again be tried. The H.F. transformer must, of course, be replaced by one of suitable size. It may be possible to tune in Chelmsford with a No. 200 coil in the aerial socket, in which case slightly better results may be obtained.

#### Operating the Receiver

Having inserted the correct coils and transformers, and connected the telephones to the receiver, tuning may be commenced. The coils should be placed at right angles to each other, and the dials of the two variable condensers adjusted until signals are received at maximum strength. The reac-

tion coil may now be brought towards the aerial coil, retuning at the same time on Cr. By way of experiment the connections to the reaction coil should be reversed by pulling the two Clix plugs from their sockets and changing them over. Better results may be obtained thus. Care should always be taken to avoid the point where signals appear suddenly to alter in tone, for with the set in this condition it is likely that you are interfering with neighbouring listeners.

#### Grid Bias

The application of negative grid bias to the first valve is likely to effect an improvement in the quality of the received signals. The link between G.B.+ and G.B.—Earth should be taken away, and a small dry battery connected to the terminals. A flashlamp refill is suitable for this purpose, and of course its — terminal should be connected to G.B.— and its + terminal to G.B.+ Grid bias is always needed when using high voltages in the plates circuits of note magnifying valves.

If it is finally decided that the grid biasing battery is unnecessary, it may be taken away and G.B.+ and G.B.—shorted as before. But if, on the other hand, a noticeable improvement in quality results, the battery may be placed inside the cabinet and leads taken to G.B.— and G.B.+ , as in the case of the H.T. and L.T. batteries.

## Important Announcement.

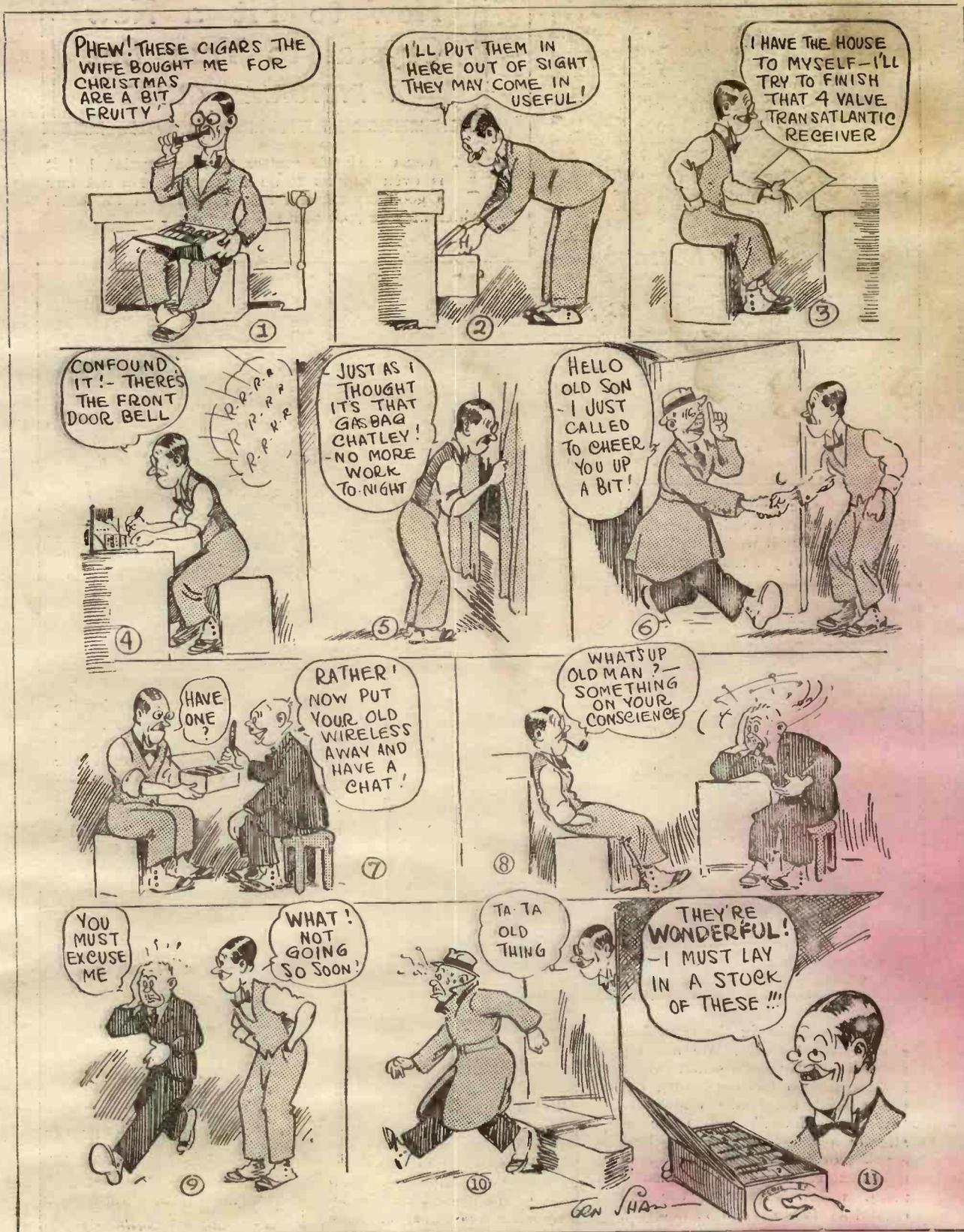
*Do not delay placing your order for the next issue of THE WIRELESS CONSTRUCTOR, which will be*

### Greatly Enlarged.

*New Sets.  
Special Articles.  
New Features.  
Free Blueprint.*

*Place your order early or you will be disappointed. Thousands of people were unable to purchase the previous issues, which were sold out immediately on publication.*

# "IT'S AN ILL WEED THAT BRINGS NOBODY GOOD"

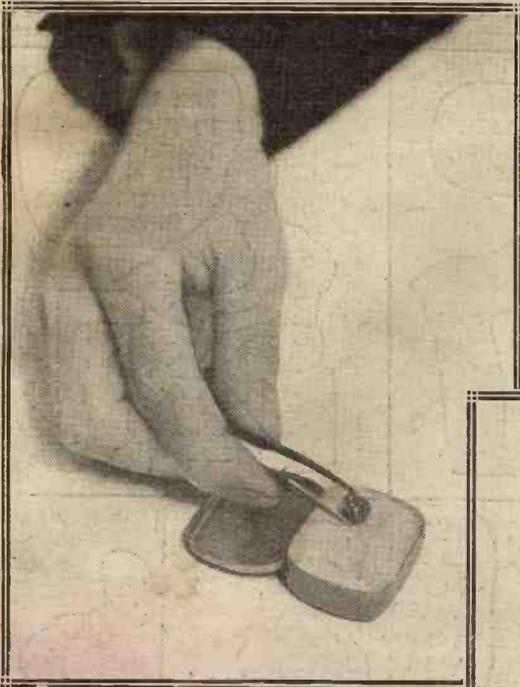


Every wireless experimenter should keep a box of "Flor de Pest's" handy

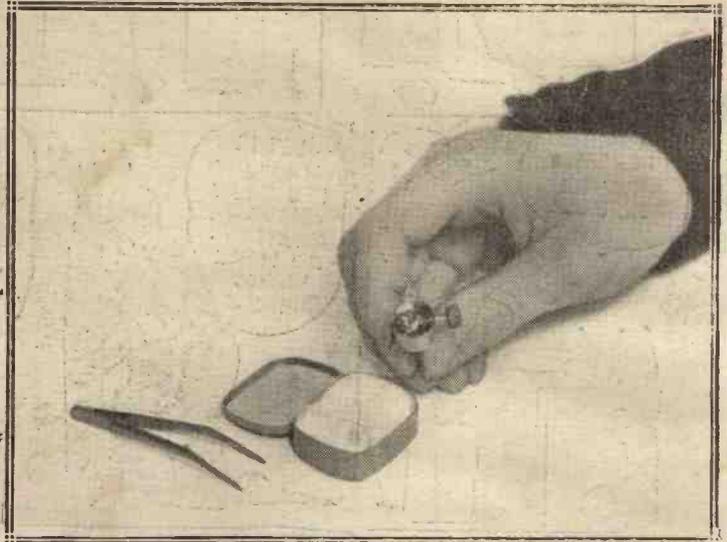
## How to Fit a New Crystal to Your Set

### A PICTORIAL GUIDE

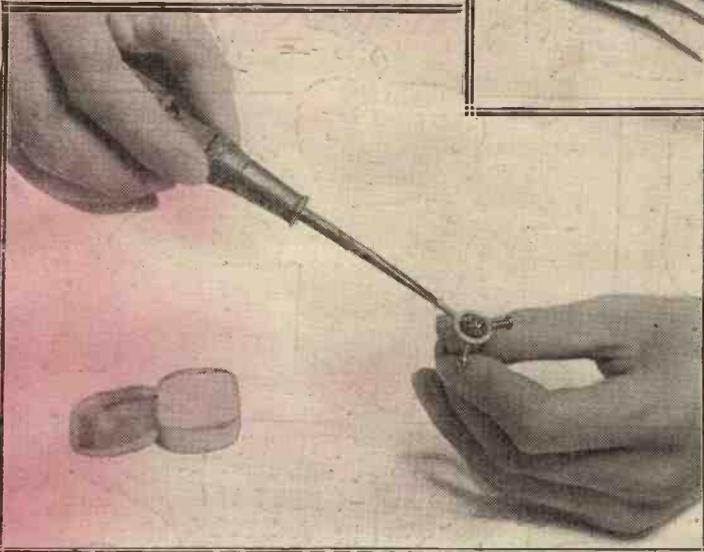
**I**T seems a simple matter to fit a crystal, but it is even simpler to do it wrongly. Do not buy a good crystal and then condemn it for faults which may be your own!



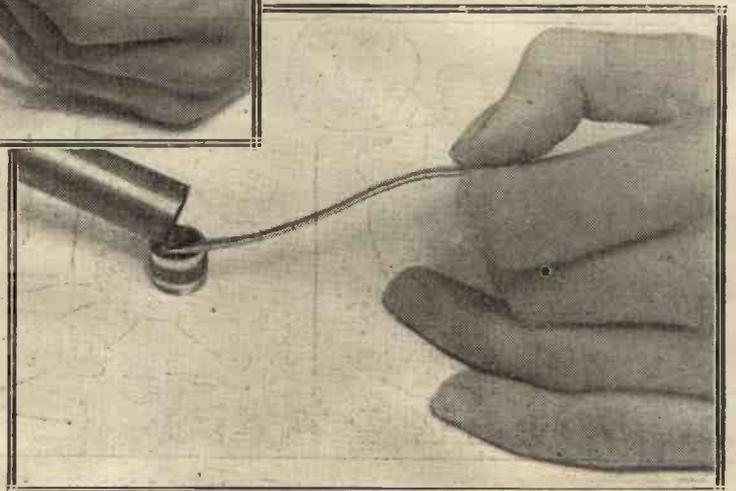
Carefully remove the crystal from its box with a pair of tweezers. Avoid touching it with your fingers, as the sensitivity is easily spoiled.

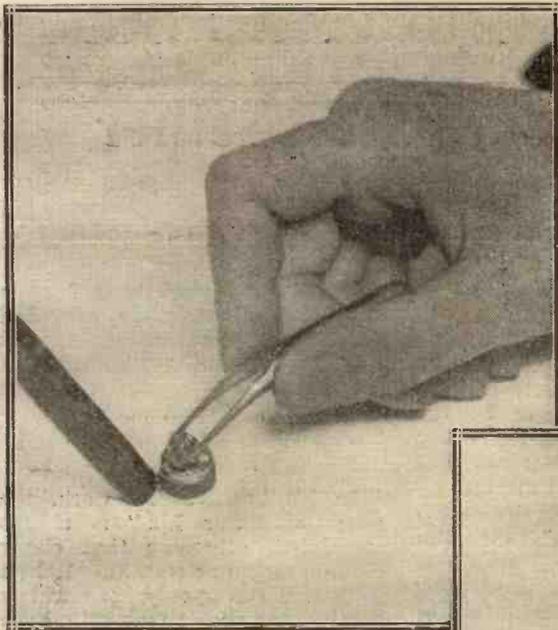


This form of spring cup grips the crystal without the use of fusible metal. In such cups it is advisable to wrap the crystal, except the surface to be exposed to the cat-whisker, in tinfoil, such as that found in cigarette or chocolate boxes. The same remark applies to the screw cup shown on the left.



If you wish to fix the crystal in a cup with "solder," do not use the ordinary tinman's solder (which has too high a melting-point), but the special substance known as "Wood's Metal." If there is already a crystal in the cup, heat a poker or soldering iron and hold it against the cup until the fusible metal melts. Remove the old crystal with a pin. If it is a new cup, melt the Wood's metal into the cup with the aid of the poker as shown.



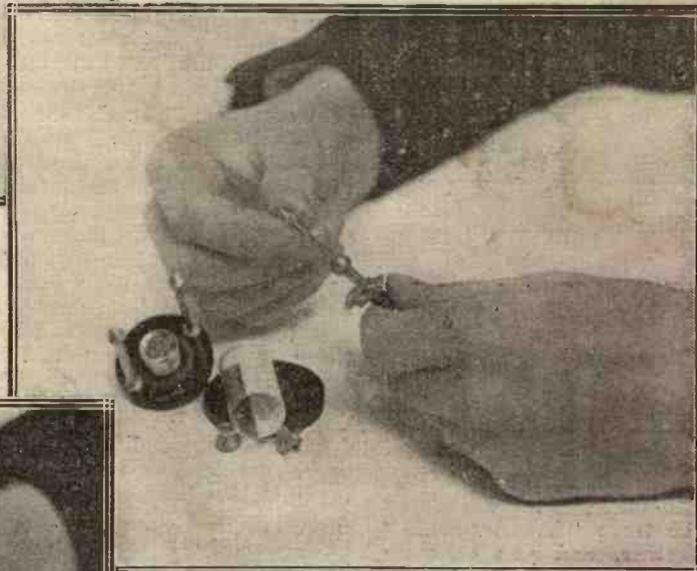


The next step is to let the metal cool down until it is solid. Now apply heat again until the metal just melts. Press the new crystal into place with the tweezers, and remove the hot poker.

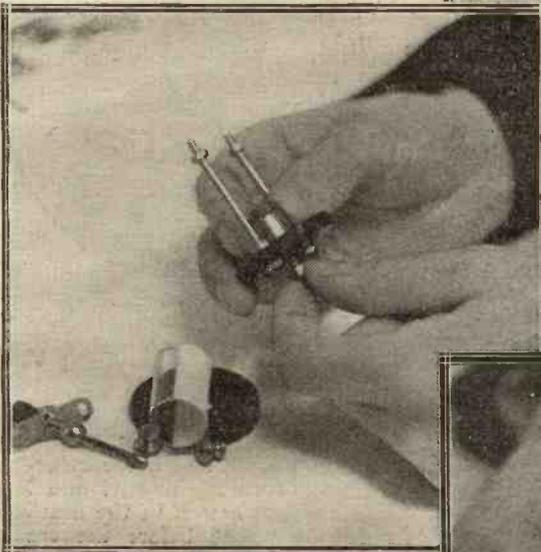
In this way you will avoid over-heating the crystal, and thus spoiling the sensitivity. Holding the cup in a wet cloth (keeping the cloth away from the surface of the crystal) will cool it down quickly.

It is now possible to obtain certain substances ("plastic metals") which will hold the crystal with only a slight warming. Some are excellent, but those which contain mercury should be avoided.

Nowadays catwhiskers are supplied in almost every crystal box. Most detectors hold the catwhisker in a kind of screw grip, so there is no trouble in fitting this part.



Some little attention is required in reassembly, so as to avoid touching the crystal surface. Be careful not to bend the catwhisker wire or to scratch it roughly on the surface of the crystal.



Our last photograph shows you how *not* to do it. The human skin has a thin oily coating, which will deposit itself on the crystal if touched. This greasy coating will render the best crystal insensitive, and is difficult to remove, without injuring the crystal. A wash with pure alcohol will sometimes do it. Carbon di-sulphide has also been recommended. Do not use petrol as it leaves a slight greasy film.





Miss Violet Stevens.

LONDON Station calling the British Isles. Our next item will be by Mr. Blank, who will entertain you."

A little chill always seems to descend upon one after that announcement, especially when you've gathered that select little party of relatives, including the "maiden-uncle," more fidgety than the three "bachelor-aunts" put together, and you offer up secret prayers that Mr. Blank really will "entertain" you.

#### Microphone Fright

But that is probably nothing compared to the feeling which inspires Mr. Blank himself, however famous an artist, when faced with "a round hole on a sponge," as one described it, and asked to make thousands of invisible people



"The Londoners" Concert Party are well-known broadcasters.

## Humorists of the Aether

By "CARRIER-WAVE"

laugh, hundreds of miles away, and be unable to gauge his success.

Bereft of facial gesture, "make-up," "props," scenery, the close contact of the audience, and all the familiar atmosphere of the theatre, is it any wonder that many a would-be micro-comedian has literally fled the scene in dismay?

No one has recognised the magnitude of their task in this direction more than the B.B.C. itself, as well as the public, and both have waited patiently for the advent of a really "funny" man, capable of sending laughter-laden aether waves throughout the world. Gradually, however, a clever little band of entertainers have been found, the first to become a household word being "John Henry" and his "Stern-half" Blossom.

#### John Henry

Their domestic differences have probably helped to cheer and unite innumerable households, for it's a funny thing, you know, but nothing stops a quarrel quicker than hearing or seeing two other people fighting like the proverbial Kilkenny Cats.

Like many other of the entertainers, he came to us via the medium of the war, for it was owing to his experiences after joining up in 1914, up and down the line, dodging bombs and bullets, that brought "John Henry" to the front, in both senses of the

word. So successful indeed were his songs and patter that he was withdrawn to form a Divisional Concert Party, and this afterwards performed in London at the big theatres; but when the slump came in things theatrical, "John Henry" dropped his stage name and adopted this one, now so familiar to us. He says himself "he has done most

things for a living, trained as a reporter, he has written, travelled all over the world, speaks enough languages to quell even Blossom if he dare, has appeared before Royalty, and become the best-known comedian in London."

#### "Our Liz"

In his broadcasting work, the name of "Our Liz" is always associated, otherwise that clever Shakespearean actress, Miss Helena Millais. Hearing only her Cockney studies, few people realise that she



"John Henry."

has made one of the finest Katherines in "The Taming of the Shrew," as well as other of the Bard's works, and in lighter work has played at the Palace, Alhambra, Queen's Hall, and every other big house of entertainment, and long established herself in the hearts of a wide public before the era of broadcasting.

#### "Wireless Willie"

Of the value of "Wireless Willie," the name by which Mr. Willie Rouse has made himself famous "over the aether," there is little need to speak. He was an ideal chairman for the "Veterans' Varieties" and "Old Memories" programmes, and only to hear him pronounce the names of his artists is a cause for laughter in itself. He is widely known for his powers as an entertainer throughout the country, and also

Introducing "The Wireless Constructor" readers to some of the artists whose witticisms are such a welcome feature in the programmes

for his concert parties, in which he is sure to include a Scottish member, thereby showing his wisdom. As a matter of fact and experience, it is the Scottish entertainer that is your true humorist, but it is his dry, pawky wit, without the "slapstick" or "grinning through a horse collar" variety that adds additional value, and consequently broadcasting suits the Scottish humorist right well, and both Hector Gordon and Syd Mac are excellent examples. Of



Mr. Willie Rouse.  
("Wireless Willie.")

this Mr. Rouse is well aware, but with his own work at all stations "Wireless Willie" gets (dare I say a rous-ing—no, better not), well, a warm welcome not only from his unseen audience, as testified subsequently by letters, but the actual members in the studio, for they, too are assured of an evening's entertainment.

Jaye Kay

On the ever-welcome actor "Jaye Kay" has surely fallen the mantle of Dan Leno, for no other actor has, to my knowledge, succeeded in actually reproducing every shade and turn of that comedian's voice. To hear him "Buying a House" is to be carried back to the dear old Tivoli days, when Dan himself burlesqued that popular song, "Queen of My Heart," then being sung by Hayden Coffin in "Dorothy," with "I'll Give Him

Beans To-night," while his "Minstrel Boy" was another gem that might well be included in Mr. Kay's repertoire.

In the Blood

The theatre may be said to be veritably in his blood, for he is a son of the late Edward Sanson, who was for so many years adviser to George Edwards at the old Gaiety, and Sir Augustus Harris at "The Lane." Though intended for a commercial life, Jaye Kay took to the stage like the proverbial duck to water, and he has toured every variety house worthy of the name in the kingdom. Though a masterpiece at "make-up," he has the faculty of being able to hold his audience by sheer force of wit.

Concert Parties

Concert parties make very good items for most broadcasting programmes, and the most popular is the body of ex-soldiers known as "The Roosters," as their choice again for "Armistice Night" testified. For their origin, perhaps I may be allowed to quote their own slogan:

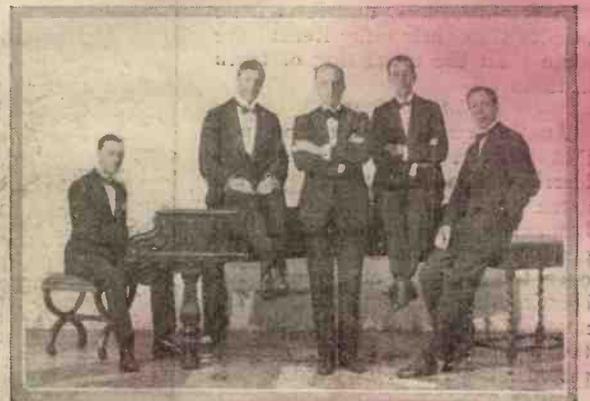
"At the foot of Olympus, which rises unmatched  
'Midst the Thracian hills, the Roosters were hatched."

As a matter of fact, they "hatched out" at Salonica in 1917, when at Summerhill Camp reinforcements were wearily waiting to be sent up the line. Time hung heavy on the hands of the 60th London Division, and was aggravated rather than relieved by "fatigues" and "refresher class." Mails and "sing-songs" were the only events of interest, till at last Lieutenant Warren conceived the idea of forming a Divisional



Mr. Louis Hertel.

Concert Party and brought it to the notice of Camp Commander Captain Roose. So in March we find our Roosters, taking their name in gratitude to the C.C., making their wardrobe from "derelict" regimentals, getting curls for the "girls" (I wish you could see "Kitty," otherwise George Western) from the tails of the mules, and their dresses from dyed mosquito netting. With over three hundred performances throughout the seat of war, and a hundred in London, including Æolian Hall, not counting all their broadcasting concerts, we feel sure that the Roosters still regard their Christmas in Palestine, 1917-18, as their most triumphant, if trying, success. Here, despite the fact that they had to resume active soldiering, being detailed to guard the dumps at Shellal, they spent every spare moment rehearsing



An Ensemble of The Roosters Concert Party.

"Cinderella," or "The Army Boot," and, by the time they arrived with the victorious troops in Jerusalem, their show was ready. But after a ninety-six-mile trek in five days, during incessant rain and with short rations, you may imagine, as they say themselves, it was far from being Jerusalem the Golden. Christmas in a city skinned of food by the Turk resolved itself into a dinner of bully beef, stew and biscuits, with tea minus milk and sugar. Their opening night was before a famous regiment quartered in Abram's Vineyard, and under orders for active service that same night at any minute.

They dressed on piled-up cases of Lewis-gun ammunition, whilst the men were being served with "120 rounds" and "iron rations." Their audience sat on their equipment,



Mr. Norman Long.

ready, should orders come through, and the Roosters admit that they had their fight, too, to make the grim, silent men forget the grim panoply of war if only for an hour. Four items went without a smile, the fifth "hit home," and after that "we got them going" and finished to roars of laughter. Many and interesting are the Roosters' own reminiscences, and it is little wonder that their army items have more than the usual ring of truth in them.

**The Londoners**

Another capable concert party is that formed under Mr. Charles Harris, "The Londoners." As the name implies, its members are all London artists coming from the great concert halls and touring over the country and round the broadcasting stations. They are much in demand at the big seaside towns and booked up for lengthy periods. "The Moonstones" is another popular little band.

Here again all their work is written by Mr. Rickards himself,



Mr. Jaye Kay.

and he works in conjunction with Mr. Ernest Sewell, and they are well known at the Palladium, the Alhambra, Queen's Hall, and the other big concert halls. Over the ether they have proved exceedingly popular, and Mr. Rickards sprung a new joke on us last week in attaching the order of O.B.E. to a man because he Owed Bills Every-where. There have been possibly worse reasons than that.

**Norman Long**

Mr. Norman Long is really one of the oldest of the radio entertainers, for he commenced as far back as the Marconi House concerts. It is always a pity that you can't see Mr. Long, as well as hear him, for his laughing eyes and cheery smile are valuable assets in themselves, and when he starts off, "Will any lady or gentleman in the audience kindly step up and select a card from this pack—



Miss Helena Millais.

perhaps that gentleman in Mer-ton?—" there are many listeners-in who feel inclined to follow his advice and "take that No. 67 at the corner."

Mr. Long was one of the first to realise the needs of radio humour. With a wide concert hall experience, he "fell into line" almost immediately, but even he admits to that "little cold feeling down the spine" when he faces that "hole."

**Louis Hertel**

The work of Louis Hertel is another tribute to humour at its best. Widely known all over the country, Mr. Hertel is also one of the finest conjurers and prestidigitateurs in the kingdom, but he was quick also to see that the old-time brands of humour were useless for broadcasting purposes. His ability to produce rabbits from the

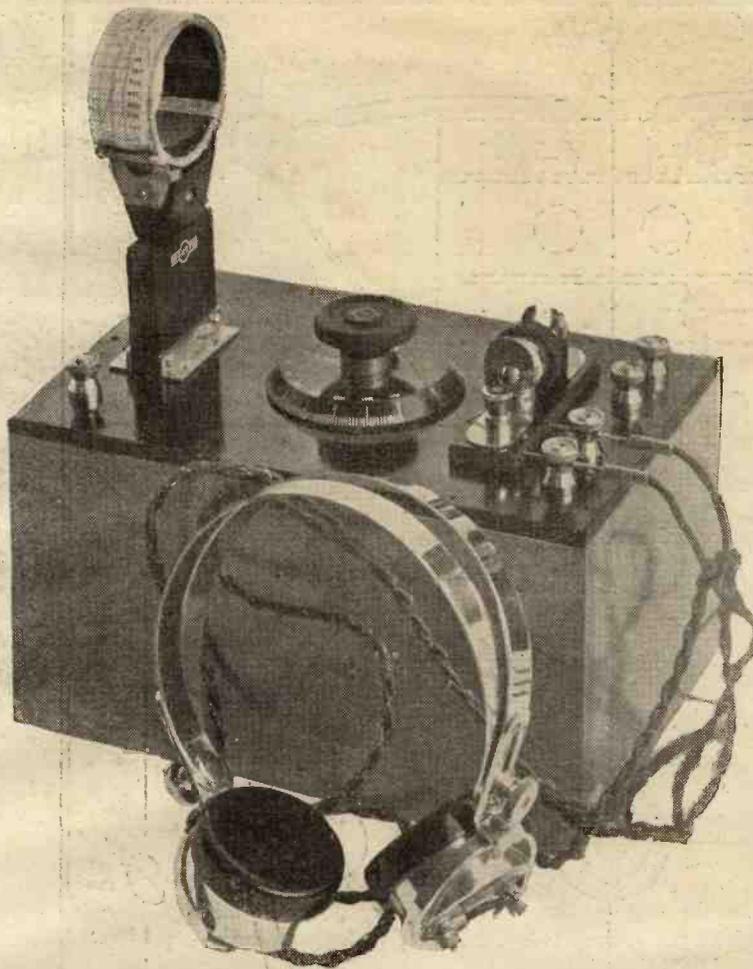


Mr. Jack Rickards.

air, or the cleverest of card tricks, were useless, so he revived his gift for character studies, and right well has he scored.

**A Growing Band**

These are but a few of the clever entertainers who have been recruited into radio service. An ever-growing band includes also Nelson Jackson, Foden Williams, the super-banjoists Olly Oakley and Will Van Allen, who held the Alhambra for months on end as "The Musical Tramp," Charles Coborn, with those "Two Lovely Black Eyes" in umpteen languages, to say nothing of "The Man Who Broke the Bank," whilst among the ladies are also Gladys Merridew, for those who like child imitations, Wish Wynne, and the cleverest star imitator on the stage, Ray Wallace. Of all the items in the programmes, humour is the most important, given a good entertainer, some music and a song, and we rather think the "talks" would invariably "go to the wall."



The receiver uses a plug-in coil and tunes with a variable condenser.

A FRIEND came to me the other day and said, "I have just heard of a new crystal detector, which seems wrong in theory, but works quite satisfactorily."

My interest was aroused at once, and the detector had to be investigated. Certainly when drawn out on paper it did not look as if it would work properly. It consisted of a cartridge-shaped container supported between two spring clips on an insulating base, terminals being attached to the two clips. The cartridge when examined was found to consist of two metal end-pieces, separated from one another by an ebonite ring. Each metal end-piece made contact with its own spring clip.

It was an easy matter to remove the cartridge from its clips, whereupon the end-pieces fell away, revealing a piece of crystal. The crystal was not connected to either end-piece, but simply lay inside the cavity. Round the inner edge of each of the two end-pieces were a number of sharp points, and it so

happens that the crystal must rest on points at each end of the chamber. A moment's consideration will show that one set of points is connected to one terminal, and the other set to the other

## A Fool-Proof Crystal Set

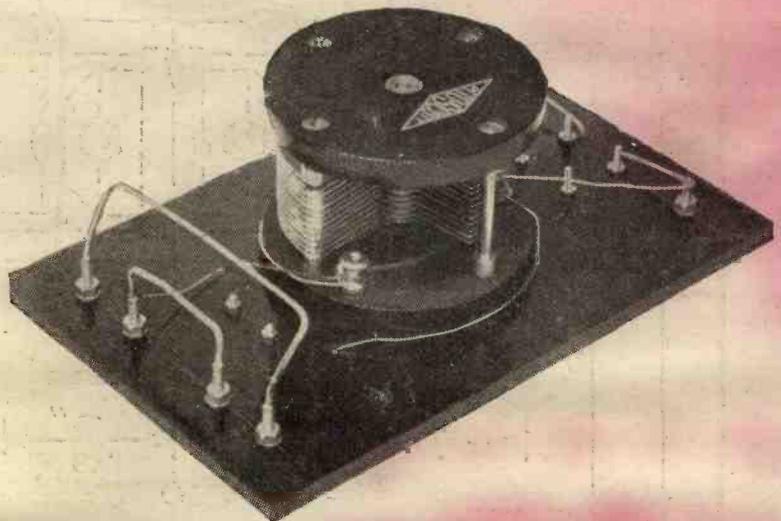
By PERCY W. HARRIS,  
Editor

*Have you ever wanted to possess a Crystal Set which would be fool-proof—no bothering about cat whisker adjustments? Have you ever been intrigued by advertisements of new crystals which you want to try without spoiling your present crystal? Would you like to change from one crystal to another in a moment? If so, this article will interest you.*

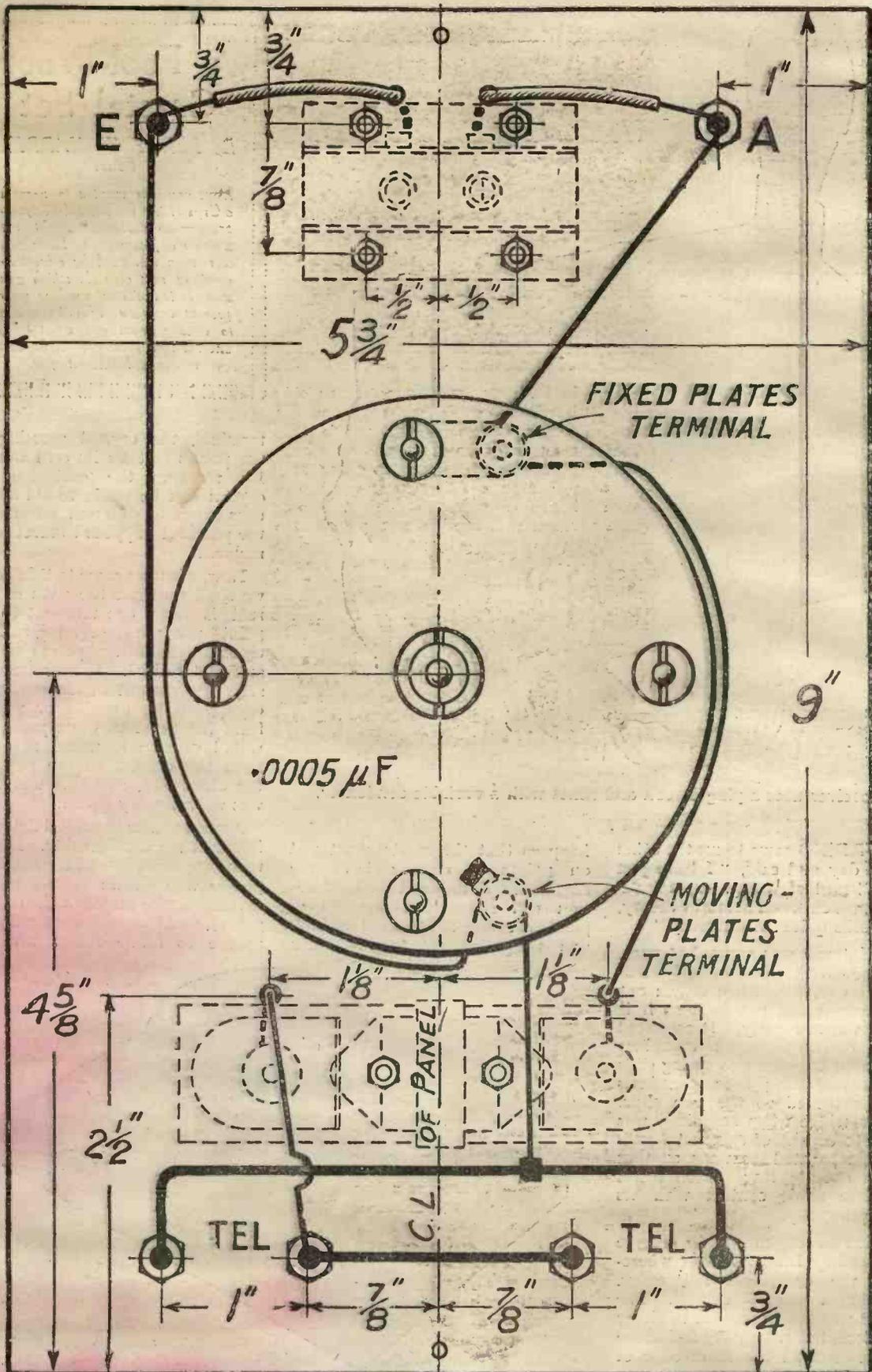
terminal, the crystal pressing on the points just by its own weight. By rotating the cartridge the crystal can be made to fall about, thus exposing different surfaces to the points it happens to meet at the moment.

Now, when we come to think of it, we shall see that the path of current is from one terminal to the points, through the crystal, and out through the other points to the second terminal. If now we consider the current in the particular crystal to be capable of passing from the point to the crystal, one would assume it would not pass from the crystal to the point at the other end, and this was what was worrying my friend.

Anything new in crystal detectors interests me considerably. I know there are hundreds of thousands of people who obtain their evening's amusement by means of the humble galena, and I know it is only human nature to fiddle round with cat



The back of panel arrangement is very simple.



A full size back of panel wiring diagram and drilling chart of the receiver. Viewed from the back, the left hand upper terminal is "Earth" and the right "Aerial." The front terminals are for telephones. One or two pairs may be used as desired.

whiskers and contacts. Consequently I went straight home and built the complete receiver shown in the photograph, just for the purpose of trying the detector under practical working conditions. The circuit is quite conventional.

It is not necessary to wind any special coils; all you need to do is to obtain a socket, mount it on a panel, and then plug in one of the many available types of inductance coils sold for the broadcast band. A number 35 or 50 will do—a 35 for waves between Cardiff and Glasgow, and a 50 for those beyond. For Chelmsford a No. 150 will be needed. Tuning is effected by a variable condenser of good quality, and there are a couple of pairs of terminals for telephone head-piece connections.

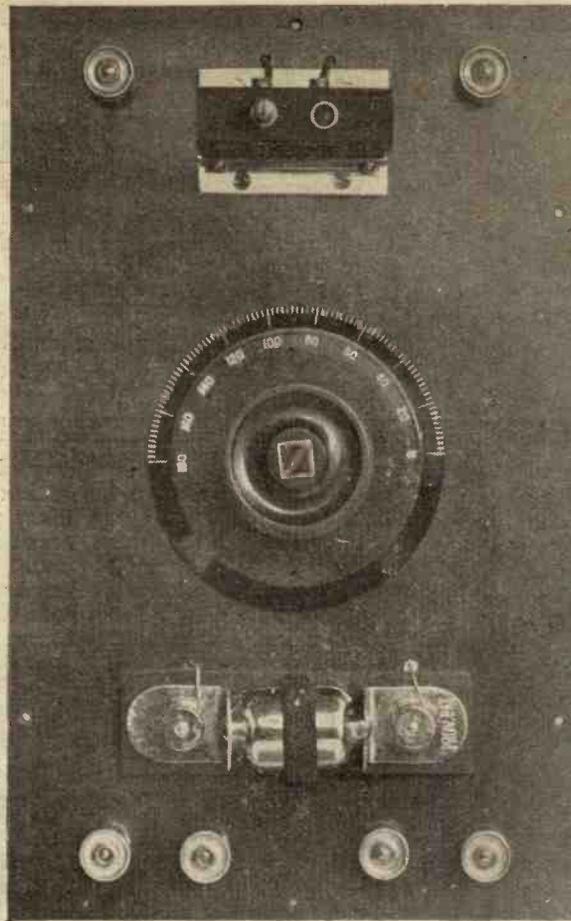
It did not take me long to finish, and I thereupon began a fascinating little series of experiments. How many sensitive points should I find? Would they all be fairly good, or should I only find an occasional good spot by rotating the little cylinder? How would the different makes of crystal compare with one another? An aerial and the Savoy band were pressed into service, and a pair

of 'phones connected up. Almost immediately I heard music.

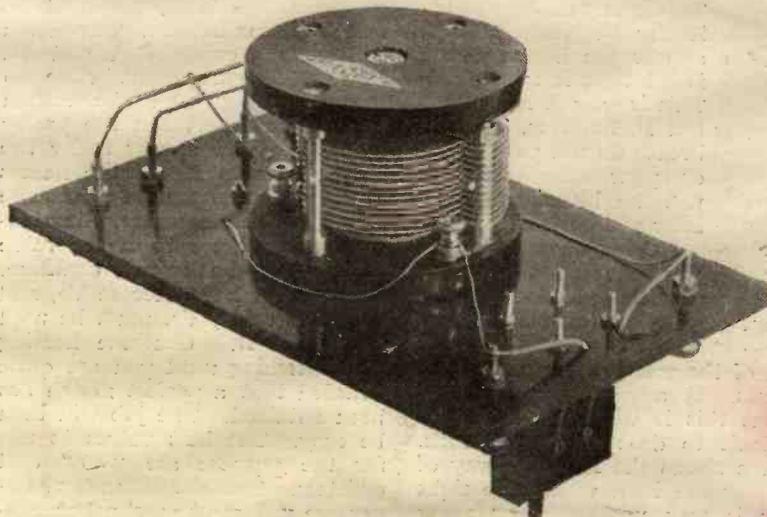
Yes, there were plenty of good places, although sometimes I had

now sold), a "Gravity" crystal detector, six terminals, a suitable box, a pair of 4,000 ohm telephones, and some wire for wiring up. The Gravity crystal detector is fastened on a little ebonite base, and has two holes by which it can be secured to the panel. Two small holes are made at the side of this detector to bring up the leads from underneath the panel. The other components are quite easily mounted, and as I have given a full detailed drawing with measurements and also photographs, you will have no trouble in making it up.

Of course, the receiver will give just as loud signals with any of the ordinary crystal detectors if you adjust them well. The Gravity Detector described can also be fitted to other crystal receivers.



A plan view of the panel. The left hand upper terminal is for the aerial wire and the right for "earth." The front terminals are for telephones—one pair for each pair of 'phones.

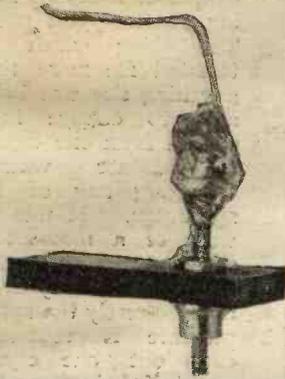


Another view of the underside of the panel.

to rotate the cylinder a couple of times for finding another good point. The thing which interested me more than anything else was being able to change in a second from one crystal to another without damaging any of the specimens. It was the work of a moment to slip out the cartridge, open it (it really drops apart directly the spring pressure is removed), drop out one crystal and slip in another. Quite small pieces will do, or one can use a fairly large specimen. It is most interesting to open one of those intriguing little tin boxes, pick out a new crystal from its comfy bed of cotton wool (which it shares with a resplendent gold cat whisker), and drop it into the nickel-plated cartridge.

To make the set you will need simply an ebonite panel 9 in. x 5 1/4 in. x 1/4 in., a socket for a plug-in coil, a variable condenser of good quality (I have used one of the new Peto Scott square law condensers with ebonite end-plates. These are well finished, and are of considerable better quality than many square law condensers

**ANOTHER INTERESTING  
CRYSTAL SET NEXT  
MONTH!**



# Soldering Simplified

By

“HOT WIRE”

An article in lighter vein which will strike a chord of sympathy in the breast of every home constructor.

FIRST of all I want you to forget all that you have read by other writers on the subject of soldering. There are lots of fellows who like to have photographs taken of themselves whilst they are *apparently* in the act of doing things with a soldering iron. I say *apparently* because the truth is that those photographs are, I am quite sure, simply fakes. In every case the iron is cold. Anybody can push a cold iron about, though it is most difficult to make satisfactory wireless joints with it. What I would like to see is pictures of these gentlemen *actually* engaged in soldering. If these were accompanied by gramophone records of what was said during the proceedings they might, I think, be distinctly entertaining. I propose to confine myself now to giving you practical hints by one who really does solder. You will see the difference between what I write and what the others write in a moment.

The first thing is to get your pronunciation of the word solder:



The wrong and . . . .



The right way to heat the soldering iron.

correct. Nothing gives a man away worse than to go into a shop and ask for a stick of “soulder” or “saoulder,” and my experience shows that nobody who talks like this ever makes a good job of a wireless set. The beginner should always speak of sawder; when he has acquired such skill that he is

able to tackle simply any kind of job he may adopt the professional form of the word, which is solder. Before we can begin our instruction it is first necessary that you should provide yourself with a soldering iron. A soldering iron is called a soldering iron because it is made of copper. In the same way we speak of tinning a joint because we do it chiefly with zinc. The purchase of a soldering iron demands no little care on the part of the beginner, for balance is just as important with it as in the case of a tennis racket, a billiard cue or a spilliken’s prodder. If it does not feel right you will never be at your best with it. In the shop, therefore, do a good deal of brandishing, testing iron after iron until you find one that feels as handy as a toothbrush. Be sure that the bit is made of pure copper. This is best done by biting it (Fig. 1). Should a dent appear the bit so bitten is all that it should be. This is why it is called a bit. If, however, a tooth breaks do not purchase it or your disappointment will be bitter, and the biter will be bit.

Having chosen the iron and conveyed it home the next thing to do is to heat it. Great care is required here to select the right end of the weapon to place in the flames. If any mistake is made about this it will be found most difficult to do really good work. Fig. 2 shows the incorrect way of heating the iron, whilst the right way is seen in Fig. 3. Having mastered this very important point we will now go on to the proper

way of holding the iron. This is made quite plain in Figs. 4 and 5. Many people do not know how to heat an iron to the right temperature. Other writers on the subject simply tell you vaguely to leave it in the gas ring until flames of a bluey green colour appear round

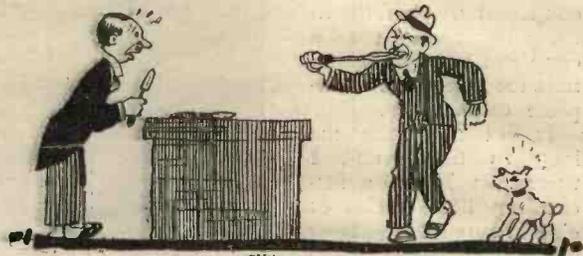


Fig. 1.

Testing the bit.

it. This is all too vague. What the beginner wants to know is the exact colour of these flames. This can be determined by a simple little experiment.

### A Testing Circuit

Wire up the circuit shown in Fig. 6. B1 is the common or garden accumulator, whilst B2 is a high-tension battery. The switch S has two contacts A and B. Place the arrangement close to the gas ring with the switch in position A. When the pretty flames begin to appear throw the switch over to B. If the flames of the gas are of precisely the same colour as the momentary illumination within the bulb of the valve all is well; but if not, continue. V1 will now have become V0, and a second valve, V2, must be used to replace it. Continue heating and switching until you are quite satisfied that a perfect match has been obtained. The job will then be easy. The best valves to use for the purpose are “06” dull emitters. These are rather expensive if bought singly, but considerable discount is obtained

(Continued on p. 213.)

# LISSENIUM

## THE RIGHT WAY TO JUDGE Low Frequency Amplification

**PURITY FIRST—VOLUME AFTERWARDS.** All too readily moderate tone quality has been accepted as good, but sooner or later the right means of obtaining pure low frequency amplification will be used universally, instead of by those who are sufficiently discriminating, as at present.

The right way to obtain pure low frequency amplification is to use a coupling at each stage which has been designed to meet the technical requirements of the position. For instance, the importance of the first stage transformer cannot be over-estimated, for any distortion here is magnified many times with each succeeding stage. But the expensive transformer which is ideal for the first stage need not be used throughout unless superlative amplification is desired, for it is not so necessary to have such high impedance in the second and third stage transformers as in the one used for the first stage. Where power amplification is used, however, the first stage transformer should be employed.

Apart from the usual transformer coupling, another interesting coupling to use is the **LISSEN L.F. CHOKE COUPLING**. To the keen enthusiast the comparisons possible are very instructive. One can, for instance, see how many stages of **LISSEN CHOKES** can be used in cascade.

Each requirement of low frequency amplification is met by the following parts. In the design of these couplings, **PURITY OF TONE QUALITY HAS BEEN THE FIRST CONSIDERATION—PLEASING VOLUME THERE IS, TOO, BUT AFTERWARDS. IN BUYING A LISSEN TRANSFORMER OF ANY TYPE, YOU CAN BE SURE YOU ARE GETTING PURITY AND POWER**—and the best transformer value.

### HOW TO USE THE LISSEN L.F. CHOKE.

The construction of an L.F. amplifier using **LISSEN L.F. CHOKES** instead of transformers is quite simple. The connections are as follows:—

One terminal of the **LISSEN CHOKE** is connected to the plate of the preceding valve, the other terminal to the H.T. Battery. A fixed condenser of .01 capacity is connected between the plate of the preceding valve and the grid of the L.F. valve, and a grid leak (preferably the **LISSEN Variable Grid Leak**) is connected between the grid of the L.F. Valve and the L.T. negative. Grid cells should be introduced between the grid leak and the L.T. negative if they are found necessary. Each succeeding stage is connected in the same manner. .... **PRICE 10/-**

# LISSEN LIMITED

#### IMMEDIATELY BEHIND THE DETECTOR- VALVE

Use the **LISSEN T1**. If you contemplate buying an expensive transformer, be sure you can get none better than this. **30/-**

#### FOR REFLEX CIR- CUITS

Under all conditions the **LISSEN T2** is one which will give very pure and powerful amplification in these circuits. **25/-**

#### FOR SECOND AND THIRD STAGES

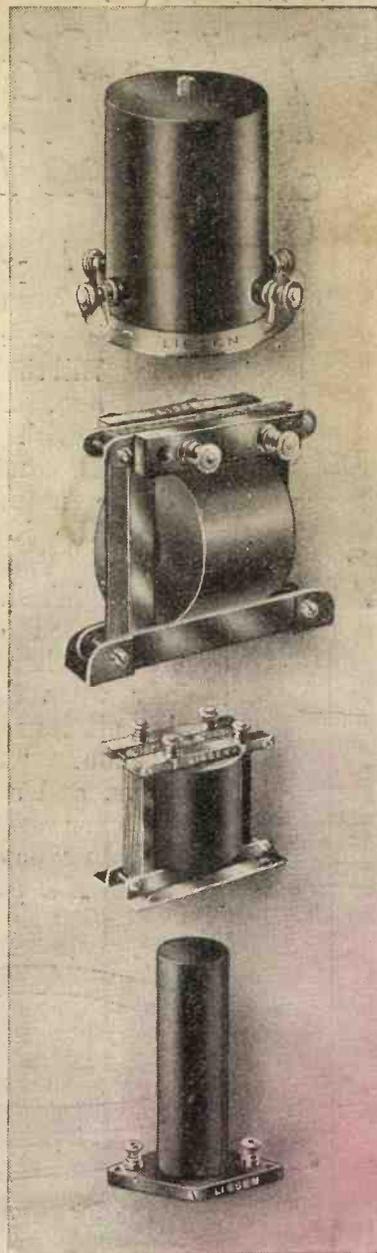
Where the **LISSEN T1** is not used throughout, the **LISSEN T2** is recommended. Price as above.

#### A POPULAR TRANS- FORMER

This is the best light transformer made. Because of its skilfully balanced design, it actually compares with many expensive transformers. **16/6**

#### LISSEN L.F. CHOKE COUPLING

The new **LISSEN L.F. CHOKE** is becoming very popular—for quality of tone it ranks with the best Resistance Capacity Coupling, without the disadvantage of using the large H.T. voltage necessary with the latter. Its price makes it very economical also. **10/-**



24-30, Woodger Rd., Goldhawk Rd., Shepherd's Bush, London, W.12  
Telephone: 3390, 3381, 3382, 1072 Riverside.  
Telegrams: "Lissenium, London."

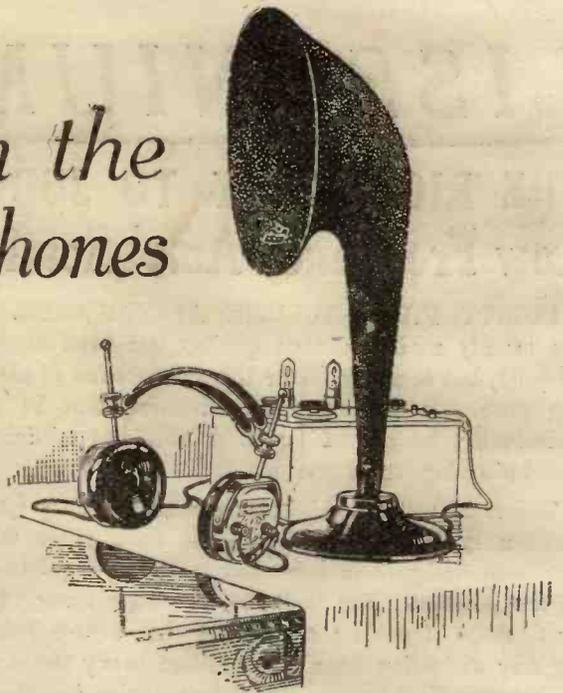
**PARTS THAT PULL TOGETHER—BUILD WITH THEM**

# Tune the Table-Talker with the "Matched Tone" Headphones



The Brandes Family Series.

**A** MARYLLIS dances. Once it was just now and then, but to young Bill that seems æons and æons ago. Now it's interminable—with the help of Brandes' Products. They are quick to define naturally the intoxicating rhythm, the joyous lilt of saxophone wizardry. Young Bill grumbles, but why shouldn't she? That lithe young body, flushed cheeks and sparkling eyes—how hard to resist syncopated melody when the *Table-Talker* brings it with all its real tone and rhythmical fascination. "Joie de vivre, Bill!" she says, and somehow he forgets his grouse when *somebody else's* sister comes in to help "flay the carpet," as Father puts it. *Ask your dealer for Brandes.*

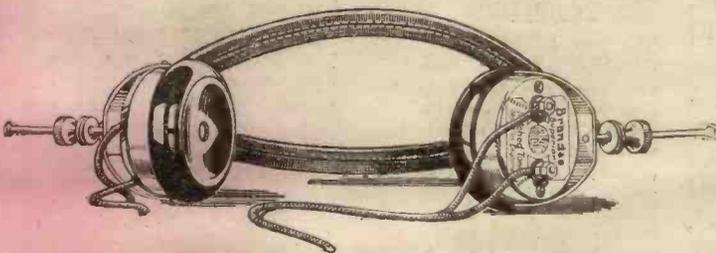


All Brandes products carry our official money-back guarantee enabling you to return them within 10 days if dissatisfied. This practically constitutes a free trial.

The "Matched Tone" feature means that both your ears hear exactly the same sound at the same instant—and you learn a new beauty of tone. They are tested and re-tested for just this one vital point, and in addition their strength, long-wearing comfort and reliable efficiency make them undoubtedly superior **25/-**

The *Table-Talker* is a Brandes quality product at a moderate price. The non-resonant, specially constructed horn is matched to the unit so that the air resistance produced will exactly balance the mechanical power of the diaphragm. This means beautiful sound-balance and remarkable tone qualities. It is twenty-one ins. high, and is finished a shade of neutral brown **42/-**

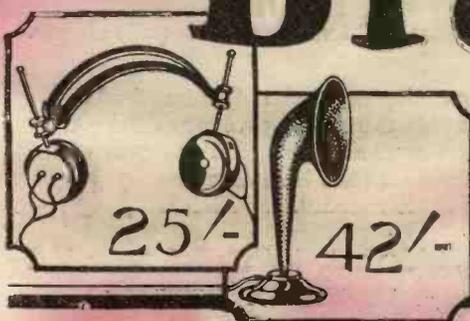
British Manufactured (B.B.C. Stamped).



# Brandes

Result of  
16 Years  
Experience

The name  
to know in Radio



(Continued from p. 290.)

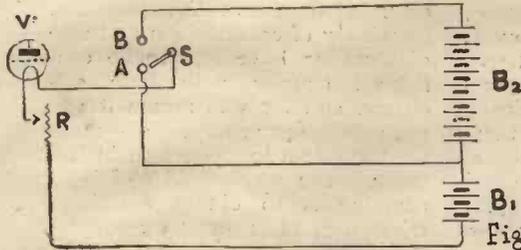
when they are purchased by the gross.

**All about Flux**

To help us to solder we require what is known as a flux. A Greek philosopher who lived many years ago announced that all things were in a state of flux. This is usually the condition of the wireless set after soldering has been accomplished. Anything really messy will do as a flux. I have obtained excellent results in emergencies with Zam-buk, margarine, dripping and hair oil. Anything in fact that splutters and makes a smell will do. Fluxite will be found useful, and it is most economical, for a couple of tins will suffice for making all the joints necessary in a 2- or 3-valve set. Other writers have told you to be sparing in the amount of flux you use. Nothing could be more misleading. Spare the flux and spoil the joint should be the solderer's motto. Lay the stuff on with a liberal hand and you will have no difficulty in getting your panels into that condition of sticky messiness which is the hall mark of good amateur work.

**Starting Work**

We will suppose now that you desire to solder a wire to the end



A wonderful testing circuit.

of a terminal. The trouble is that one really requires three hands to do the job easily, one to hold the solder, one to hold the iron, and one to hold the wire. Unless you are one of those fortunate people born with an allowance of hands fifty per cent. above the normal, the best tip is to make use of the big toe and the next one of the left foot for holding the solder (Fig. 7). A little practice is required before a good foot grip can be obtained, but it is well worth while to cultivate a handiness, or rather footiness of this kind. Some constructors who are not blessed with prehensile toes hold the stick of solder in the teeth. This is a method which I do not recommend particularly in the case of beavers or those who cultivate moustaches of the Chu Chin Chow type.

**More Tests**

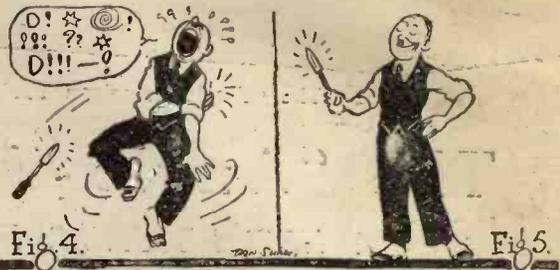
And now for it. Hold the wire firmly in the left hand and place its tip in contact with the end of the terminal. Get a blob of solder on the iron and apply it to the right spot. How long should the iron be held in place? There are two quite simple indications which should be duly marked by the beginner. Do not remove it until the ebonite of the panel has begun to melt a little. This tightens up the terminal automatically and much improves the resistance of the ebonite. The second indication is given by the wire itself. When you leap into the air with a scream, placing your fingers in your mouth, you may be quite sure that the joint is done to a turn. One of the dangers of holding the solder in the mouth is that it is apt to be swallowed when the fingers are thrust in. Should such an accident occur, gulp down a tin of fluxite immediately, and stand on your head before the fire until the heat melts the solder and causes it to run out. In such an emergency false teeth, if worn, should be removed. I knew a man once who neglected to do this and succeeded in soldering his top and bottom plates so firmly together that it took four dentists and a plumber to remove them.

**A Secret**

The great secret in making sound joints is to use plenty of solder as well as plenty of flux. My own average is roughly half a stick per joint, but I have a friend who maintains that no really good joint can be made with less than three sticks. Personally I think that this is rather overdoing it, for my joints, a specimen of which is seen in the heading, are always neat and tidy-looking, and provide a firm enduring contact of low resistance, which stands up well to wear and tear. Take the soldering done in

the photograph as your model, and your work will do you credit. It almost makes me weep when I see the skimpy niggardly soldering done by some members of the staff of this journal.

You may employ covered wire, bare wire, hard wire, soft wire, or square rod. My own preference is not for any of these. I wire my



Incorrect and correct method of gripping hot iron.

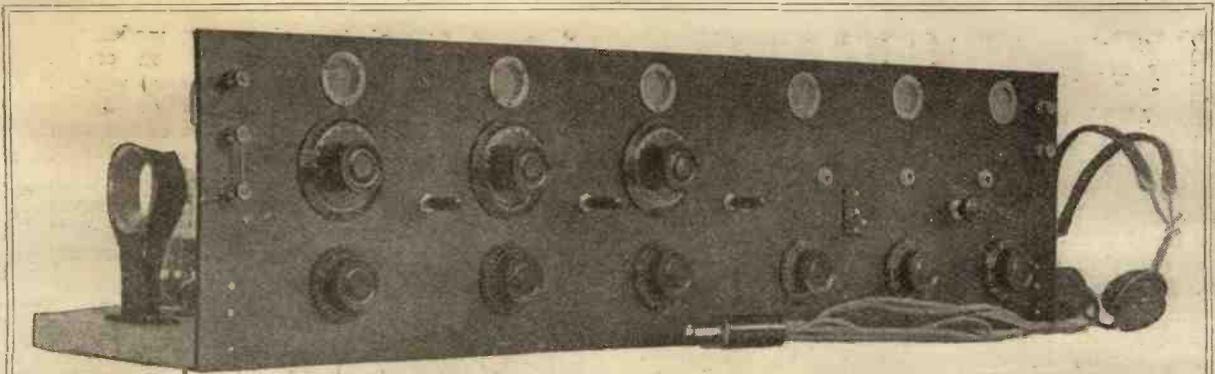
sets entirely with sticks of solder. Besides offering a large surface for the passage of high-frequency currents, this method has the great advantage that no tinning or anything of that kind is necessary. It is a little costly perhaps, but it does look neat.

**A Few Hints**

Let me conclude with a few hints. Do not pamper your soldering iron. You and I want irons to use and not to look at. A good coating of dirt is a protection to the delicate surface of the copper, and it also makes for nice big joints. If the iron is heated red-hot, it can be used for boring large holes in wood or in ebonite panels. When not actually in use for soldering it makes an excellent poker. It may also be used as a hammer, as a case opener or as a life preserver should burglars break in! Some people use a rest for the soldering iron, but this is an amateurish and finicky gadget. The iron should always be laid upon the table cloth, when it is put down for a moment. After all, what is a hole more or less in a table cloth so long as one develops a good professional style of soldering?



The third hand method.



The "Anglo-American Six" withdrawn from its case.

## The "Anglo-American Six"

A NEW RECEIVER WITH THREE STAGES OF HIGH-FREQUENCY AMPLIFICATION

By PERCY W. HARRIS, Editor

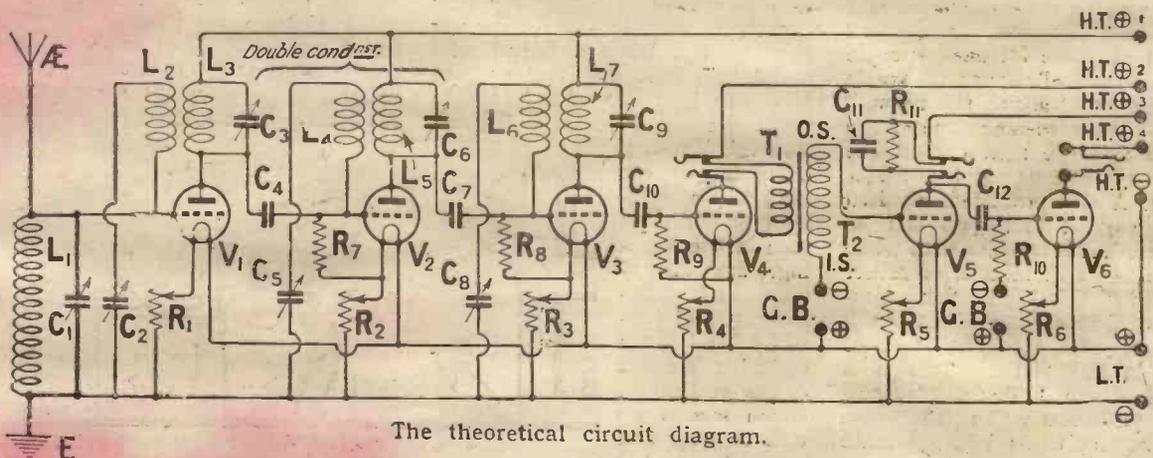
NOTE.—Many months of study and experimenting preceded the production of this extremely sensitive six-valve instrument, which represents a practical solution of many problems which have previously puzzled the home constructor

I HAVE given the name "Anglo-American Six" to this instrument because, in its make-up, ideas from both sides of the Atlantic have been used. For example, the long, low vertical panel behind which the various components are arranged in the same order as the circuit diagram; the use of plugs and jacks for changing over from one circuit to another; the adoption of gauze-covered windows for viewing the valves; and the placing of the terminals on a terminal board behind the instrument are all ideas which, if they did not originate there, at least were first popularised

on the other side of the Atlantic. The use of square law condensers, the simultaneous tuning of two circuits with a double condenser, the Cowper neutralised tuned anode method, high-frequency transformers fitted to valve legs, and certain other features are typically British ideas. Added to these reasons is one which will appeal to the more advanced experimenter. The set is eminently suitable for stretching out into those great distances which separate us from the numerous American broadcasting stations.

In point of fact, the "Anglo-American Six" is a combination of

my previous "Transatlantic" design and the "Neutrodyne Receiver" described in the first issue of THE WIRELESS CONSTRUCTOR. Simplicity of construction and ease of handling have had to be considered equally with high efficiency, and for this reason it was not considered practicable to make the receiver a loose-coupled instrument. The great object of loose coupling is to obtain additional selectivity, but a loose-coupled receiver has one more dial to control, and in the present instrument selectivity is very high owing to the use of three stages of tuned high frequency amplification.



The theoretical circuit diagram.

# IF IT'S POWER

Low frequency amplification gives power, but the temptation to gain power by adding L.F. Amplifying Panels to any receiver has its sting.

Rather build into your receiver at the offset a SUPER-SUCCESS (All Black) Transformer, which actually gives power amplification, than be misguided into adding another valve—the only alternative, having fitted inefficient transformers.

## SUPER-SUCCESS (All Black) L.F. TRANSFORMER

AS USED in the TWIN VALVE RECEIVER described in the current issue.

The production of highly suitable power valves has placed a new responsibility on to inter-valve transformers. When power valves are employed the heavy current passed on to the primary will break down any ordinary transformer.

It cannot be too strongly emphasised that the new power valves require a transformer especially designed. Remember it is the SUPER-SUCCESS (All Black).

Price 21/-

**SUCCESS TUNER.** Covers all Broadcasting and Continental Stations with one initial expense.

Price 21/-

**SUCCESS ANODE CAPACITY REACTANCE.**

A proved method of High Frequency Amplification combined with a vernier control of reaction.

Price 50/-

**SUCCESS EARTH RELAY LEAD-IN SWITCH.**

Safeguards life and property. Switching outside the house. Operated from the inside.

Price 6/6

**SUCCESS VERNIER COIL HOLDER.** Designed for low loss tuners. Quick and Micrometer action.

As used in the T.A.T. Receiver described by Mr. John Scott Taggart in the December Issue of *Modern Wireless*.

Price 5/6



REG. NO. 703507.

Successful reception of the short waves requires the simplest of arrangements—detector and one note magnifier which consists of one very important component—the low frequency transformer.

Choice of this instrument cannot be too deliberate. It need not be emphasised how, in so critical a receiver as one designed for the reception of K.D. K.A. on 68 metres, an ill-designed L.F. Transformer can mar your reception beyond skilful tuning.

The absolutely clear and undistorted reception of the SUPER-SUCCESS (All Black) has been brought about by extended experiments of trial and error.

Tested under every conceivable condition the SUPER-SUCCESS unconditionally gives you power amplification, and represents a new experience with which you should not delay your acquaintance.



COMPONENTS

Obtainable from all Dealers.

Wholesale Distributors

LONDON.—BEARD & FITCH, Ltd., 34, Aylebury Street, E.C.1; CABLE & ELECTRICAL SUPPLIES CO., 234, Pentonville Road, N.  
MANCHESTER.—BEARD & FITCH, Ltd., 1, Dean Street, Piccadilly.  
BIRMINGHAM.—COOKE & WHITFIELD WIRELESS Ltd., 24 St. Paul's Sq.

BRISTOL.—FRED BURRIS & SONS, 7/15, Redcliffe Street, WHOLESALE FITTINGS CO., Ltd., 14, North St., Stokes Cross.

Full list of wholesale distributors appears in the Manufacturers' Directory, November BROADCASTER & Wireless Retailer.

Advertisement of Beard & Fitch, Ltd., London, E.C.1.

Barclays 313

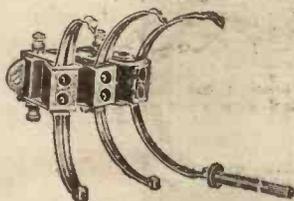
In replying to advertisers, please mention THE WIRELESS CONSTRUCTOR.

# Christmas and New Year Gifts for Wireless Enthusiasts



**IGRANIC Honeycomb COIL** (Gimbal mounted)

Built on the same principles as the famous Honeycomb Plug mounted coil. In 20 sizes to cover wavelength ranges of 100 to 23,000 metres. Prices from 4/10 to 15/- according to size.



**IGRANIC Gimholder Coil Holder**  
Without stand, for panel mounting . . . Price 15/-  
With stand, for 3 coils . . . Price 21/-



**IGRANIC Audio-Frequency Amplifying Transformer**  
(Patent No. 205013)

Noted for its distortionless reproduction of speech and music. The metal shroud effectively shields from external interference, so that a number of these Transformers may be mounted closely for multi-stage amplification with economy of space in assembly. The impedance at speech frequency is suitable for most types of valves. Made in ratios of 1:5 for first stage and 1:3 for subsequent stages.

Prices	
(Shrouded type)	
Ratio 1:5	21/-
" 1:3	19,6
(Open type)	
Ratio 1:5	20/-

What more welcome gift can one give to the wireless enthusiast than component parts for his set—and how few gifts are so welcome as Igranic! When you give Igranic Devices you pass two compliments—one of the Season, the old, old compliment; the other, a compliment to the expert knowledge of the recipient. Wherever radio is spoken of with experience, there Igranic Components are known to be second to none in their performance. In those experimental sets which are making radio history—and in the finest made-up sets that wireless dealers sell—you will find Igranic Radio Devices. So,

to help them build better sets, give your wireless friends



They include:

Honeycomb Coils, Filament Rheostats, Interval Transformers, Variometers, Vario-couplers, Bi-plug Coil Holders, Tri-plug Coil Holders, Battery Potentiometers, Vernier Friction Pencils, etc.

All carry a six months guarantee.

Ask your local dealer to show you them.

Write us for List Z347.

**IGRANIC ELECTRIC CO., LTD.**  
149, Queen Victoria Street, London, E.C. 4

Works: Elstow Road, BEDFORD.

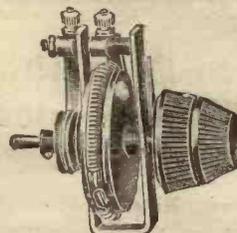
Branches: BIRMINGHAM, BRADFORD, CARDIFF, GLASGOW, MANCHESTER, NEWCASTLE.



**IGRANIC VERNIER FRICTION PENCIL**

Designed for use with variable condensers, variometers and similar apparatus to convert the plain instrument into Vernier type. You merely drill a hole in the panel near the edge of the dials and press in one of the bushes supplied with the pencil. For fine adjustment, the pencil is inserted in the bush—so that the rubber ring engages with the bevelled face of the dial—and rotated.

By sliding the clip attachment towards the brass pin, a pencil may be converted into an anti-capacity adjuster. Price, complete with clip, spare rubber ring and 3 bushes . . . 2/-



**IGRANIC Filament Rheostat (Vernier Type)**  
The perfect "control" for Dull Emitter Valves operated by 2-volt battery and Bright Emitter Valves with 4 or 6-volt battery. Supplied with 4, 6, 8 or 10 ohms resistance. Price, with fixing screws and drilling template for panel mounting 7/-



**IGRANIC Auxiliary Rheostat, 25 ohm**  
For joining in series with existing rheostats to obtain additional resistance for the control of Dull Emitter Valves. Any value of additional resistance up to 25 ohms may be obtained. Easy to fit. No further control required. Price 1/3



**IGRANIC Filament Rheostat, 30 ohm type**  
Designed for controlling all types of Dull Emitter Valves. It is smoothly and evenly variable over its whole resistance range and affords very fine selectivity. Suitable for controlling up to four valves according to the type of valve used. Current carrying capacity 0.4 amp. Price, with screws and drilling template for panel mounting 7/-

**Plugs and Jacks**

The plug and jack method of switching has several important advantages, not the least of these being the elimination of complicated wiring on the low-frequency side. In such a receiver as this it is highly desirable to be able to bring into, or cut out of, circuit the first or the second of the note magnifying stages and to be able to switch on the loud-speaker rapidly. Furthermore, to obtain high efficiency it is desirable to have different voltages upon the detector, first and second note magnifying valves. It is quite a simple matter to arrange switches which will place the telephones in the plate circuit of the detector, first, or second note magnifying valve, but most of these arrangements have the disadvantage of changing over the voltage normally used on the last valve to the plate of the valve to which the telephones are switched.

**A Practical Point**

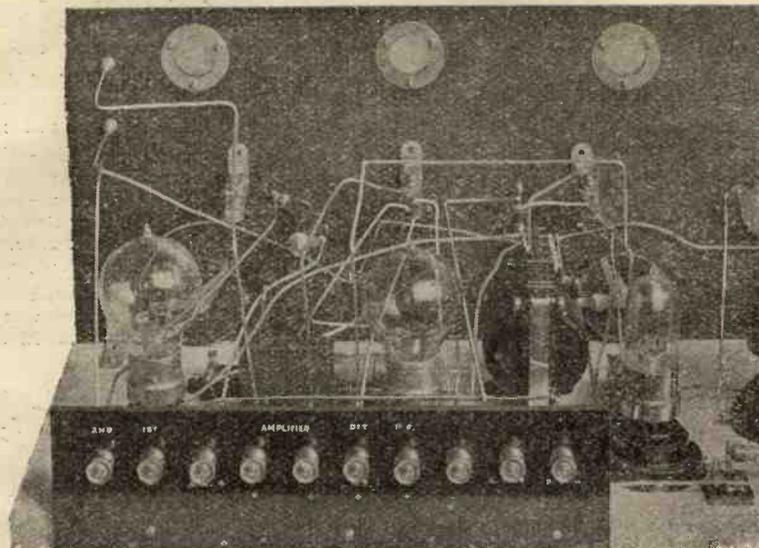
In practice, this does not upset matters to any great extent, save when the set is adjusted on the edge of reaction, and it is often useful to put up with this slight disadvantage in order to obtain simplicity. The plug and jack method, however, does not disturb the voltage normally applied to a particular valve. Thus in the present receiver plugging the telephones into the plate circuit of the detector valve simply substitutes the telephones for the primary of the intervalve transformer. On plugging them into the first note magnifying stage, the anode resistance is removed

from the plate circuit, and the telephones are substituted. In the last jack, the telephones are simply inserted in the plate circuit of the last valve.

**Stability**

An efficiently built receiver (not provided with some stabilising device), using one stage of tuned

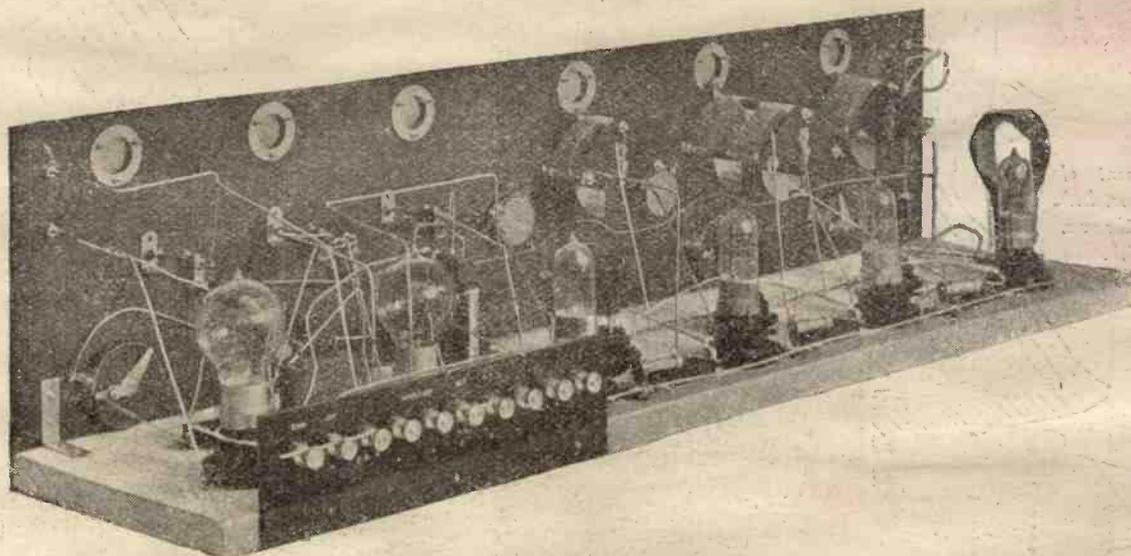
care in design. Here, again, we have the two methods of stabilising. The simple way of connecting the grids of the high-frequency valves to the slider of the potentiometer, by which a positive bias can be placed upon the grids, has much to recommend it, and if the set is well designed, comparatively small



The terminal strip behind the instrument.

high frequency, will be very prone to self-oscillation. This self-oscillation can be kept under control either by introducing losses into the circuit or by neutralising the valve capacity. The former is the simpler method, but the latter the most efficient. Two stages of high frequency require much greater

losses need be introduced. With three stages the losses have to be heavier before the set can be made stable, so that the additional amplification obtainable by the use of three tuned stages is to some extent discounted by the losses involved. For this reason I did  
(Continued on page 211)



Viewed from the rear, the set is seen to be simple in its wiring. It works excellently with either bright or dull emitter valves.

# Cossor

in their new

Watch your Dealer  
test a Cossor Valve  
—no need for him  
to open the Box

ONE of the principal difficulties that has to be faced by every Valve Manufacturer is to ensure that his Valves reach the user in the same good condition in which they leave the factory.

Many prominent Radio authorities and journals have consistently advocated some form of sealing which would prevent any Valve being used even for demonstration purposes—before being sold. It has remained for A. C. Cossor, Ltd., to work out a patented packing scheme which is of the utmost benefit to the trade and user alike.

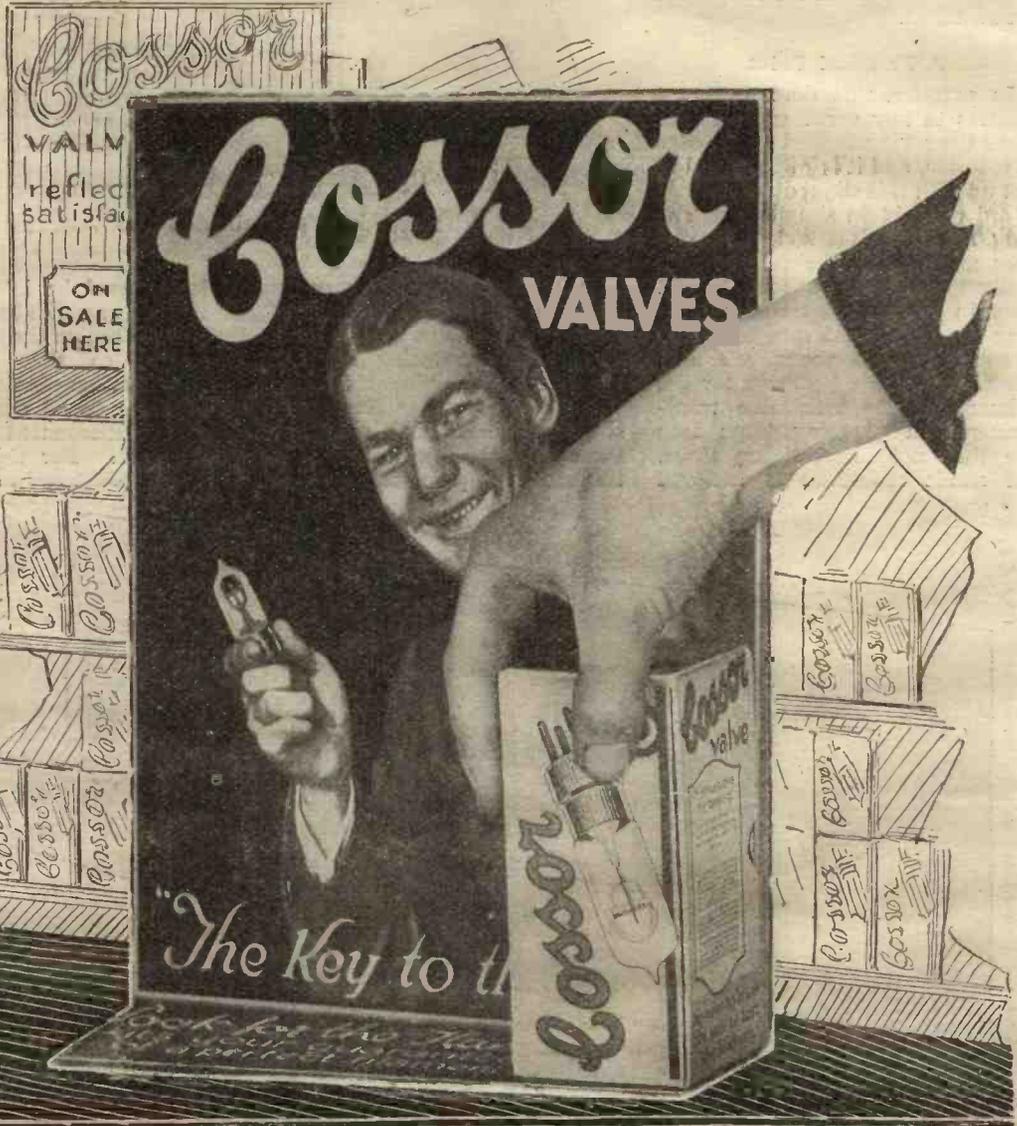
The idea is simplicity itself. The Valve is securely packed in a thick layer of cotton wool, and sealed in its carton. To each of its filament legs has been attached a copper wire brought through the packing and connected to a couple of brass studs on the exterior of the carton. It will be obvious

**TYPES and PRICES.**

- P1. For Detector and I. F. use 12/6
- P2. (With Red top) for H. F. use 12/3

**WUNCELL DULL EMITTERS**

- Model A. (With resistance in base for use with 2-, 4-, or 6-volt accumulator).
  - WR1. For Detector and I. F. use 23/6
  - WR2. (With Red top) for H. F. use 23/6
  - Model B. (Without resistance) working direct from 2-volt accumulator.
  - W1. For Detector and I. F. use 21/-
  - W2. With (Red top) for H. F. use 21/-
- From all Dealers.



Advertisement of  
A. C. Cossor, Ltd.,  
Highbury Grove,  
London, N.5.

# Valves

## sealed cartons

that if these two studs are placed in circuit with a flash lamp and battery the current will pass through the filament and—completing the circuit—cause the flash lamp to light. If, on the other hand, the filament is broken, the current cannot pass, and the lamp will not light.

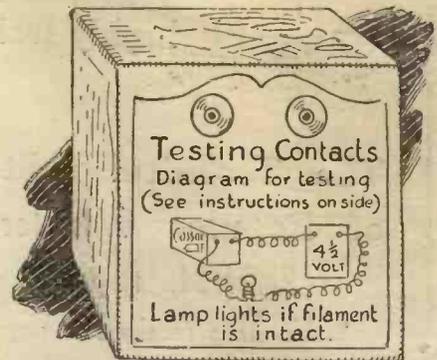
This idea is incorporated in an electrical Showcard supplied to all Dealers. All that he has to do is to pick up the Cossor sealed Carton containing the Valve, and place its studs in contact with two metal strips on the Showcard. If the Valve is in order the miniature lamp behind the showcard lights up—he need not break the seal at all.

If you want to be sure of getting a Valve with a full life, therefore, be sure you choose a Cossor—the only one that is guaranteed a safe passage from factory to user.

## Every Purchaser gets an unused Cossor Valve—

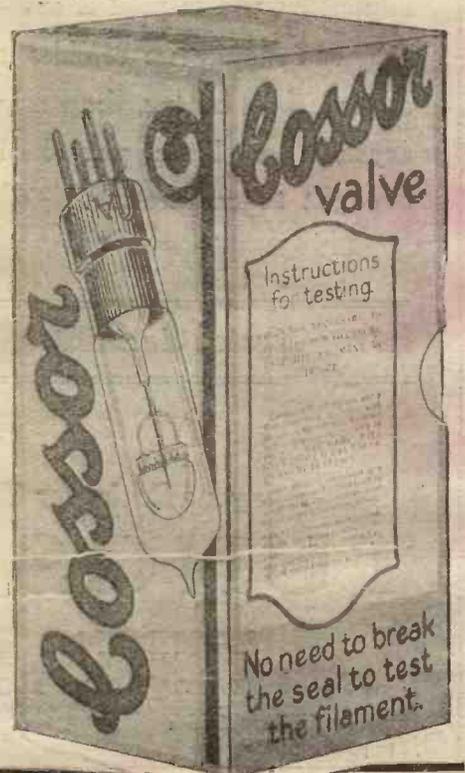
### Seven Features you cannot get with any other Valve

1. An arched filament which entirely supports its own weight and which does not require springs or other forms of tension to prevent it from sagging. This makes for long life for the Valve.
2. A hood-shaped Grid—scientifically built up on a stout metal Grid band—with every turn of its wire anchored in three distinct positions. This guarantees complete freedom from microphonic noises.
3. A hood-shaped Anode completely enclosing the Grid and filament and thereby making use of practically the whole of the electron stream. This ensures greater sensitiveness.
4. A special type of Valve—known as the Cossor P.2 (the Valve with the red top)—which has been specially designed for high-frequency amplification. This means that Stations—hitherto out of your reach—can now be picked up with certainty.
5. A unique method of testing Cossor Valves by which every Valve is given a complete and costly series of tests before being issued. This ensures that Valves which, superficially, might look correct must conform to a definite scientific standard or be rejected.
6. And now a Dull Emitter which glows at a temperature which is practically invisible during daylight. The Wuncell is available with characteristics to match exactly the P.1 and the P.2. It operates at 1.8 volts and requires so little current that a small portable accumulator will last the average 3 valve Loud Speaker Set a fortnight on a charge at a cost of a few pence.
7. Finally, the new patent Cossor packing system—a method which will revolutionise the industry—is a genuine effort on the part of the manufacturers to strike out of the rut in the honest endeavour to see that Cossor Valves arrive at their ultimate destination in an absolutely new and unused condition.



Above: The end of the Carton showing the metal contacts and circuit diagram of the Showcard.  
Below: The new Cossor box—every Cossor Valve irrespective of type is being packed in this method.

Interesting and useful literature on the Cossor Valve will be sent post free to all who apply. In any case before you purchase a Dull Emitter be sure you read our large Folder containing a full description of the many exclusive features of the Wuncell. A pos card brings it free.



Gilbert Ad. 1774.

# WHICH CRYSTAL FOR YOU?

Are you deciding by the slow and costly method of trial and rejection? or——

Will you be guided by the experience of highly trained and responsible experts ! !

The Technical Editor of *Popular Wireless*, 22/11/24, says :

“ We have received a sample of that well-known crystal, Tungstalite, for test. It was tried out both in ordinary crystal and in valve-crystal circuits. In all cases results were commendably satisfactory, and in point of sensitivity and stability we consider it as good, if not better, than any crystal we have yet had brought to our notice.”

Every Crystal Guaranteed

**NOT A 'DUD' SPOT ON IT.**

*Felix:—  
‘Gee! Tungstalite’s Wonderful’*

**TUNGSTALITE**  
BLUE LABEL  
REG. N° 447149

**16**

*“The Finest Crystal in Existence!”*

Ask your Dealer for TUNGSTALITE (Blue Label), or send 1/6 to:

## TUNGSTALITE LTD.

LONDON:

47, Farringdon Road,

'Phone: Holborn 2557.

E.C.1

YORKSHIRE:

41, Call Lane, Leeds.

(Continued from page 207).

not adopt the method of simply adding a further high-frequency valve to my "Transatlantic" design, as some readers have asked me to do.

Experience with the Neutrodyne Receiver, described in the first issue of THE WIRELESS CONSTRUCTOR, has shown that the method I introduced there of using the windings of the ordinary plug-in transformer, one for the anode winding and the other for the neutralising winding, is highly efficient and practical. The present set is therefore made up with two stages of high frequency simultaneously tuned, the coupling being the tuned anode method, with one of the windings of a high-frequency transformer used in conjunction with a neutralising condenser, to give a neutrodyne effect. The third stage of high frequency is separately tuned. The aerial is directly coupled, there being only one tuning condenser for this part of the circuit, and as the set can be made to oscillate or not as we desire, without magnetic reaction, it has not been necessary to introduce the conventional reaction coil. This, I may say, simplifies the wiring considerably.

**Simple Lay-out**

The actual building of the receiver did not take very long. Designing the layout and general disposition of the parts, however, took much more time than many readers will credit, for the aim throughout was to obtain shortness of wiring, simplicity, ease of construction, and, lastly, a good appearance. The wiring of the high-frequency side has been tried out in a number of different ways, and the final arrangement proved to be the best of many.

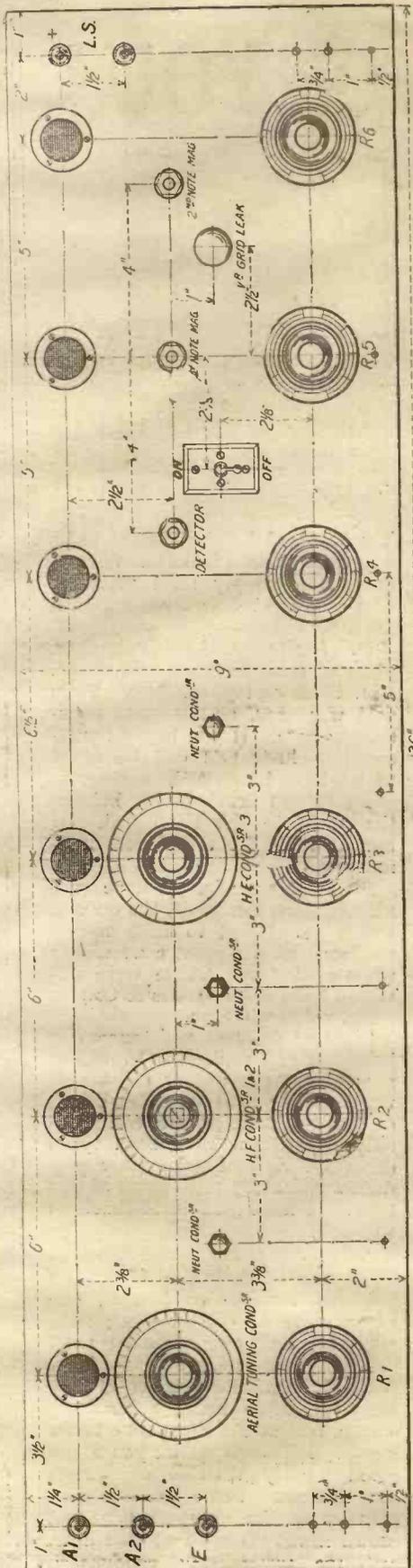
**Terminals**

Looking at the front of the panel, three terminals will be seen on the left, the lower two being joined by a strip. These terminals are used for the aerial and earth connections, and with them either series or parallel connections of the aerial tuning condenser can be had. The six filament resistances (dual pattern for either bright or dull emitter) are seen along the bottom of the panel. The three condenser dials are respectively for aerial tuning, the double condenser controlling the first two high frequency stages, and the condenser controlling the third stage. The values of these are respectively .0005  $\mu$ F. for the aerial tuning condenser, .0003  $\mu$ F. for each half of the double condenser and .0003  $\mu$ F. for the third H.F. tuning. Immediately adjacent to the three dials are the three knobs of the neutralising condensers, while on the right-hand half of the panel can be seen the three jacks for placing the telephones in the detector, first note magnifying or second note magnifying circuit. Two other controls will also be seen an "on-and-off" switch for all filaments, and a variable grid leak in the last note magnifying stage. The first note magnifier is transformer coupled, and the second resistance coupled, as this combination has been found to give both purity and strength.

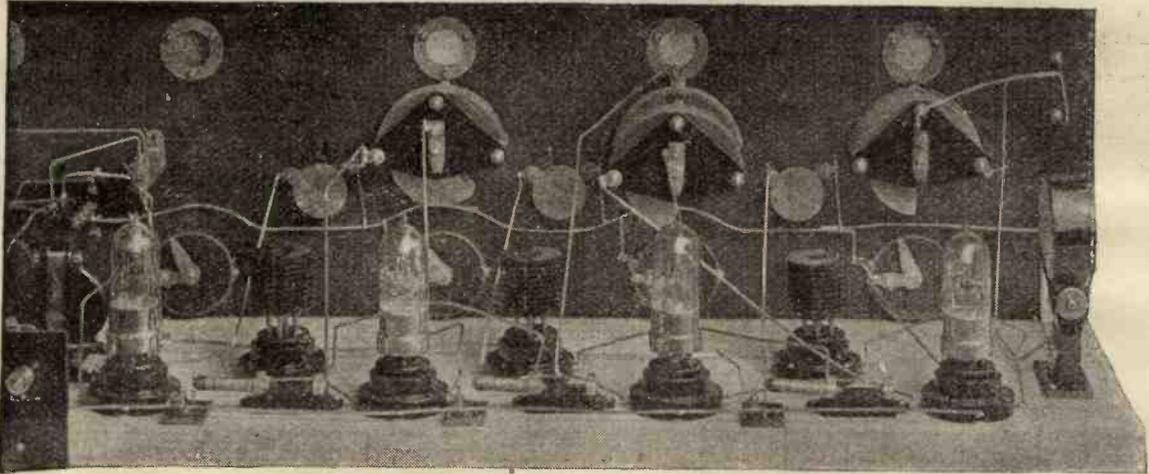
**Terminals Behind**

To avoid trailing leads and general untidiness, the battery terminals are all connected to one terminal board at the back of the instrument. In the photograph accompanying this article, the set is seen withdrawn from its polished mahogany cabinet. When in place the terminals project through the back of the cabinet in the space specially cut out for them.

The instrument is highly sensitive, giving results which are better than those I have ever previously obtained. Its chief charm is its appetite for distance. It does not, as some readers might imagine, bring in the distant stations with huge volume. Any fairly experienced reader knows that many efficient three-valve sets will bring in, say, Aberdeen in London at loud-speaker strength. To get this strength, however, in most cases, reaction has to be forced almost to the limit, giving a distorted effect, which is not at all desirable or pleasant. The "Anglo-



Layout of panel and drilling diagram to scale. A complete wiring diagram and further constructional details will appear in the next issue. A full size blue print of this panel can be obtained (No. Croo6A), price 1/6 post free.



The high frequency end of the receiver.

American Six" brings in the distant stations with crystal clarity and without any "forcing." Madrid, for example, when heard on my indoor aerial at Wimbledon comes in (using the three high-frequency stages and the detector only without note magnifiers) at the same strength and purity as does London on a crystal set on the outdoor aerial. This may not convey a great impression to the beginner, but the man who is used to handling wireless sets will know that this is a highly desirable state of affairs. The note magnifying stages, of course, are only used for loud speaker work; for telephone reception there is no need to use them.

The technique of handling this receiver is somewhat different from that of other instruments. Let me say at once that I do not recom-

mend the set to the beginner without previous experience. To the man who is already experienced in handling such a receiver as my "Transatlantic," two or three nights' work on the new receiver will be ample to familiarise him with it. There is not space in this article to deal with the many interesting points in handling, and as I am very anxious to give readers a very full report and practical instructions, such details must be held over until next month, when a special article will be devoted to the subject.

#### Components Needed

We need to build this set:—

One ebonite panel, 36 in by 9 in. by  $\frac{1}{4}$  in. (Use one of the "guaranteed" ebonites here. By "guaranteed" ebonite I mean one which

is guaranteed by the makers to be free from surface leakage. Several firms now supply such material. In the present case I have used a Pilot panel.)

One baseboard. This is simply a piece of suitable wood 9 in. wide, 1 in. thick and 36 in. long. Plain deal was used, and is quite satisfactory here. If you buy a ready-made cabinet, this will be fitted with a loose baseboard.

Two brass brackets for holding the panel to the baseboard. (I bought these from the local ironmongers.)

Fifteen terminals. (I have used nickel-plated terminals, the ends of which are drilled to take square sectioned wire, a great convenience when soldering. These were obtained from Burne-Jones & Co.)

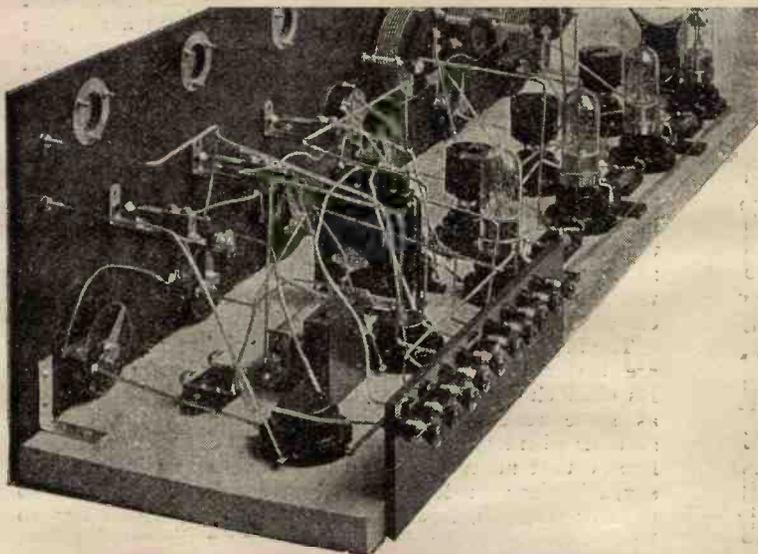
Six valve windows.

Six dual filament resistances (for bright or dull emitters). I strongly recommend the use of resistances which can be used for either bright or dull emitters, as you will probably experiment with both types of valves. Several makers now produce satisfactory resistances of this type. (I have used McMichaels in this set.)

#### Variable Condensers

Three variable condensers, one of .0005 mfd., one of .0003 mfd. (double), and one of .0003 mfd. (single) (Bowyer-Lowe square law). Variable condensers differ greatly in price, some being exceedingly cheap, and at the same time badly made. I strongly advise you to get good quality variable condensers for this set. Some variable condensers of the cheapest type cut down signal strength considerably.

Three neutralising condensers. (I have used condensers by



The note magnifying end of the instrument.

Gambrell Bros., Ltd., Burne-Jones, Ltd., and Bowyer Lowe, Ltd., in this set with equally good results. (Those shown in the photos are Gambrell's).

Two double-circuit jacks for panel mounting (Elwell).

One single circuit jack for panel mounting (Elwell).

Plugs for same (Elwell). You will use one of these plugs for your telephones and the other for the loud speaker.

One on-and-off switch (Connecticut).

One variable grid leak (Bretwood).

**Valve Sockets**

Nine valve sockets for board mounting. I have used the Burndept "Anti-phonic" throughout. These sockets although more expensive than the conventional type are very useful when dull emitter valves are used, as they eliminate those annoying "ponging" sounds which are characteristic of some dull emitter valves. Furthermore they have low capacity and certainly add to the life of a valve by saving sudden jars. For uniformity I have used these throughout, even for the plug-in transformers, although they are not really necessary for the last. There will be no loss of efficiency if less expensive anti-capacity sockets are used, provided, of course, they are of good quality. Whatever type of valve socket is used, be sure it is of the low capacity type, for the first three valves at least. If you intend to use bright emitters throughout there is no point in spending extra money to obtain the anti-microphonic holder.

Three fixed condensers .0003 mfd.

Three grid leaks 2 megohms.

One fixed condenser .001 mfd.

One fixed condenser .0001 mfd.

(Any good make can be used.

I have used both Dubilier and Paragon.)



Mr. E. Le Breton Martin who often broadcasts during the children's hour.

One fixed condenser .25 mfd. (T.C.C.)

Clips for grid leak.

One socket for board mounting for plug-in coil.

One good intervalve transformer. (That shown is the Igranic new pattern 5 to 1 ratio.)

One anode resistance 100,000 ohms (Dubilier).

One ebonite strip measuring 1 1/2 in. by 3 in. by 1/4 in.

Square wire for wiring up.

Suitable cabinet. (I have used one made by The Carrington Mfg. Co.)

Whatever you do (unless you are thoroughly experienced in the matter of the design of sets), do not attempt to make the set smaller or fit it into a size of panel you have already and which is different from that shown. I know it's a great temptation to see what you can do and how you can pack the parts into a panel of different shape or a cabinet of different size. It may seem to you on examination of the photograph that the parts are

unduly spread out. This spacing is intentional and deliberate. There would have been no difficulty in making the set on a panel at least a foot shorter had I so desired. The present size was chosen after much experimenting in the spacing of parts to avoid interaction.

**Plug-in Transformers**

You will also need three plug-in transformers of each wave-length range. As explained these are not used as transformers. One winding is used for a neutralising coil and the other for a tuned anode coil. As these are not used in the ordinary way the wave-length is not that stated on the instrument, the transformers normally marked 300 to 600 metres actually giving in the neutrodyne circuit a wave-length from about 350 to well over 700 metres. To get the lowest B.B.C. wave-lengths, transformers of the 150 to 300 metre range must be used. To avoid the expense of two transformers for the broadcast band I have arranged with the leading makers of plug-in transformers to manufacture special sets for this instrument. These will be specially wound so as to cover the broadcast band adequately. They will be on sale and advertised by the time the next issue of THE WIRELESS CONSTRUCTOR appears. This set works excellently on the ordinary plug-in transformers, so that those readers who already have matched pairs need only buy one more of each wave-length range without troubling to see whether it matches or not, as the third high frequency stage is not tuned with the same condenser as the other two.

Next month a fully detailed wiring diagram and full instructions on handling the receiver will be given. Meanwhile the photographs and circuit diagram will provide the more experienced experimenter with sufficient data to build the set.

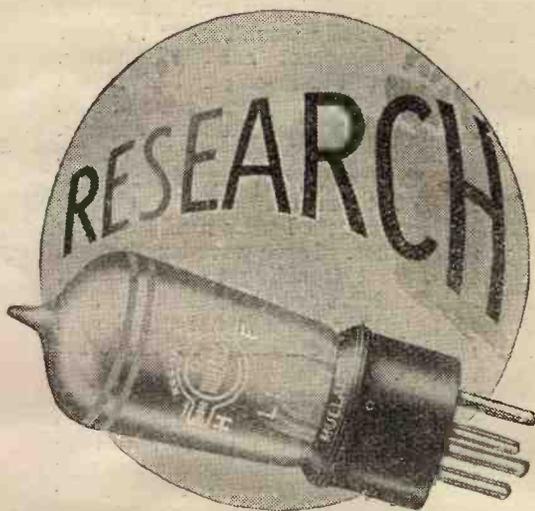


Tit for Tat.

# Mullard Double

## Mullard H.F. & L.F. Dull Filament Master Valves

The introduction of the dull filament valve was met with sincere appreciation from those who realised the marked advantages made possible by this design. With customary thoroughness, the Mullard dull filament type valves showed steady improvements in design, till to-day you can obtain Mullard specialised dull filament valves for both H.F. and L.F. operation.



The "REAL" Long-distance Valve.

Mullard Double Ring Valves (named to distinguish them from the Bright Filament H.F. and L.F. Single Ring Valves) have an efficiency in operation that will surprise you, the secret of their reliability and power being the wonderful precision in design and assembly that is maintained during their manufacture, and the extreme care that is taken to ensure their perfect evacuation and final testing. Their sensitivity does not become weakened in service, and their mechanical strength does not permit any possible internal contact between the filament and electrodes.

# Mullard

## THE MASTER VALVE

OBTAINABLE FROM ALL ELECTRICIANS, WIRELESS DEALERS, IRONMONGERS, ETC., ETC.

# Ring DULL FILAMENT Valves

## Are you Missing

- |                                       |                            |
|---------------------------------------|----------------------------|
| (1) POWERFUL AMPLIFICATION.           | (5) PURITY OF TONE.        |
| (2) MINIMUM CURRENT CONSUMPTION.      | (6) CONSTANT SENSITIVITY.  |
| (3) REDUCED BATTERY COST AND TROUBLE. | (7) MECHANICAL ROBUSTNESS. |
| (4) LONG FILAMENT LIFE.               |                            |

Then you need Mullard H.F. and L.F. Dull Filament Valves in your set.

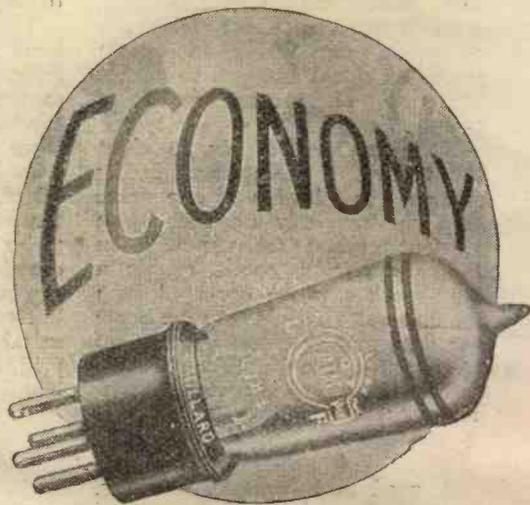
Ask for Mullard H.F. Double Red Ring Valves for H.F. AMPLIFICATION.  
Type D.3 for Accumulators. 21/- each  
Type D.06 for Dry Cells. 25/- each

The "REAL" Long-Distance Valve.

Ask for Mullard L.F. Double Green Ring Valves for L.F. AMPLIFICATION.  
Type D.3 for Accumulators. 21/- each  
Type D.06 for Dry Cells. 25/- each

The "REAL" Pure Tone Valve.

Leaflet V.R.20 gives full technical information.



The "REAL" Pure Tone Valve.

# Mullard

## THE MASTER VALVE

Advt.—The Mullard Radio Valve Co., Ltd. (C), Nightingale Works, Balham, S.W.12.

In replying to advertisers, please mention THE WIRELESS CONSTRUCTOR.

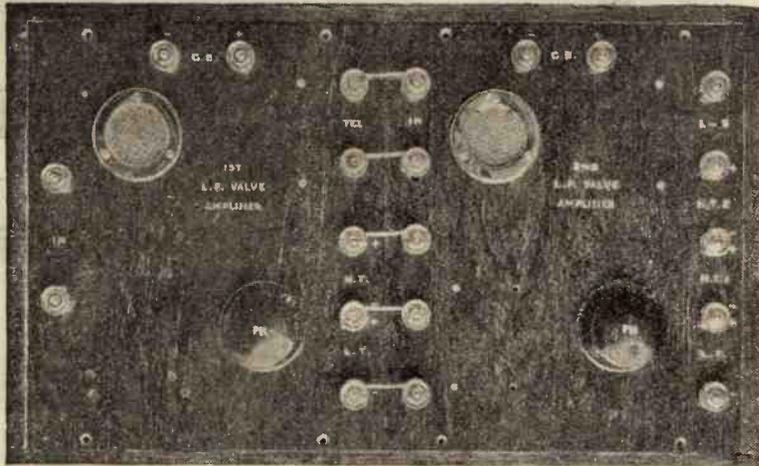


Fig. 1.—The valves are contained within the cabinet out of harm's way.

# A Loud-Speaker Amplifier for Your Crystal Set

By  
**E. REDPATH**

**T**HERE are, no doubt, many readers already in possession of serviceable crystal or single-valve receiving sets who would like to obtain good loud-speaker reception from their local station, particularly in view of the forthcoming festive season. Others, with a preference for telephone reception, may wish to obtain increased signal strength to permit the use of several pairs of telephones.

At a distance of six to eight miles from a main transmitting station, the addition of one valve as a low-frequency amplifier to an efficient crystal receiver will, in ordinary circumstances, enable a loud-speaker to be operated in a manner quite satisfactory for home use. At greater distances, say, up to 25 miles, two amplifying valves will be necessary for really satisfactory results.

### Sensitivity

A good deal depends, however, upon the sensitivity of the crystal receiver and the general efficiency of the aerial with which it is used. Further, opinions as to what really constitutes "loud-speaker reception" differ considerably, so that, by designing a two-valve amplifier in separate units, readers who are doubtful as to their minimum requirements will be able to construct and try the first unit, subsequently adding the second if considered necessary.

### General Description

The appearance of the complete two-stage amplifier is shown in the photograph, Fig. 1. With a view to neatness and general compactness, the valves are fitted behind the respective panels, the glow from each lighted filament being

visible through the respective gauze windows.

Diagonally opposite the valve window on each panel is the knob of the filament rheostat which, being of the "dual" type, permits either bright or dull-emitter valves to be used as desired.

The two terminals on the left-hand side of the amplifier are the input terminals, to be connected to the telephone terminals of the crystal or valve receiving set. The three vertical rows of terminals, five in each row, are for the telephones or loud-speaker, high-tension and filament-lighting batteries, as indicated in a subsequent drawing. The two terminals at the top centre of each panel are for grid batteries, so that by applying suitable negative potential to the grid of each valve distortion in this amplifier may be avoided and a

considerable saving effected in high-tension current.

If one panel only is in use, the telephone or loud-speaker and battery connections are made, of course, to the five terminals on the right. By the provision of five corresponding terminals on the input or left-hand side of the second panel, with suitable connecting links or pieces of stout wire, the battery connections of the first panel are brought on to the second, so that, with the two-stage amplifier complete, all connections, except the input and those of the grid batteries, are made on the extreme right.

### The First-stage Amplifier

The photographs, Fig. 1 and 3, show a plan and back view respectively of the double amplifier, complete with valves. The theoretical-circuit diagram is shown in Fig. 9, and the action is as follows. The low-frequency

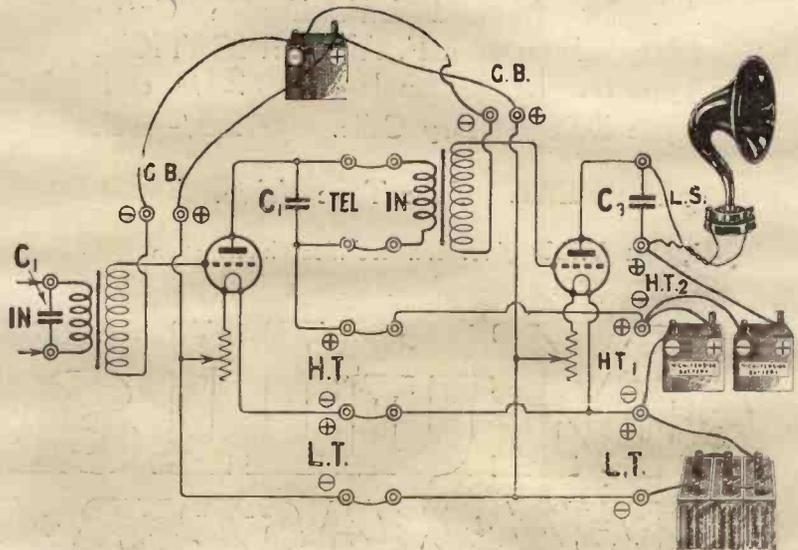


Fig. 2.—Combined circuit and pictorial diagram showing how the two panels are wired to the external components.

As a sequel to the theoretical article which appeared in our last issue, Mr. Redpath now gives full practical details for the construction of an amplifier which may be added to any existing crystal or valve receiver

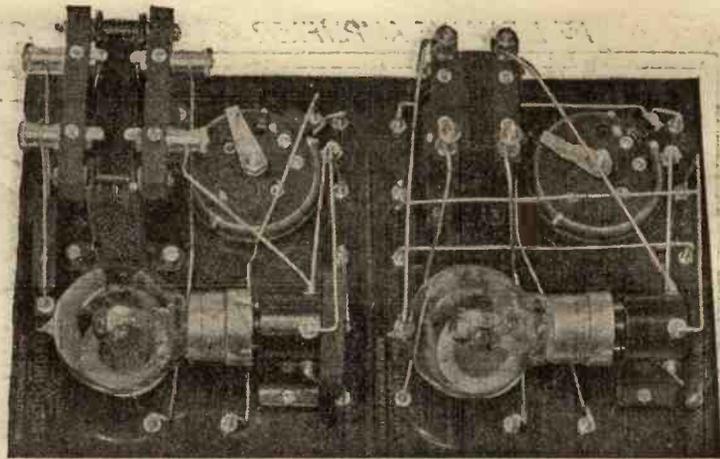


Fig. 3.—The two panels viewed from the rear.

currents which actuated the telephone receivers when connected to the original crystal or valve receiver are now made to traverse the primary winding T<sub>1</sub> of the step-up iron-core transformer T<sub>1</sub> T<sub>2</sub>, the primary winding being shunted by a fixed condenser C<sub>1</sub>, capacity .002 μF. If the original receiving set is already fitted with a telephone condenser of approximately this capacity, the condenser C<sub>1</sub> may be omitted.

Currents induced in the transformer secondary T<sub>2</sub> are applied to the grid and negative filament of the valve, this latter connection being made via the grid-bias battery GB.

**Accumulators**

The filament-lighting circuit includes a 4 or 6 volt accumulator (a 4 volt for the .06 dull emitters or

a 6 volt for general purpose valves) connected to terminals I,T+ and I,T-, the filament rheostat R and the valve filament itself. The anode, or output circuit of the valve, includes the telephone receivers (shown dotted in this instance) shunted by a fixed condenser C<sub>2</sub>, capacity .002 μF, and the high-tension battery connected to terminals HT+ and HT-. The telephone receivers therefore are now actuated by the amplified currents flowing in the anode circuit of the valve.

**Grid Bias**

The value of the grid battery depends upon the type of valve and the high-tension voltage employed. With an ordinary hard-

receiving valve and a high-tension voltage of 80 to 100 volts, an ordinary flashlamp dry cell battery, with "tappings" at 1½, 3 and 4½ volts, will usually be found quite satisfactory. Use the voltage that gives the best results.

**List of Components**

The following components are required:—

- 1 Panel, 7 in. × 6 in. × ½ in. thick. (Radion panel was used.)
- 9 Terminals (nickel plated).
- 1 Burndept "Dual" or similar rheostat.
- 1 U.S. "Super" transformer or other suitable first stage transformer.
- 1 Valve window.
- 1 Aermionic valve holder.
- 2 Dubilier condensers (.002 μF).
- 16 S.W.G. tinned copper wire for connections.

**Constructional Details**

The ebonite panel is first to be marked out and drilled in accordance with Fig. 5, a full-sized blue print of which may be obtained from Radio Press Sales Department, price 1s. 6d., post free.

In order to drill the 1 in. diameter hole required for the valve window, a ⅜ in. or ½ in. hole should first be drilled, after which an ordinary 1 in. centre bit, used from both sides of the panel, will enable a 1 in. disc of ebonite to be removed, leaving a clean hole.

Figs. 4 and 6 shew how the various components are to be fitted in place. All the items may be secured with the exception of the two condensers, which are held in position by soldering after the wiring is completed.

The actual wiring is a fairly simple operation, and should be carried out in accordance with the complete wiring diagram (Fig. 7) (Blueprint No. C 1005 B). Before

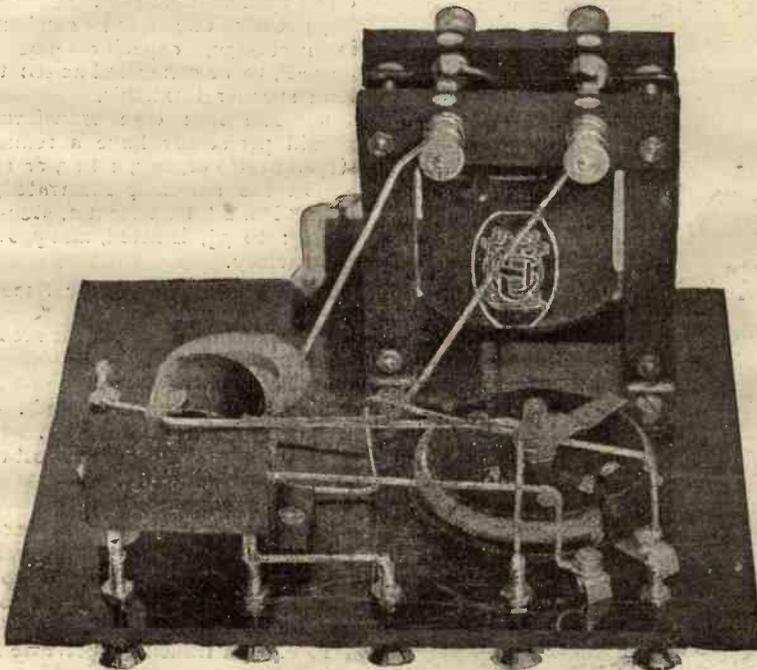
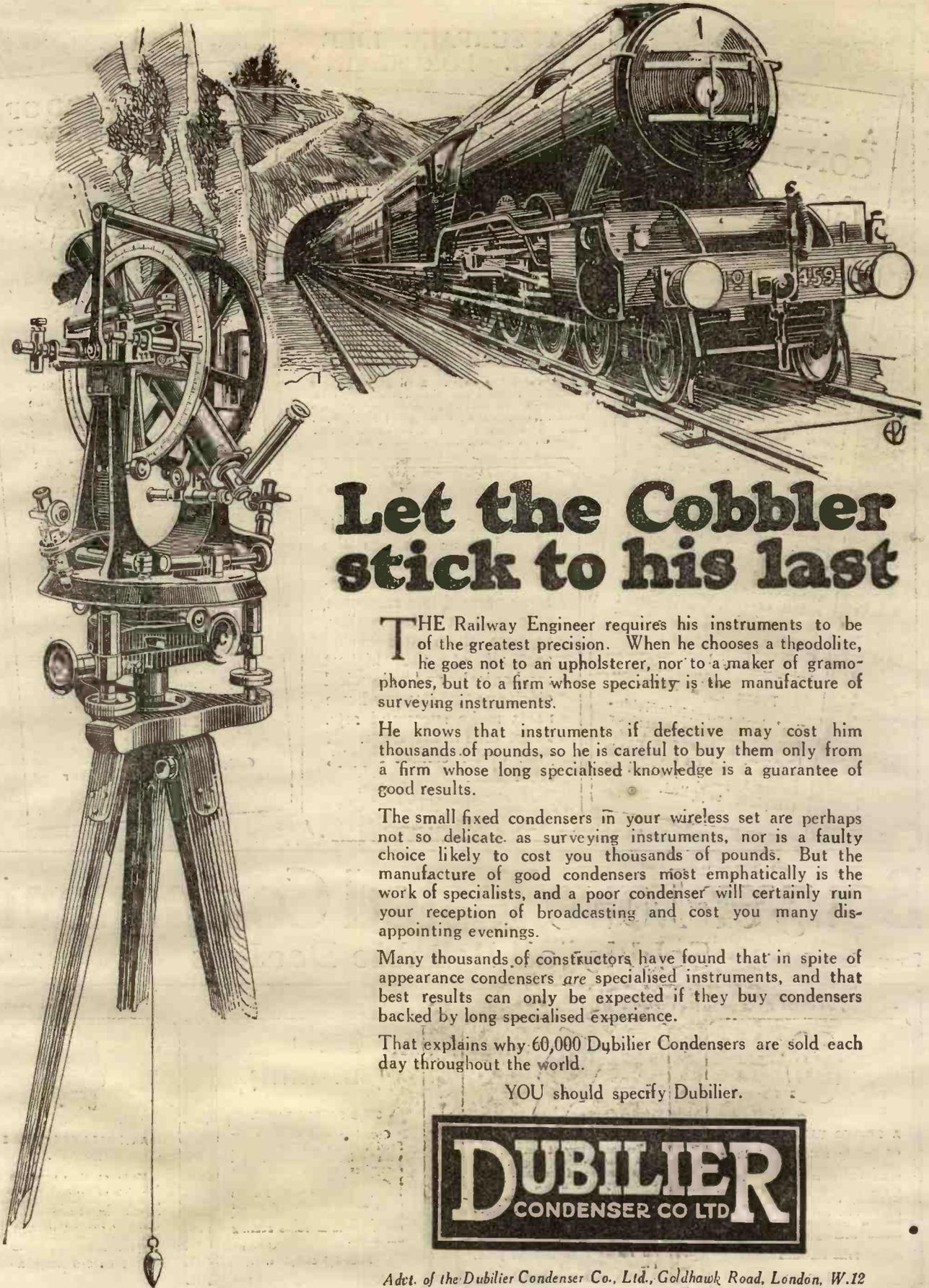


Fig. 4.—A view of the first panel wiring.





## Let the Cobbler stick to his last

THE Railway Engineer requires his instruments to be of the greatest precision. When he chooses a theodolite, he goes not to an upholsterer, nor to a maker of gramophones, but to a firm whose speciality is the manufacture of surveying instruments.

He knows that instruments if defective may cost him thousands of pounds, so he is careful to buy them only from a firm whose long specialised knowledge is a guarantee of good results.

The small fixed condensers in your wireless set are perhaps not so delicate as surveying instruments, nor is a faulty choice likely to cost you thousands of pounds. But the manufacture of good condensers most emphatically is the work of specialists, and a poor condenser will certainly ruin your reception of broadcasting and cost you many disappointing evenings.

Many thousands of constructors have found that in spite of appearance condensers are specialised instruments, and that best results can only be expected if they buy condensers backed by long specialised experience.

That explains why 60,000 Dubilier Condensers are sold each day throughout the world.

YOU should specify Dubilier.



Advt. of the Dubilier Condenser Co., Ltd., Goldhawk Road, London, W.12

E.P.S. F. 1

In replying to advertisers, please mention THE WIRELESS CONSTRUCTOR.

### A NEUTRODYNE CONDENSER



EVERY Neutrodyne Circuit needs a condenser whose minimum capacity is practically zero and whose maximum is less than the minimum of an ordinary condenser. The instrument illustrated fills these conditions. It has been carefully tested and yields admirable results in any Neutrodyne Circuit. The base rod and the operating spindle are of ebonite; the plates and standards are of heavy gauge brass. Fixing is by a single screw, with an additional  $\frac{1}{8}$  in. hole in the panel for the operating spindle. Every detail of this production is up to the high standard demanded of Bowyer-Lowe Components. The price is exceptionally low.

PRICE 5/- EACH.

Each instrument is individually packed in a container bearing our name and trade-mark. Insist on seeing this before buying. Drilling template supplied.

### "A SURFACE LIKE FINE PORCELAIN"



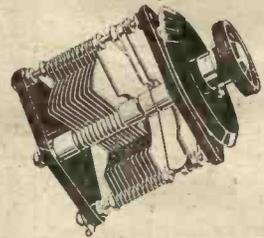
In these words a customer describes the first Bowyer-Lowe Panel he bought. Every Bowyer-Lowe Panel is finely finished, but what is more important, every one is guaranteed to be entirely free from metal and may be used without rubbing down.

### BOWYER-LOWE TESTED RADIO PANELS

Sold in sealed packages. Semi Matt, 3d. per sq. inch. Polished one side and all edges 1d. per sq. inch. Drilled and engraved for any Radio Press Set (except OMNI top panel) 1 1/2d. per sq. inch. Thickness  $\frac{1}{8}$  inch in all cases. Order direct if your dealer does not stock.

THE Set you make is just as good as the parts you put into it. Those who use Bowyer-Lowe parts obtain reception of unusually fine quality, because these components are all of the highest mechanical and electrical efficiency. Bowyer-Lowe parts make successful sets. Insist on having them. If your dealer cannot supply, order direct.

### A STANDARD OF PERFORMANCE



Prov. Pat. 7213/24.

MONEY cannot buy condensers of higher efficiency than the Bowyer-Lowe Square Law type. They have the highest capacity ratios in wireless and as a result yield signals of a purity and volume not otherwise to be obtained. Install them in your sets and notice the difference they make. Tuning will be simplified, your wavelength range will be increased, and you will obtain reception free from distortion.

#### FOUR TYPES MADE.

- Standard, .0003 to .0015 m.f.
- Vernier, .0002 to .001 m.f.
- Double, .0001 to .0005 m.f.
- Triple, .0002 to .0003 m.f.
- Quadruple, made to order.

#### AT PRICES FROM

11/6

Order direct or from your Dealer.

# Bowyer-Lowe Tested Components

Bowyer-Lowe Co. Ltd.

Sold by all Reliable Dealers

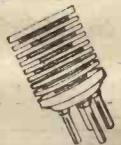
Letchworth



#### A BETTER VALVE WINDOW

Of heavily nickel-plated Brass, Bezel rounded on outer and inner circumferences. Nuts, bolts, backing plate and gauze supplied. Outer diameter  $1\frac{1}{2}$  in., inner diameter 1 in. Each window individually packed in carton bearing our trade-mark.

Price 9d, each.



#### H.F. TRANSFORMERS.

You may buy at random any two Bowyer-Lowe Plug-in H.F. Transformers of the same range and they will match perfectly. There is no necessity to ask for special matching for H.F. Stages if you buy these standard transformers of guaranteed quality. All terminals clearly marked. All ranges at a uniform price. Particulars on request.

Price 7/- each.



#### STUD SWITCH PARTS.

Complete sets of parts for Stud Switches, 2 to 10-way, with  $\frac{1}{4}$  in. radius arms. Set comprises Switch Arm with Ebonite Knob, Bush, Contact Plate, 10 Studs with 2 Nuts each, and 2 Stops. Lacquered finish. Drilling template supplied. Sold in boxes bearing our name.

Price 2/3 complete.



#### ANTI-CAPACITY VALVE HOLDER.

Made at the suggestion of Mr. P. W. Harris in a form to give high efficiency, especially on short wavelengths. Can be fitted to Panel without nuts, as the ebonite base plate is tapped. Lacquered finish.

Price 1/2 complete.

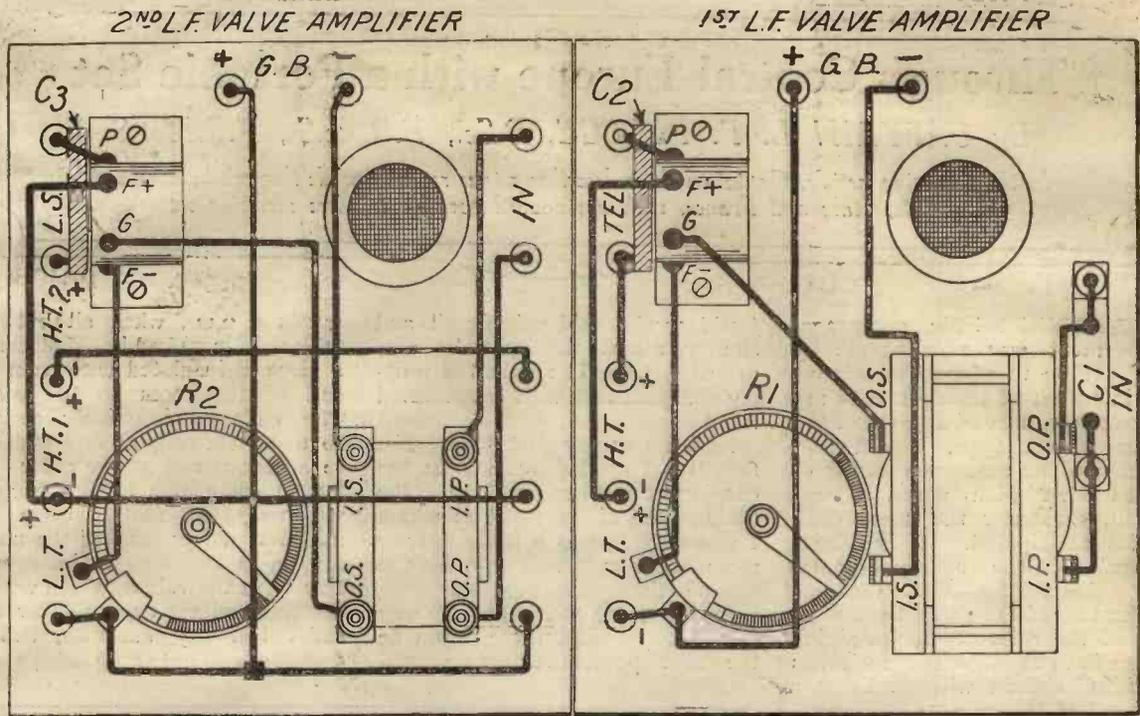


Fig. 7.—Practical wiring diagram. Full-sized blue print, Croo 5B, price 1/6 post free.

(Continued from page 218.)

Drill the panel in accordance with Fig. 5, remembering to provide 5 holes down the left-hand side instead of only 2; fit the components and terminals in place and wire up in accordance with the back of panel wiring diagram, Fig. 7.

Readers who decide to construct both panels for use as a two-valve amplifier, will require a containing box or cabinet measuring 12 in. by

7 in. by 4½ in. deep. The cabinet illustrated in Fig. 1 was made by Baker & Russell.

**The Complete Two-Stage Amplifier**

With both panels completed and fitted side by side in the containing box, corresponding terminals in the two centre rows are to be connected together by means of short pieces of No. 16 gauge wire, connections are to be made to the

existing receiving set and to the loud-speaker and batteries as indicated pictorially in Fig. 2, which

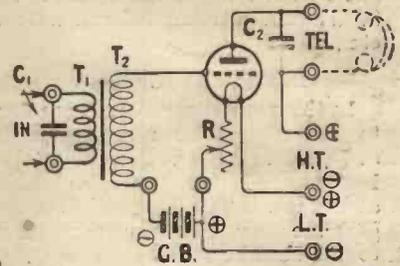


Fig. 9.

is a complete circuit diagram of the two-valve amplifier.

With from 100 to 120 volts on the anode of the second valve, a negative grid bias of from 4½ to 6 volts will usually be found satisfactory.

By the provision of a special terminal (HT<sub>2</sub>+), any additional voltage may be applied to the anode of the second valve, so that one of the small power valves may be employed with suitable anode voltage and negative grid potential in order to obtain a greater volume of sound from the loud-speaker than would be the case with the ordinary type of receiving valve.

With the completed amplifier connected to a crystal receiving set, some 15 miles from the broadcasting station, extremely clear loud speaking was obtained of sufficient volume to be easily audible all over the house.

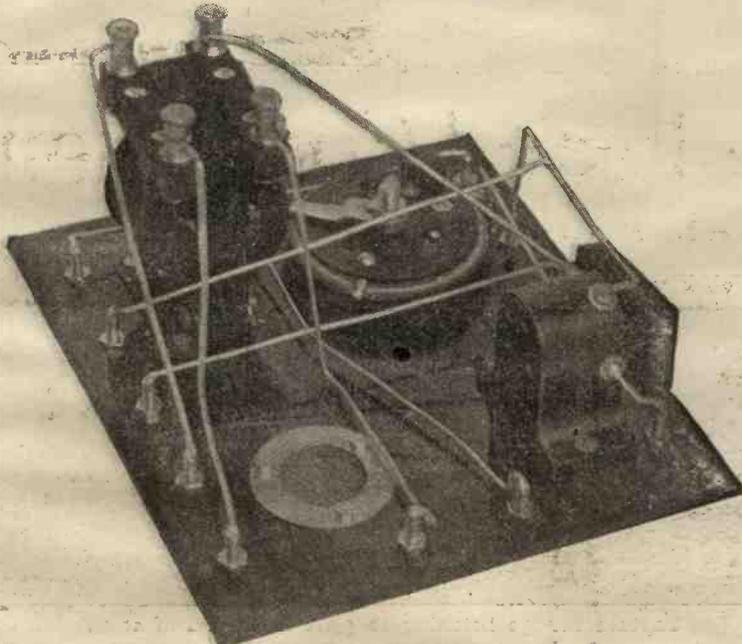


Fig. 8.—The wiring of the second panel.

## Through Central Europe with a Portable Set

By CAPTAIN L. F. PLUGGE, B.Sc., F.R.Ae.S., F.R.Met.S.

In the following article, Captain Plugge describes a tour recently made through Switzerland, Austria, Italy and France, with a standard portable wireless receiving set

ALTHOUGH little encouragement was afforded me by those to whom I mentioned my intention of taking one of my instruments, a two-valve set of the reflex circuit type, I did not, thanks to the numerous letters of introduction with which I was armed, encounter the many difficulties anticipated. I had been warned of the stringent rules laid down by the Customs Authorities of the various countries and of the difficulty in obtaining a permit to install or use a wireless receiving station without being a national of the country concerned, even if the station were to be a fixed station. What would it be for a portable one? I was told of the laws forbidding the use of foreign material, the licences to be got out in such cases, the forms to be filled in, the questions to be answered, etc., etc.

### Diplomatic Kindness

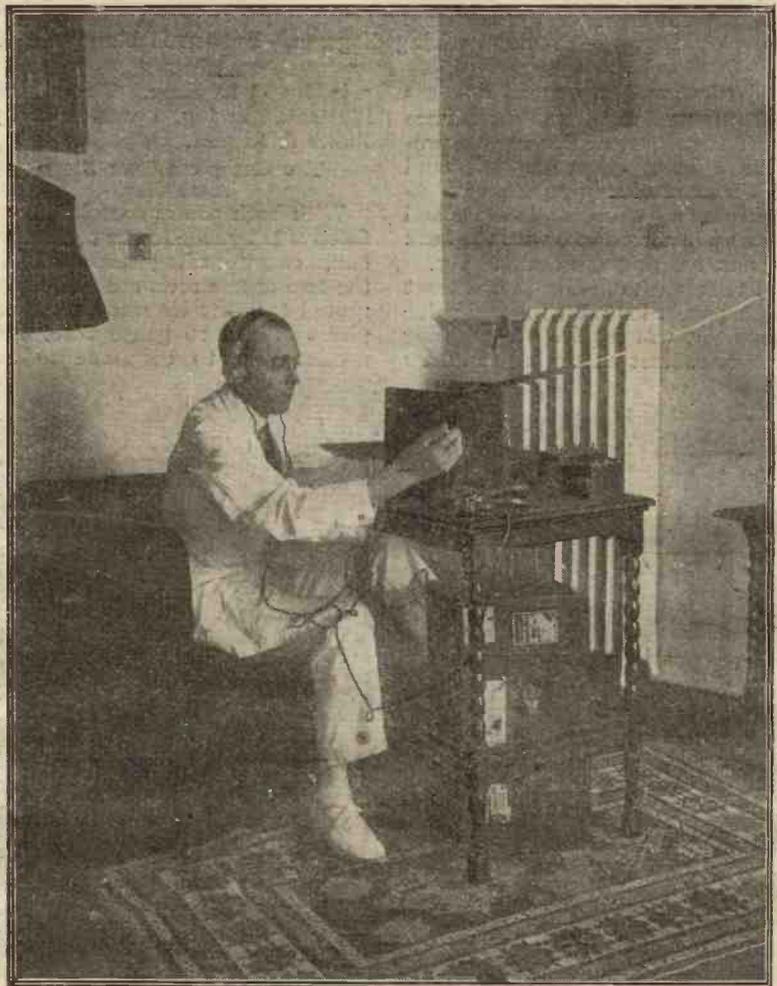
In this respect my thanks are due to the diplomatic representatives in London of the various countries I traversed for their valuable assistance. The credentials they gave me proved an "open sesame" to the hard hearts of the *gendarme*, *doganiere*, *zollbeamter* and *donanier* alike, who, "ne connaissant que leur consigne," are the most difficult people to move. I was told that a considerable sum of money would have to be left as a guarantee at Dieppe and a declaration made that the instrument would be taken direct to Switzerland without being used. Looking back at the "hold-ups" I experienced at the different frontier towns, I am inclined to advise all travellers who do not like their luggage examined to travel with a portable wireless set. This probably needs some explanation. The fact was that declaration of the wireless gear caused so much commotion and evinced so much interest to all concerned, that after its examination there was no other question about the rest of my numerous bags. These were immediately chalked without a murmur. Escorted by the heavily laden

*facchine*, who told volubly all and sundry about the case he was carrying, I would regain the waiting compartment with a contented mind.

Zurich was my first stop. The first test I carried out was in the evening of my arrival there. The dining-room of the hotel at which I was staying was a fairly narrow room, some 40 ft. in length, on the ground floor. Heating was provided by steam radiators. To any wireless enthusiast these would be the first points to notice. To-

wards 9 p.m., when all but two tables of diners had left, I stretched a piece of insulated wire from one end of the room to the other. The ends were quickly secured to a curtain-ring at one end and to a picture-rail at the other. To fix an earth clip to the radiator was only the matter of a few minutes. After making the necessary connections to the instrument I fitted in the valves, which were of the dull-emitter type, fed by four small bell dry batteries, two in

(Continued on page 226.)



Captain Plugge listening to 5XX in his room at the Hotel Britannique, Bordighera.

# "UTILITY"

## NO CAPACITY



WC 147/2.

LEVER PATTERN. each		
No. WC 147/1	(1 Pole C.O.)	4/3
No. WC 147/2	(2 " C.O.)	5/-
No. WC 147/3	(3 " C.O.)	6/-
No. WC 147/4	(4 " C.O.)	7/6
No. WC 147/5	(5 " C.O.)	10/-
No. WC 147/6	(6 " C.O.)	10/-

KNOB PATTERN. each		
No. WC 130/1	(1 Pole C.O.)	3/9
No. WC 130/2	(2 " C.O.)	4/-
No. WC 130/3	(3 " C.O.)	5/-
No. WC 130/4	(4 " C.O.)	6/-
No. WC 130/5	(5 " C.O.)	7/-
No. WC 130/6	(6 " C.O.)	8/-

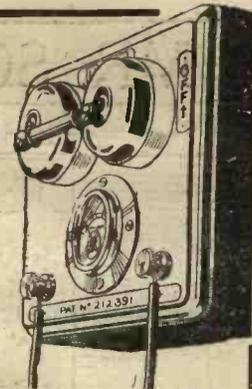
Black Bronzed.

Lever type nic el plated 6l. each extra.

**WILKINS & WRIGHT, LTD.,**  
Utility Works — Kenyon Street,  
BIRMINGHAM.

# SWITCHES

## Charge your own ACCUMULATORS at home — FREE



FOR DIRECT CURRENT ONLY

Cut out the continual weekly expense of having your accumulators re-charged. Eliminate the annoyance of being left with accumulators run down just when you want them most, and the trouble of carrying them to the nearest garage for re-charging. Do away with all this NOW by charging your own accumulators at home, and absolutely without cost.

If you have a Direct Current supply of electricity of any voltage in your house, either for lighting or heating purposes, all you need to charge your own accumulators at home is the

## ULINKIN

PATENT No. 212391.

**The D.C. HOME CHARGER** which charges your batteries automatically whenever you have lights, radiators, electric irons or vacuum cleaners in use in any part of your house, without consuming any extra current, and therefore free of cost.

**PRICE £2:2:0** CARR. FREE.

Complete with simple instructions.

Send 42/- for a ULINKIN To-day, or write for illustrated booklet and fuller particulars.

Trade Enquiries Invited.

**The Gran-Goldman Service**

(Dept. C.3), 71, Fleet Street, London, E.C.4.

An Electrical Engineer says: "Please forward another of your 'Ulinkin' Chargers. The last one I installed gives every satisfaction. It has practically paid for itself already. A splendid little instrument."

**AUTOMATIC IN ACTION**  
Requires no attention.  
Cannot go wrong.

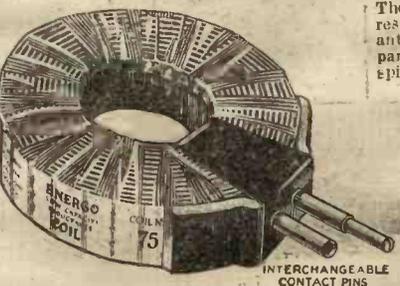


### Energo H.F. TRANSFORMERS MATCHED.

Most attractive and efficient. Wound with silk-covered wire. Made in all wavelengths.

No.	Wave Length in Meters.	Price.
1	150-450	3/9
2	250-700	4/-
3	450-1200	4/3
4	900-2000	4/6
5	1600-3000	4/9
6	2000-5000	5/-

Wave lengths when used with .002 Condenser in parallel across primary



INTERCHANGEABLE CONTACT PINS

# Energo PRODUCTS

A selection is shown here of some of our components which created such widespread interest at the White City Wireless Exhibition. They are entirely British, very finely finished, efficient products, and are guaranteed by us. Thoroughly recommended for home constructors and manufacturers.

Purchase from your local dealer.

If any difficulty in obtaining, please write direct to—  
**ENERGO PRODUCTS, LTD.,**  
2, OLIVERS YARD, E.C.1

### Energo LOW CAPACITY TUNING COILS.

Sharp Tuning. Low Self-capacity. Low Resistance. High Inductance.

These coils have been specially designed to give maximum results. Patent air-spaced winding and mounted in an anti-capacity and feather-weight method, they are particularly suitable where coil holders with loosely fitted spindles are used.

#### Approximate Wave length Shunted with Condenser.

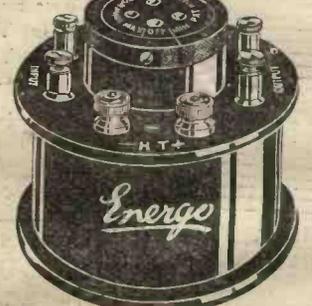
No.	Min. .0005	Max. .001	Price.
25	85	280	3/6
35	125	450	3/9
50	140	650	4/-
75	225	975	4/6
100	300	1300	5/4
150	500	2000	6/-
200	600	2500	6/10
250	750	2750	7/1
300	1000	4000	7/5
400	1300	5250	8/3
500	1350	6500	9/-



### Energo L.F. TRANSFORMER

For Supreme Results, Efficiency Finish and Permanent Reliability. The Energo L.F. Transformer is highly suitable for all circuits, and especially recommended for first stage and reflex circuits. Price 15/- each.

The Talk of the White City Exhibition

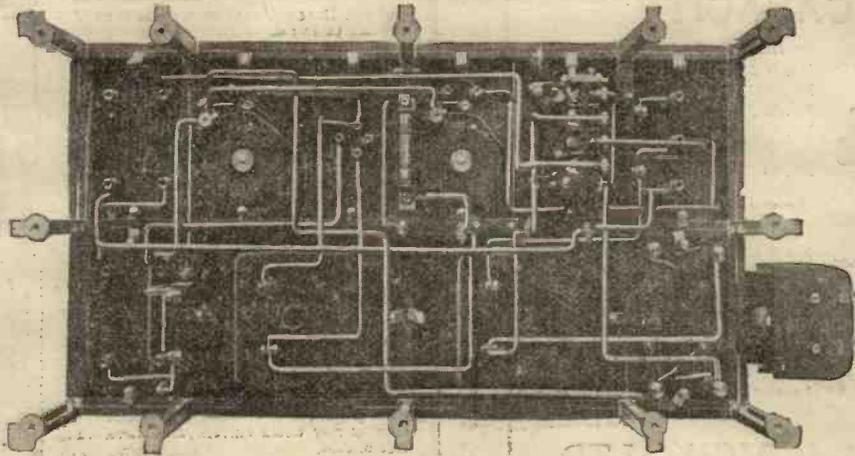


### Energo ONE-VALVE AMPLIFIER

This unit embodies our Energo L.F. Transformer which ensures perfect amplification, a combined patent valve holder and rheostat, the whole fitted entirely in ebonite. Provision is made for grid-bias. Very attractive and highly finished. Full instructions with each. Price 48/- each.

# MR. SCOTT-TAGGART'S "TWIN VALVE"

Described in this Number



NEAT  
WIRING  
SPELLS  
EFFICIENCY

## COMPLETE SPECIFICATION

CAT. No.	QUANTITY	DESCRIPTION	PRICE
	1	N.T. Frame No. 23A and case ....	£ 14 6
	1	$\frac{1}{2}$ PB. 3 terminal panel ....	3 4
CP. 7592	2	$\frac{1}{2}$ PB. 4 " ....	8 0
CP. 7597	1	1 PB. Polar Condenser '0003 mfd. ....	18 0
CP. 7596	1	1 PB. " " '0005 mfd. ....	18 0
CP. 7580	1	$\frac{1}{2}$ PB. Single Valve Holder panel ....	3 8
	2	$\frac{1}{2}$ PB. Valve and Bobbin Rheostat panels ....	18 0
CP. 7847	1	$\frac{1}{2}$ PB. Intervalve Transformer ....	1 6 0
	2	Fixed condensers '0003 ....	7 8
CP. 7660	1	Fixed condenser '002 ....	4 4
A. 488	1	2 megohm grid leak ....	2 6
CP. 7663	1	Grid leak clip ....	1 2
	1	$\frac{1}{2}$ PB. Cam Vernier 'J' type 2-way coilholder ....	15 0
		Insulated Wire ....	1 6
			£8 18

USE THE COUPON  
ON THIS PAGE  
IN ORDER TO  
OBTAIN FULL  
PARTICULARS OF  
POLAR BLOK

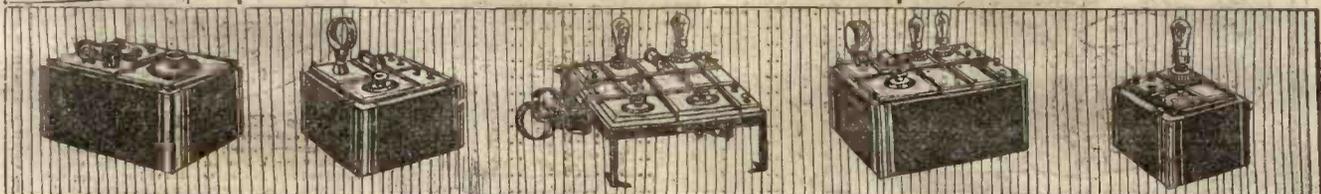
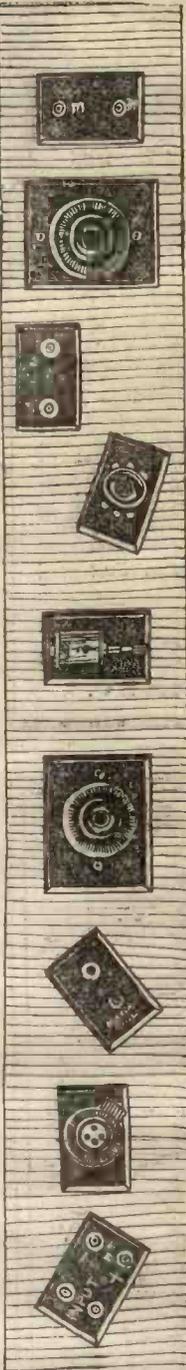
To Radio Communication Co., Ltd.  
(Dept. 28) 34/35, Norfolk Street,  
Strand, W.C.2

Please supply

- (a) The free "Twin-Valve" leaflet.
- (b) The Polar Blok book, price 2/- (post free) for which I enclose remittance for 2/-.

Name.....

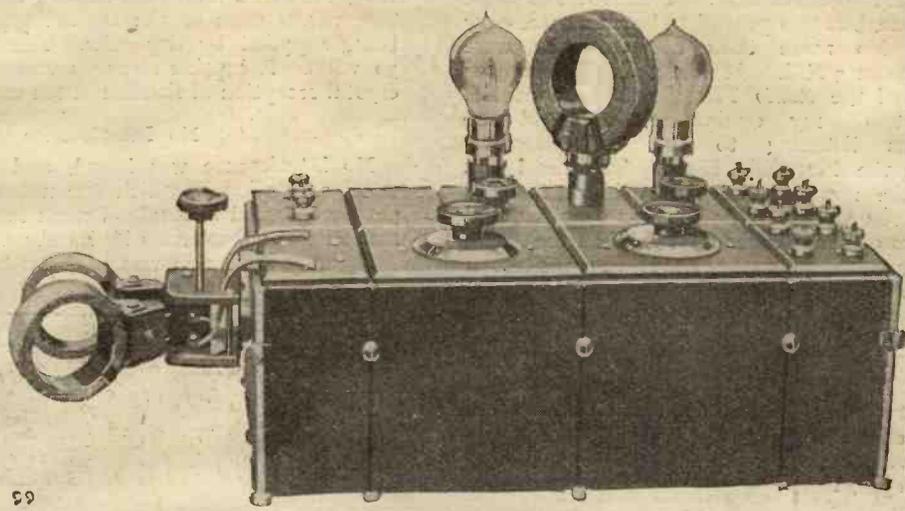
Address.....



RADIO COMMUNICATION COMPANY, LIMITED.

# CIRCUIT BUILT WITH POLAR BLOK APPARATUS

Two Valves do the work of four



POLAR BLOK "TWIN VALVE"

## POLAR BLOK SYSTEM

This photograph shows Mr. Scott-Taggart's Twin Valve circuit built with Polar Blok apparatus and described elsewhere in this issue of the *Wireless Constructor*. This system of set construction & extension is the experimenter's system *par excellence*.

Components are mounted on small panels which are provided with the necessary terminals and clamping units.

These panels can be mounted in any desired order on a frame made up of tubes and connectors and the whole, after being wired up, can be enclosed in a sectional metal box.

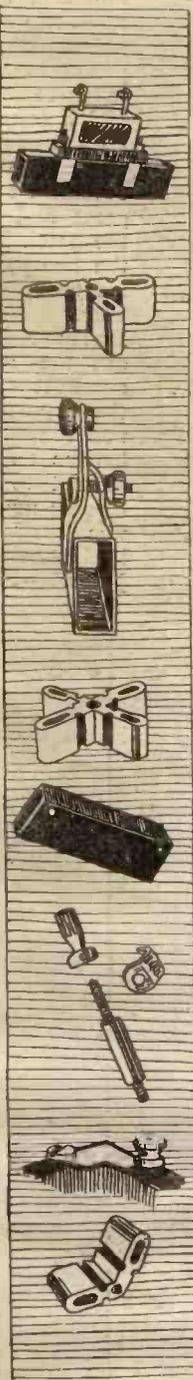
Thus there is no need to drill holes in ebonite, no need to solder numerous wires, no need to discard any parts or material when alterations or extensions are made. At present you may be limited to a few circuits for the reason that you are not able to afford the expense of replacement involved in the extension of a set constructed in the ordinary casual unsystematic manner.

With the Polar Blok System of Set Construction, there are no such limitations. You can try out quickly and efficiently any new circuit by simply rearranging your panels and rewiring your set. Moreover, alterations and extensions of a set built on the Polar Blok principle do not spoil its appearance. Symmetry, compactness and neatness are the invariable characteristics of a Polar Blok set.

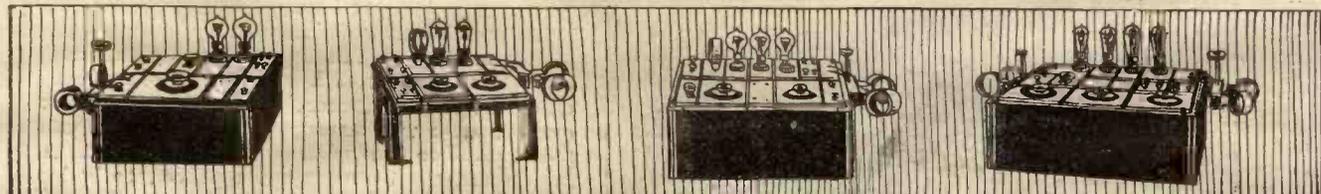
The decorative border of these pages illustrates some Polar component parts and panels, as well as some of the various sets built on this principle.

Combine efficiency and appearance.

Build your Twin Valve Circuit on the Polar Blok System and with Polar Blok apparatus.



AN IDEAL :: CHRISTMAS GIFT  
 THIS POLAR BLOK SET WORKS WELL, LOOKS WELL, AND IS REASONABLE IN PRICE ::



34 - 35, NORFOLK STREET, STRAND, W.C. 2

(Continued from page 222.)

series, and two in parallel. The dull glow of the valves warmed my heart for I had feared that they might have been damaged. However, the valves appeared none the worse for their five hundred miles trip and rough handling. I carried two spare valves with me, but this proved to be an unnecessary precaution. No more than fifty seconds were taken to tune in 5 XX. It was a Sunday evening and a copy of the *Radio Times*, which, of course, formed part of my equipment, informed me that I was listening to the "De Groot's" orchestra at the Piccadilly Hotel. The thrill was great and the news spread like wildfire through the hotel. Even the hotel doctor was sent for, and the two pairs of headphones that I had taken with me never crowned so many heads in so short a time. Mr. Rex Palmer gave out the news in excellent style, and the distance I had taken twenty-four hours to cover seemed to vanish. Closing my eyes, I was back in my bachelor flat in St. James's—the same

voice, the same millibars, the same list of news agencies that I was listening to only two evenings before. My readers with a more technical mind might want to hear some details of the reception. To them I would say the aerial was made of 100 ft. of electron wire, the earth 5 ft. of the same wire to the radiator. The valves were of the D.E.R. type, I.T. current being supplied by dry cells. The H.T. used was 30 volts. Reception strength was equal to normal crystal reception of London at ten miles from ZLO.

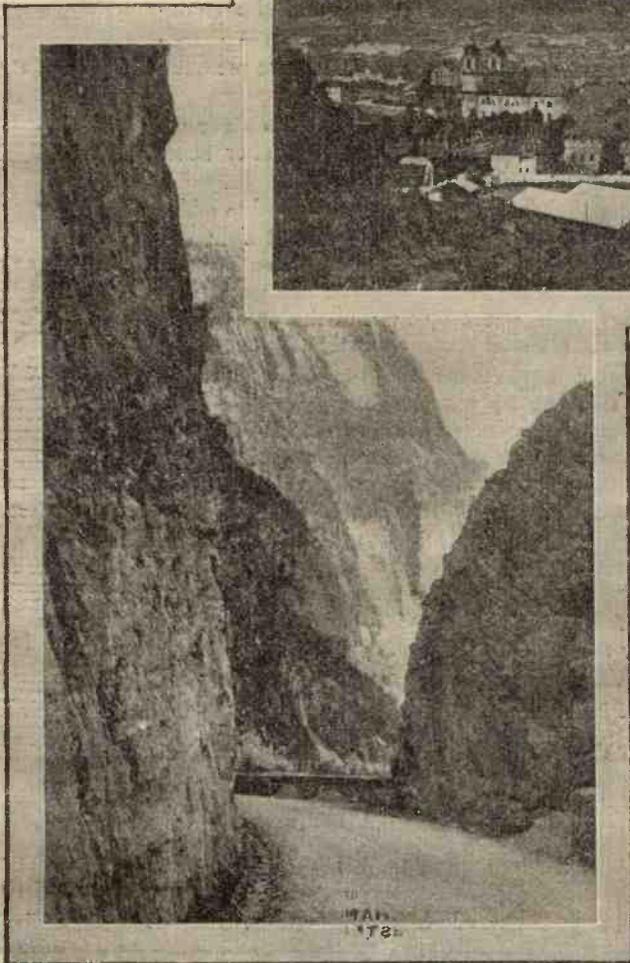
#### No Interference

No interference was heard, and the amount of usual oscillation to which one unfortunately has to get accustomed in England when tuning in a distant station was conspicuous by its absence.

My stay in Zurich was in August and the Zurich



A general view of Innsbruck, showing the peaks which screen the city.



A pass on the famous Dolomite road.

station which is now working with 500 watts on a 650 metres wavelength had not yet been opened, and very few experimenters were about. Those who may endeavour to repeat the experiment now may no longer find the silence to which I refer.

Next Innsbruck in the Austrian Tyrol was reached. Many of my readers, I am sure, know that delightful town on the River Inn surrounded by high and snowy peaks. I had not seen it for the last two years, but there seemed to be no change. It was just as if the town had slept during my two years' absence and awakened again on the morning of my arrival. The rooms at the "Tyrolerhof," where I stayed, were provided with a kind of running balcony—very suitable for fitting an aerial wire I thought. So climbing along the rail at the risk of being accused of trying to enter the next bedroom, the faithful piece of electron wire was strung up. This time it was found possible to stretch out some fifty feet. A radiator in my bedroom again proved to be an excellent earth. The Savoy Bands came through splendidly and in good strength under these

(Continued on page 229.)

# Duodyne

## A LONG DISTANCE LOUD SPEAKER RECEIVER

Two  
Stages  
High  
Frequency  
  
Automatic  
Tuning



**DUODYNE V** combines the Duodyne III and a Two Stage Power Amplifier.

Range Under Average Conditions:

On Headphones - 3,000/4,000 miles LOUD SPEAKER - 1,000/1,200 miles

The extraordinary range and simplicity of operation of this receiver must make an irresistible appeal in Imperial and Continental markets.

Price £18 18s. 0d.

**DUODYNE III** Two stages of H.F. and Detector.  
Ranges Under Average Conditions:

On Headphones - 2/3,000 miles. Price £10

*A child can tune it.*

## A GENERAL PURPOSE FAMILY RECEIVER RADIO - STRUCTA

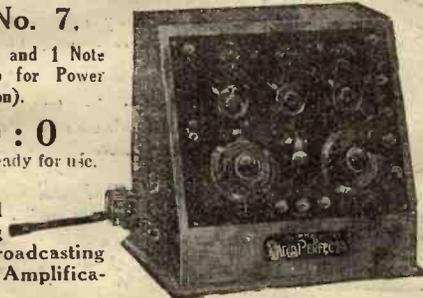
MODEL No. 7.

2 Valves, 1 Detector and 1 Note Magnifier, (wired up for Power Amplification).

£8 : 10 : 0

Wired and Tested ready for use.

Designed to appeal to those who, living adjacent to a Broadcasting Station, find H.F. Amplification unnecessary.



**GUARANTEED RESULTS** 100 Miles from high-powered under average conditions with Station, 35 Miles from Main P.M.G. Aerial for **MAXIMUM** Station (London, &c.), 10 **LOUD SPEAKER** Miles from Relay Station **STRENGTH.** (Plymouth, Leeds, etc).

For other models see lists.

## CURTIS RADIO INSTRUMENTS

EXCLUSIVE in DESIGN  
and in the  
QUALITY of REPRODUCTION



The luxuriously silent functioning of the Curtis Models is the exclusive characteristic which places the Rolls-Royce car somewhat above ordinary comparison.

We would be happy to advise clients as to the model best suited to their requirements and to supervise the efficient erection of the complete installation in conjunction with their local agent.

Prices range from £25 to 200 Gns.

Catalogue of Curtis Radio Instruments is free on application when particularly requested.



## THE RADIONETTE

Two New Models.  
PERFECT RECEPTION  
AT  
160 TO 200 MILES

from the high-powered station. No extra coils required. The many thousands of satisfied Radionette users are a solid guarantee of uniform RADIONETTE efficiency.

**THE RADIONETTE DE LUXE** in handsome French Polished lidded Oak Cabinet (200 to 1,850 metres). Price 21/-

**THE RADIONETTE JUNIOR DE LUXE** for local Broadcast. French Polished lidded Oak Cabinet. All-Ebonite Variometer tuning. Price 16/-

PARAGON CURTIS Products are always of uniform and dependable quality. Ask your local agent for full particulars and illustrated Catalogues.

## PETER CURTIS, LTD.

75, CAMDEN ROAD, N.W. 1.

Telegrams: "Paracurtex." Phone: North 3112 & 3113  
BIRMINGHAM: 76, Newall Street. Central 7236.  
MANCHESTER: 312, Deansgate. Central 5095.

In conjunction with

The PARAGON RUBBER MFG. CO., Ltd.

# Find the true worth of your set!

Find out how many stations you can really get! Don't be satisfied with simply picking up a distant station, but bring it in with all the beauty and strength of tone that you so easily get from your local Broadcast Station. Ask your Dealer for ORMOND SQUARE LAW CONDENSERS (ALL ORMOND PRODUCTS ARE BEST), and give your set a real opportunity to prove its merits.



## PRICES

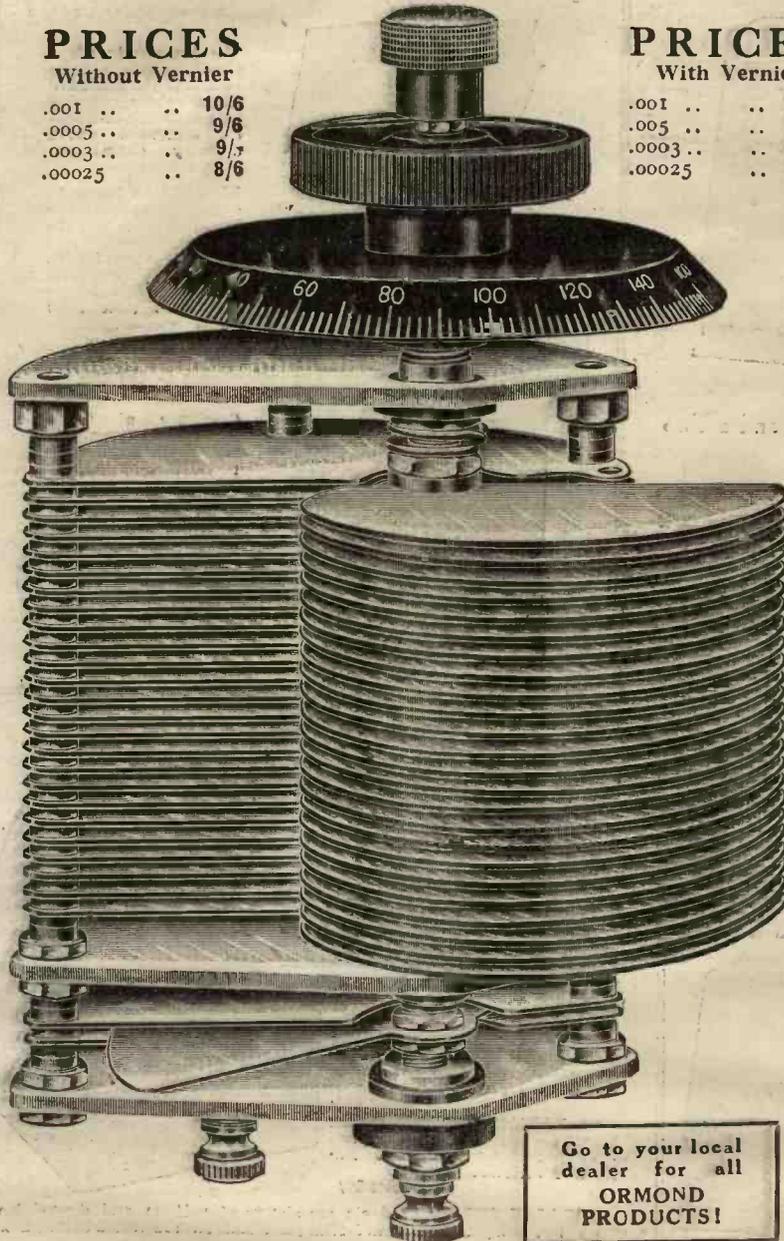
Without Vernier

.001 .. ..	10/6
.0005 .. ..	9/6
.0003 .. ..	9/3
.00025 .. ..	8/6

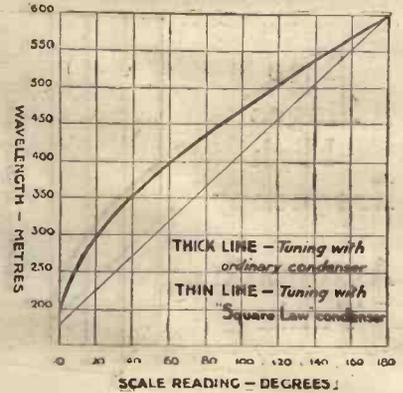
## PRICES

With Vernier

.001 .. ..	12/-
.005 .. ..	11/-
.0003 .. ..	10/6
.00025 .. ..	10/-



Go to your local dealer for all ORMOND PRODUCTS!



## The "Square Law" Type Variable CONDENSER.

The use of a "Square Law" Condenser renders the tuning of a Receiver a very simple matter indeed. A calibration chart may be made by the following simple means:—

Tune in a Station of known wavelength on the lower part of the condenser scale and plot it on the chart. Repeat this process with another station of known wavelength which is received on the upper part of the condenser scale. Draw a straight line through the two points and the chart is complete.

Owing to details of its design, this type of Variable Condenser possesses a negligible minimum capacity, and the specially shaped vanes give an ease of control which is entirely unknown to users of the ordinary type.

We specialise in turning Brass and Steel Screws and Machined Parts and Accessories of all descriptions.

All Cheques and Postal Orders should be crossed and be made payable to "The Ormond Engineering Company."

# Ormond Engineering Co.,

199-205, Pentonville Road, King's Cross, London, N.1.

'Grams: "ORMONDENGI, KINCROSS."

'Phone: Clerkenwell 6652 and 7833.

25 YEARS' BRITISH MANUFACTURING EXPERIENCE.

(Continued from page 226.)

conditions, the set being on the point of oscillation.

#### Innsbruck

At Innsbruck, thanks to the courtesy of the Managing Director of "Tyrolia," a large firm of book-sellers in the Maria Theresienstrasse, I was able to spend a couple of evenings experimenting on the sixty metres aerial erected by them over their store. German and Austrian dull-emitter valves which were on sale there worked well on my set and were very cheap compared with ours. The German valves were seven shillings each, and the Austrian, made in Vienna, eight shillings. Their specification was similar to our British type—2 volts and .25 amp. The British set was much admired. With it I tuned in London and the various German, French and Austrian stations much more easily and with better results than with the best three-valve Austrian set available, with which comparative tests were carried out. Chelmsford came in just like Radiola does in London. I did not anticipate these results because of the special geographical situation which Innsbruck occupies. It is situated in a deep valley and the mountains surrounding it are very near and steep. They seem like huge cliffs rising to more than 2,000 and 3,000 ft.

#### The Dolomite Road

From Innsbruck I proceeded to Bolzano by train and thence by car along the beautiful Dolomite Road, with its ever-changing scenery that one could go on describing for ever, finally reaching Cortina d'Ampezzo. My rooms were booked at "Tre Croci," a palatial hotel some four miles out of the village and a steady half-hour climb by car. There, 8,000 ft. above sea level, surrounded by the warm red columns of the fantastic Dolomite heights, I wondered as I gazed at them what effect they would have on the ether waves. Anticipating more difficult reception, as distance from London was increasing, I succeeded, with the help of my chauffeur, to fix a standard British Post-office 100 ft. aerial between two distant balconies. It was made this time of some lighting flex purchased at Innsbruck. It is not possible to report such good reception from "Tre Croci." Nothing at all was audible except howling and atmospheric until darkness set in. A thunderstorm was raging at the time. The carrier wave from 5XX

was heterodyned at that stage, but only unreadable speech and distorted music came through. After a couple of hours of this standing to attention, "God Save the King" was clearly heard! I was only able to stay two days at "Tre Croci," and consequently had no time to make another night attempt which probably would have been more successful.

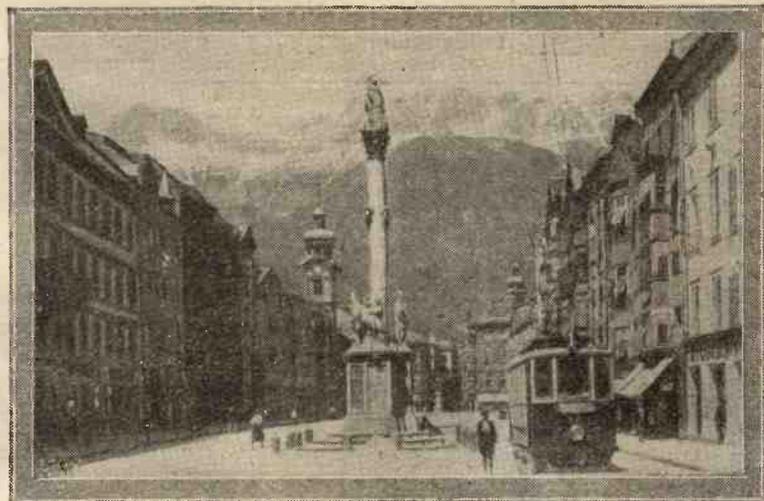
A day's motor drive through the beautiful valley of the Piave, where our troops fought during the Austrian advance, brought me to the Venice Lagoon. Knowing the severity of the Venetian authorities in regard to wireless apparatus (I had been told stories of wireless sets being thrown overboard), it was not without apprehension that I felt the motor-boat which had been waiting for me at "St. Juliana" approach-

in some cases askew, covering a span of more than 300 ft. I heard that local objection to radio arose owing to some discontented inhabitants carrying a receiving set in their gondola. Complete with loud speaker, they would make a practice of pouring out Radiola dance music accompanied by intermittent howling and crackling in the vicinity of the "Serenata." I think that all lovers of Venice and its old and quaint customs will be heart and soul with the Venice authorities in objecting to that.

#### No Aerials at Lido

At the "Excelsior," on the Lido, everyone seemed too gay, bathing all day and dancing all night, to have time to worry about wireless. I saw no aerials at this famous Adriatic resort.

Leaving Venice, I proceeded to



Maria Theresienstrasse, Innsbruck. The publishing firm, "Tyrolia," referred to in this article, may be seen on the right.

ing the Venice marine customs. Boldly pointing to my five pieces of luggage, I said "Niente a dichiarare." I must have an honest face, for no more was said but the usual "Molto bene" with a salute. Wishing to stand by my word, I did not open the wireless case while in the City of Gondolas—temptation was great, however. Wireless did not appear to be entirely debarred at Venice, for as I was paddled the following day down the Grand Canal I noticed several "Palazzi" with aerials that might have made many of us envious. The municipal authorities evidently did not object to wires crossing thoroughfares, nor did they appear to limit Venetians to 100 ft. of the precious thread. Several of the aerials I noticed consisted of a single wire stretched across the Grand Canal from one building to another,

Milan. This great centre of Northern Italy seemed behind the times. Milan is, however, shortly to have a broadcasting station, but everything about it was kept so dark that I was not able to get any reliable information on the matter. We may then look forward this winter to some of the performances at the "Scala," which this station, I understand, will be broadcasting. This will prove an interesting experiment, as the "Scala" of Milan, apart from being the largest opera house in the world, is especially wonderful for the acoustic properties of the auditorium. Standing in the spot occupied by the "Chef d'orchestre," one may clap one's hands ever so slightly and then hear the sound run round the loges echoing some seven to ten times as plainly as a bell.

(Continued on page 233.)

# HULLO EVERYBODY!!

↓ THESE GOODS ARE SENT BY POST. Foreign Packing Extra. ↓ CALLERS! THESE 3 COLUMNS FOR YOU NO POST ORDERS FOR SAME.

**"PARTS FOR 2-VALVE UNIDYNE" RECEIVING SET**

The 4-electrode valve, Thorpe K4 each .. 17/6  
 2 Terminals for .. 10d.  
 6 Microstat Filament Resistances each .. 2/9  
 1 Variable Grid Leak .. 2/6  
 1 Single-Pole Double-Throw Switch .. 1/3  
 1 .0005 Variable Condenser, with Vernier .. 7/3  
 1 Cam Vernier 2-way Coil Holder .. 9/-  
 Panel 5 1/2 in. x 1 1/2 in. drilled to hold two 5-pin valve holders for .. 2/-  
 2 5-pin Valve Holders each .. 1/6  
 1 Fixed Condenser, .001 1/2, 2/2, 3/-  
 1 Fixed Condenser, .002 1/2, 2/2, 3/-  
 1 Shrouded L.F. Transformer, 10-1 .. 20/-  
 8 yds. No. 18 Gauge Tinned Copper Wire .. 1/2  
 Necessary Screws, Nuts, and Washers Free if above lot purchased, and Post Free.



**FERRANTI L.F. BETTER THAN THE BEST 17/6**

Try our light as a Feather Phone, 4000 ohms.

**L.F. TRANSFORMERS**

Eureka Concert Grand £1 10/-  
 No. 2. (Second Stage) £1 2/6  
 Ieranic, 5-1 Ratio 21/-  
 The Ferranti, 4-1 17/6  
 The Silverton, 5-1 21/-  
 The G.R.C. 5-1 15/-  
 The G.R.C. 10-1 20/-  
 Marconi Ideal .. 35/-  
 Power Burndept L.F. 5-1 Ratio .. 25/-  
 Lissen T. 1 L.F. .. 30/-  
 " T. 2 L.F. .. 25/-  
 " T. 3 L.F. .. 16/6

**LOUD SPEAKERS BABY MODELS**

Sterling, 4000 ohms .. £2 15/-  
 Sterling Dinkle .. 1 10/-  
 Brown's 2000 ohms 2 .. 8/-  
 Amplion Junior .. 1 7/6  
 Dragon Fly .. 25/-  
 Ultra .. 27/6

Lead-in tubes: 6d., 7d., 8d.  
 Valve Pins and Nuts 2 a 1d.  
 Stop Pins and Nuts 2 a 1d.  
 Nickel Terminals 2d.  
 Nickel Contact Studs 2 for 1 1/2d.  
 Nickel Switch Arm 1/- (one-hole fixing)  
 Loading Coil and plug 8d.  
 Gages Permalite 1/-  
 Condenser Brushes 6d.

2-meg. Leaks .. 10d.  
 Cheap Fixed .. 6d.  
**RAYMOND FIXED CONDENSERS.**  
 .001, .001 to .0005 10d.  
 .002, .003, .004 .. 1/-  
 .006, 1/3 ; .01 1/9 ; .02 1/9  
 D.C.C. Wire, per lb. .. 13 g. .. 9d. 20 g. .. 9d.  
 22 g. .. 10d. 24 g. .. 1/3  
 28 g. .. 1/1 28 g. .. 1/3  
 30 g. .. 1/6 Etc., etc.

Terminals complete--  
 Brass Pillar .. 1d. 1 1/2d.  
 W.O. or Phone 1d. 1 1/2d.  
 Fancy Patterns 1d. 1 1/2d.  
 Extra large .. 2d. 3d.  
 Valve Sockets 2 for 1 1/2d.  
 Machine cut Screws Stocked (Best).  
 Pullies .. 4 1/2d.  
 4 Taps and Wrench 2/11  
 Screwdrivers .. 6d.

**LARGE NUMBER OF BARGAINS TO CALLERS ONLY**

**ACCUMULATORS**

2 v. 40 amps. .. 9/6  
 4 v. 40 amps. .. 16/0  
 4 v. 60 amps. .. 18/6  
 4 v. 80 amps. .. 23/8  
 6 v. 60 amps. .. 27/6  
 6 v. 80 amps. .. 33/-  
 6 v. 105 amps. .. 38/6

Hart's Stocked. All High Quality.

Neutron Crystal .. 1/8  
 Uranium .. 1/-  
 Midite .. 6d.  
 Enclosed Detectors 9d.  
 Large, Brass, on base 1/3  
 Ditto, Nickel, on base 1/6  
 MicMet Type 2/8  
 Variometers (special) 1/6  
 Ditto, with clips, etc. 2/3  
 Ebonite D.C.C. and Dial .. 3/9  
 Also at 3/11, 4/3, 4/8 up.

**H.T. BATTERIES**

66 N. & K. .. 7/11  
 60 v. .. 7/8  
 30 v. .. 4/6  
 60 B.B.C. .. 9/8  
 36 B.B.C. .. 5/6  
 9v. B.B.C. .. 2/6  
 1.5 (D.E.) .. 1/9  
 Ditto .. 2/- to 3/-

**TOOLS**

Set of Spanners .. 1/8  
 Taps, 0, 2, 4, 6 B.A. set 2/-  
 Small Soldering Irons 1/-  
 7 Twist Drills .. 1/11



**SHIPTON**

**STRIP RHEOSTAT,** 7 ohm (with fuse), 3/-  
 30 ohm, 3/-  
 60 ohm, 3/-  
**POTENTIOMETER,** 600 ohm, 4/6

**DUBILIER TYPE FIXED CONDENSERS.**

The cases are a moulded composition of extremely high insulation quality, and are non-hygroscopic; .002 Ruby mica only is used for dielectric, and the conductive surfaces are cut from the best copper sheet.

.001 to .0005 .. each 1/-  
 .002 to .006 .. each 1/3  
 Post Free.

**RAYMOND PLUG IN COILS.**

25 .. 3/9 150 .. 6/-  
 35 .. 3/9 200 .. 7/-  
 50 .. 3/9 250 .. 7/6  
 75 .. 4/- 300 .. 8/-  
 100 .. 5/6 400 .. 9/6  
 Set of 4 for B.B.C. wave lengths .. 14/11

**FOR NEUTRODYNE CIRCUITS.**

"Colvern" Ind. Vernier. The low maximum of any vernier is adversely affected by capacity effects and any vernier which is employed to give fine tuning MUST NOT be in association with the main tuning condenser.

PRICE 2/6. Post 3d.

**MYERS VALVES UNIVERSAL D.E. 12/6 21/-**

**"RAYMOND" FIXED CONDENSERS.**

Ebonite Base, Terminal Fittings. Post Free.

.001, .001 to .0005, 1/2  
 .002 to .004 .. 1/3  
 .006 .. 1/6  
 .01 and .02 .. 1/9  
 .05 .. 3/8

**MANSBRIDGE TYPE CONDENSERS:**

Best quality obtainable. Accurate, permanent, noiseless, unaffected by atmosphere, beautifully cased, double insulators, two extra fixing lugs, made entirely of finest materials, pass all tests, guaranteed.

1 mfd. .. 3/6  
 2 mfd. .. 3/11  
 Post 3d. each.

**NEWY SNAP TERMINALS.** Complete Set .. 2/6

**DIAMOND WEAVE BASKET COILS (5) EXTRA AIR SPACE (DUPLX WAXLESS)**

Equal to Honeycomb. 25, 35, 75, 100 (wave-lengths marked). Set of 5, 3/9

**"POLAR" MICROMETER 5/6**

CONDENSEE, BOXES, ALL SIZES, STOCKED.

West End Stockist--Polar, Edison Bell, Ferranti, Silvertown, Dubilier, Lissen, Energo, Unidyne, Eureka, G.R.C., Sterling parts, etc.

Tape Aerial, 100 ft. 3/-  
 Sausage Aerial .. 2/6  
 Bns Bar, 1/2 square, 15 feet .. 1/-  
 Bus Bar, 18 square, 15 feet .. 10d.  
 16 D.C.C. Wire per lb. 3/-  
 100 ft. 7/22 and 6  
 Insulators .. 3/6

**PARTS FOR 7 CIRCUIT CRYSTAL SET (Percy Harris).**

.0003 S. Law Condenser, Panel, 10 x 8, Burndept Detector, Terminals, Elix, Carboard Tube, 3 x 7 in., 16 D.C.C., and square tinned, Ratio Press Transfers 22/6 the Lot. Post free.

**CHELMSFORD 5XX.** Post Price.

D.C.C. Coil .. 1/3  
 With adapter .. 2/3  
 D.C.C. Extra Air Space .. 2/11

**PARTS FOR ST. 100 (Less Box & Ebonite) Absolutely Inclusive 26 6s. Od. to £10.**

**"DE LUXE" SUPER LOUD SPEAKER** 2,000 ohms 24/-  
 A "REAL" BARGAIN

Legless Valve Holder 1/-  
 Solid Rod Ditto .. 1/-  
 Under Panel Ditto. 1/6  
 Ebonite Dials .. 8d., 1/-  
 Valve Templates 2d. 4d.  
 Electron Aerial .. 1/3d.  
 Adhesive Tape Roll 2 1/2d.  
 Copper Foil per foot 2 1/2d.  
 1 in. Fibre Strip 3 ft. 2d.  
 Insulated Hooks 4 for 3d.  
 Ditto Staples 5 a 1d.

**"ORMOND" L.F. 13/11**  
 A Wonderful Transformer

**DUTCH '06 VALVES** 12/6

**1 1/2 D.C.C. USUALLY IN STOCK**

Twin Flex 4 yds. 6d.  
 Twin Silk Small 6 yds. 6d.  
 D.C.C. Bell Wire 10 yds. 5d.  
 Knobs, 2 B.A. 2d. 3d. 4d.  
 Small Knobs 6 B.A. 3d.  
 Small Knobs 4 B.A. 3d.  
 Wanger Plugs pair 3d.  
 Gex Insulators each 1d.  
 Tape Aerial 100 ft. 2/-  
 Valve Windows 9d. to 9d.  
 Mica .. 2d.

**BROWNE "IMPROVED" WIRELESS SET - 7/6**

**RAYMOND CRYSTAL SETS** 7/11 9/11 12/11

2 B.A. rod per ft. 2 1/2d.  
 4 B.A. rod per ft. 2d.  
 Basket Holders .. 8 1/2d.  
 Also at 10d., 1/-, 1/3, 1/6  
 2-way Coil Stands 1/11  
 3-way ditto .. 3/11  
 2-way with ex handles .. 2/11  
 3-way ditto .. 4/9  
 4.5 Batteries 4 1/2d.  
 Brass Coil Former 2d.  
 Twist Drills .. 1/4

**PHILLIPS '04 TYPE VALVE** 15/11

Microstat .. 2/6  
 Switch Arms 8d. to 1/-  
 Flex (Red and Black) per yd. 5d.  
 Shellac .. 3d.  
 Loading Coil and Plug 8d.  
 Contact Studs 4 for 1 1/2d.  
 Nickel ditto 2 for 1 1/2d.  
 Nickel Switch arm 1/-  
 Sorbo ear caps pair 1/4  
 Tumbler Switches 1/4

**PHILLIPS 12/6 P.W. "UNIDYNE"**

**"METAL" (FRENCH) '06 VALVES, 15/11**

Phone Cords 6 ft. 1/-, 1/3  
 Nugraving .. 1d.  
 Empire Tape 2 yds. 1d.  
 Allen Var. Grid Leak 1/3  
 Best Sleeving 3 yds. 10d.  
 Rubber Lead-in 10 yds. 1/-  
 Thick ditto. 1d., 2d., & 3d.  
 Aerial, 7/22 100 ft. 1/10d.  
 Ditto, Extra Heavy-100 ft. 2/3  
 Anti Cap. Handles 8d.  
 Tumbler Switches 1/-

**BUS-BAR BOXES**

1/16 sq. - 15 feet 6d.  
 18 sq. - 15 feet 5d.

**BUY RAYMOND GOODS**

5 Waxless Coils 200/2000 .. 1/5  
 5 equal 25 to 100 .. 1/11  
 5 ditto, Extra Air Space .. 2/8  
 6 waxed 200/3800 .. 1/8  
 7 waxed 150/3300 .. 1/11  
 Chelmsford D.C.C. 1/-, 1/3, 2/6  
 With adapter, 9d. extra.  
 Switch Arm 12 Stads, 12 Nuts, 12 Washers.  
 Lot 10 1/2d.

**MANSBRIDGE TYPE FIXED CONDENSERS**

1 MFD. .. 3/6  
 2 MFD. .. 3/11

**D.F.D.T. SWITCHES.**

Min Panel .. 1/-  
 On China Base .. 1/7d.  
 On Ebonite Base 1/11 2/6  
 S.P.D.T. SWITCHES.  
 Miniature Panel .. 10d.  
 On China Base .. 1/1d.  
 On Ebonite 1/3 to 1/9  
 Murray Valve Holder 1/3  
 Spring Washers 4 a 1d.  
 Coil Plug on Base 10d.

**FIBRE STRIP (For Coils)** 3 ft. long, 1 in. wide, 2d.

**BREAST DRILLS 0 to 1/2 chuck**

Cut Bevel and Gear 4/9

De Luxe Crystal Set 7/11  
 4 Whiskers, 1 Gold .. 2d.  
 Coil Plugs (ebonite) 4 1/2d.  
 Ditto .. 8d. 8d.  
 Shaped .. 8d. 1/-  
 5 ohm Rheostat .. 1/3  
 Various 1/3, 1/6, 1/9, 1/11  
 With Dial .. 1/11  
 Ormond .. 1/9  
 'Phone Connector .. 1d.  
 Nuts 2, 4, 6 B.A. doz. 2d.  
 Washers .. 12 s 1d.

**N and K No. 3 17/6 LATEST MODEL 17 6**

New 3-pole Laminated Magnets, which ensure an even max. pull and still greater volume. Windings well insulated. Large size earpieces and leather headbands of standard "N & K" comfortable design. Technically, "N & K" Headphones represent the last word in Wireless Reception.

IMPOSSIBLE TO EQUAL FOR CRYSTAL SETS.

**K. RAYMOND**  
 27, LISLE STREET,  
 LEICESTER SQUARE, W.C.2

**HOURS OF BUSINESS:**  
 DAILY . 9 to 7.45  
 SUNDAY . 10 to 1  
 WE STOCK 3d. sq. in. EBONITE.  
 Phone: GERRARD 4637.

# HULLO EVERYBODY!!

All these Goods sent by Post. Foreign Packing and Post extra.

## "DE LUXE" MODEL



AS SHOWN, WITH DIAL, KNOB AND BUSH.  
 '001 - 7/3  
 '0005 - 5/11  
 '0003 - 5/4  
 '0002 - 4/11

POST 6d. SET.  
 UNSURPASSED FOR FINE TUNING.

John Blair, Esq., Rexall Pharmacy, Milton, says:  
 Your Condensers are a REVELATION to me as a Dealer. Sept., 1924. C. Walton, Esq., Andover:  
 Tested your Condensers on Megger and got "INFINITY."

## NEW MODEL

With knob and dial.

WITH VERNIER.

'001 - 9/3  
 '0005 - 7/3  
 '0003 - 6/9

With EBONITE DIAL and Two Knobs. Post 6d. Set.



## TWIN CONDENSER



SQUARE LAW

'00025 - 12/6  
 '0003 - 12/6  
 '0005 - 18/11

TWIN (ORDINARY)  
 Equal units of '00025 or '0003 9/3  
 Complete with Knob and Dial.



## NEW MODEL

SQUARE LAW

AL'MN ENDS EBONITE ENDS  
 '0003 10/- - 11/6  
 '0005 10/11 - 12/6

With Knob and Dial. Post Free.

## JACKSON BROS.

"J.B." VARIABLE "J.B." ordinary type  
 CONDENSERS. Standard Super Micro-

SQUARE LAW

'001 - 9/6	'00025 - 6/9	'001 - 8/8 - 9/6 - 11/6
'00075 - 9/-	'0002 - 5/6	'00075 - 8/- - 9/- - 11/-
'0005 - 8/-	'0001 - 5/3	'0005 - 7/- - 8/- - 10/-
'0003 - 6/9	Vernier 4/8	'0003 - 5/9 - 6/9 - 8/9
		'00025 - 5/9 - 6/9 - 8/9
		'0002 - 5/- - 5/6 - 8/-
		'0001 - 4/9 - 5/3 - 7/9
		Vernier 4/- - 4/6 -

Complete with Knob and Dial

## STERLING SQUARE LAW

with Vernier.  
 '001 ..... 30/-  
 '0005 ..... 25/6  
 '00025 ..... 23/6

## POLAR

'001 var. Condenser 10/6  
 '005 " " 10/8  
 '0003 " " 10/8  
 Micrometer Condenser 5/8  
 Cam Vernier 2-way Coil Holder 11/-  
 Polar 2-way, with Vernier 11/-  
 Polar 3-way, with Vernier 17/-  
 Polar-Junior, 2-way Cam Vernier 6/-  
 Polar Junior, 3-way Cam Vernier 9/6

## GOSWELL ENGINEERING

Patent Valve Holder 1/6  
 Goswell 2-way coil holder 5/6  
 Goswell 2-way Vernier Coil Holder 9/-  
 Goswell 3-way Coil Holder 7/6  
 Goswell 2-way Panel Mounting 3/-  
 Goswell 3-way Panel Mounting 5/-  
 Goswell 3-way Cam Vernier 12/8

## LISSEN

Variable Grid Leak 2/6  
 Anode Resistance 2/6  
 Lissen Minor 3/6  
 Lissenstat 7/6  
 Do. Universal 10/6  
 2-way Switch 2/9  
 Series Parallel 3/9  
 T1 Transformers 30/-  
 T2, 25/-; T3, 16/6;  
 Coils: 25, 4/10, 30, 35, 40 4/10, 50 5/-, 60 5/4, 75 5/4, 100 6/9.  
 5 point switch 4/-  
 Lissen choke 10/-  
 Aux. Res. 1/3



41 43  
**AMPLION BASKET**  
 Dragon Fly, 2-way, 25/-  
 4/11.

## McMICHAEL'S H.F. TRANSFORMERS

150-300 10/-  
 300-600 10/-  
 1,100-3,000 each  
 (Manufacturer's advance.)  
 100,000 ohms Fixed 2/6  
 32 2 meg. Leak 2/6  
 Both with clips.

## Genuine DR. NESPER HEADPHONES

Adjustable diaphragm, detachable receivers, double leather-covered, head-springs, long flexible cords, nickel plated parts. Very comfortable fitting to the head. LOOK FOR THE TRADE MARK.  
 4,000 ohms 12/11  
 Post 6d. pair.

FRENCH THOMSON-HOUSTON JUST TRY THEM. 4,000 ohms per Pair 15/11

## EDISON BELL

'0001 to '0005 Fixed 1/3  
 '002 to '006 2/-  
 '001 1/3  
 '0003 with Grid Leak 2/6  
 Variometer 10/6  
 Twin Detector 5/6



"R.I." NEW MODEL IN SEALED BOX  
 Don't Buy Otherwise.  
 Post 25/- Free



49  
**FORMO SHROUDED**  
 18/-

## POST ORDERS

Owing to tremendous pressure on Post Dept. ALL POST ORDERS accepted for delivery in strict rotation and on no other terms. Delivery for orders received AFTER Dec. 15 NOT guaranteed before the holidays. But we will do our best.



"BABY" COIL STANDS  
 2-way on base 3/-  
 3-way on base 4/9  
 (brass fittings)  
 2-way ex. handles 4/8  
 3-way do 5/6  
 (nickel fittings)  
 2-way Cam Vernier, high-class 5/9  
 Several high-grade patterns  
 2-way at 5/-, 5/6  
 3-way at 6/11, 7/6

ALL VALVES ON PURCHASER'S RISK.

## VALVES

THORPE K4 (5-pin) 17/8  
 PHILLIPS 4 ELEC-TRODE 12/6  
 (Both for UNIDYNE.)

## BRIGHT EMITTER 12/6 each

B.T.H. R. Type Edison A.R. ..  
 Marconi-Osram R. or R 5 V ..  
 Mullard-Ora ..  
 Cossor P.1 ..  
 Cossor P.1 ..  
 Myers-Universal Mullard H.F. (Red Ring)  
 Mullard L.F. (Green Ring)

## DULL EMITTER 21/- each

B.T.H. Type B.3  
 Edison A.R.D.E.  
 Marconi-Osram D.E.R.  
 25/- each Type  
 B.T.H. B.5  
 Edison A.R.O.6  
 Marconi-Osram D.E.3  
 Mullard D.F.Ora

## DULL EMITTER POWER VALVES

For use with A.R.D.E. and D.E.R. Valves.  
 Marconi-Osram, Type D.E.6, 2-2.5 volt, 25 amps. 25/-

## DULL EMITTER POWER VALVES

For use with '06 Valves:  
 B.T.H. Type B.6 25/-  
 Marconi-Osram Type D.E.4 30/-  
 Mullard, Type D.F.A.2 30/-

## POWER VALVES

For use with Bright Emitters  
 B.T.H. B.4 35/-  
 Marconi-Osram D.E.5 35/-  
 Mullard D.F.A.1 35/-  
 '06 Dutch 13/6  
 Phillips '04 Type 16/11

## FILAMENT RHEOSTATS

Wire Wound Type. Rotary Action.



IGRANIC ohms each.  
 Plain Type 4 & 7 4/8  
 With Vernier Adjustment 4 7/-  
 Plain Type 30 7/-  
 The Raymond 6 1/6  
 The Ormond 2/-

## BASKET COIL HOLDERS

No. 1 2 for 2/-  
 No. 2 2 for 2/6  
 (both with plug)  
 Coil Stand 2-way for Basket Coils 4/11  
 Universal 2-way for Basket Coils 5/11

## HEADPHONES

We can recommend these as being excellent Headphones, with a great reputation. G.R.C. 4,000 ohms resistance, each £1 0 0  
 B.T.H., 4,000 ohms resistance, each £1 5 0  
 Brandas Matched Tone, 4,000 ohms resistance, each £1 5 0  
 Brown Type A, 4,000 ohms resistance, each £3 2 0  
 Sterling, 4,000 ohms resistance, each £1 5 0  
 Geophone, 4,000 ohms resistance, each £1 5 0

Post EBONITE Prices. 3/18th in. 1 in.  
 6 x 6 .. 1/6 2/-  
 7 x 5 .. 1/8 2/-  
 8 x 6 .. 2/- 3/-  
 9 x 6 .. 2/2 3/3  
 10 x 8 .. 3/- 4/2  
 12 x 6 .. 3/3 4/2  
 12 x 9 .. 4/3 5/6  
 12 x 12 .. 5/6 7/6  
 14 x 10 .. 5/6 7/6  
 Cut to Size, 3/16 in. at 1d. square inch.

## DUBILIER

'001, '002, '003, '004, '005, '006, Fixed 3/-  
 '0001, '0002, '0003, '0004, '0005 2/6  
 Type 577, '01 7/6  
 Grid Leaks, each 2/6  
 Anode Resistance 50,000, 70,000, 80,000 100,000, on stand complete 5/6

## IGRANIC

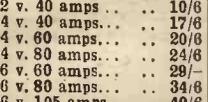
Coils: 25, 5/-; 35, 5/-; 50, 5/2; 75, 5/6; 100, 7/-; 150, 7/10; 200, 9/3; 250, 9/-; 300, 9/5; 400, 10/3; 500, 10/6  
 Fil. Rheostat 4/6  
 Potentiometer 7/-  
 30-ohm Rheostat 7/-

## WATES MICROSTAT

For D.E. or R. Valves 2/9  
 Post Free.



ACCUMULATORS MADE BY WELL-KNOWN FIRM FOR ME. POST PRICES.  
 2 v. 40 amps. 10/6  
 4 v. 40 amps. 17/6  
 4 v. 60 amps. 20/6  
 4 v. 80 amps. 24/6  
 6 v. 60 amps. 29/-  
 6 v. 80 amps. 34/6  
 6 v. 105 amps. 40/6



Formo, open 12/6



Manchester "Powquip," 15/6



Ormond, 14/6



Shrouded "Powquip," 18/-



Standard "Powquip," 14/6

## BRETWOOD (New Model)

Var. Grid Leak 3/-  
 Anode Resistance 3/-



33  
**ENERGO**  
 H.F. Plug-in Transformers  
 No. 1. 150-350 3/6  
 No. 2. 250-700 3/11  
 No. 3. 450-1200 4/3  
 No. 4. 900-2000 4/6  
 No. 5. 1800-3000 4/9  
 No. 6. 2200-5000 4/11



14 21  
 Voltmeter, C and S, one-hole fixing, 1/3



16 44  
 Rheostat, Bretwood with Dial, Valve-holder, extra value, 2/6 1/9



D.P.D.T., 1/5



S.P.D.T., 1/2



15  
 Grid Leak, 1/-, 1/3, 2/6

## WATMEL

Var. Grid Leak 2/6  
 Anode Resistance 3/6



51 Enclosed Detector Micrometer Adjustment, 1/9  
 By post 2/3.

RIGHT OPPOSITE DALY'S GALLERY DOOR

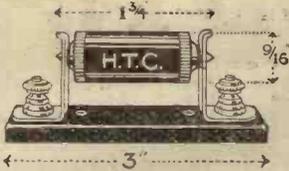
# K. RAYMOND

27, LISLE STREET, LEICESTER SQUARE, W.C.2

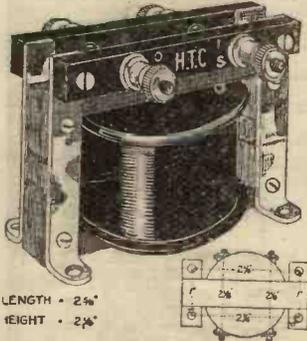
HOURS OF BUSINESS: DAILY - 9 to 7.45 SUNDAY - 10 to 1

No responsibility accepted on post orders unless cheques and postal orders are crossed and made payable to the firm. Moneys sent must be registered

Phone: GERRARD 4637



**A FIXED DETECTOR.** New & Reliable. A decade of crystal reception has seen the introduction of various types of crystal rectifiers—catwhisker and otherwise. After but a few evenings' sapping pastime in searching for that sensitive spot—one you lost in the eternal search for one better—you'll find, as experimenters who have used crystal detectors for years, that a good crystal combination is alone satisfactory. **H.T.C. Detector** . . . 3/6  
Complete with Ebonite Base, Clips and Terminals . . . 4/6



**A DISTORTIONLESS L.F. TRANSFORMER.** Specially wound to prevent breaking down of primary winding—a common fault with many expensive transformers. Price 15/-

# SMALL THINGS PLAY GREAT PARTS

Small things do play very great parts: and it is only after considerable experience you will discover that highly efficient Radio Apparatus is built of highly efficient components—small things playing great parts.

The Valve holder carries the heart of your receiver. Ordinary valve sockets carried in a moulding with poor insulating properties with nuts and washers only 1-16th inch apart are proved, by simple comparison, of very low efficiency. Such an arrangement produces distortion, short-distance paralysis and flat tuning in any receiver—adding considerably to the paralysing inter-electrode capacity of the four-pin valve.

Technical authorities—John Scott Taggart, F.Inst. P. A.M.I.E.E., and Percy W. Harris, the Editor of this journal—are quite definite in their recommendation.

For successful H.F. reception use Low Capacity Valve Holders. For the highest efficiency of any stage, use Low Capacity Valve Holders.

Do not wait to find out these things for yourself—take their advice.

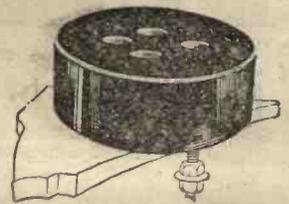
The H.T.C. are specifically designed to give efficiency to the heart of your receiver. Do not blind yourself. Fit H.T.C. Low Capacity Valve Holders—they get the best from your valves.

Type A (above Panel). Templates supplied . . . 1/9  
Type B (below Panel). " " " " . . . 1/6

*Dealer, if they do not stock H.T.C. Products, may try to persuade you that something they have in stock is just as good. H.T.C. Products are unequalled for their electrical performance. If your dealer, perchance, does not stock them—be advised—send direct to:*

## H.T.C. ELECTRICAL CO., LTD.

2 and 2a, BOUNDARIES ROAD, BALHAM, S.W.12  
Trade Enquiries Invited. Telephone: Battersea 374



Type A (above panel). This model especially appeals to those who prefer above-panel mounting. Template supplied.

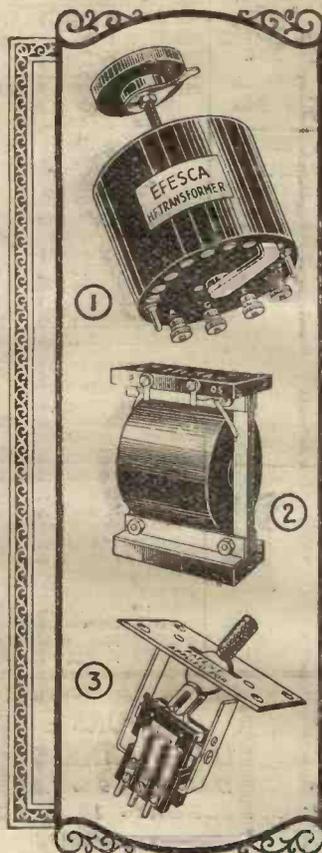


Type C (below panel). The special advantage of this type is the method of mounting—below panel. Template supplied.

**WARNING.** Purchasers of Valve Holders are notified to beware of imitations. It is very necessary when buying to look for the name H.T.C. on the template, without which no Valve-Holder is the genuine and original H.T.C. It may be taken that colourable imitations—simply because they are imitations—will not nor cannot give the efficiency which is inherent to the H.T.C.

BRITISH & FOREIGN PATENTS APPLIED FOR.

Barlays 410



The Components illustrated are:

1. **EFESCA HIGH-FREQUENCY TRANSFORMER.**—Specially recommended where more than one stage of high frequency amplification is required. Can be employed immediately preceding a reactance coupling to form two high-frequency stages or any number of separate transformers may be used in combination. Can also be used as a Tuned Anode Transformer by shunting the primary with a .0003 mfd. variable Condenser in any number of stages. Wavelength range, 150-2,600 metres, complete as illustration, wound on ebonite former, 21/- Ditto, embodying Grid Leak and (.0003) Condenser, for use as Transformer connected to Detector Valve, 25/-.

2. **EFESCA SPEECH AMPLIFYING TRANSFORMER TYPE "C."** This Transformer is designed to give the amplification of a power Transformer without the loss in purity of reproduction generally experienced with power amplification. The coil is wound in a special manner to neutralise resonant effect, while the laminations of the core are extra carefully insulated from each other to localise eddy currents and thus prevent distortion. Ratio 2-1 one hole fixing, 25/-.

3. **EFESCA ANTI-CAPACITY SWITCH** (Patent applied for).—A double pole, double throw switch, specially designed to minimise the capacity which exists in most change-over switches. The contact brushes are of phosphor bronze and present only their edges to each other with a comparatively wide air gap—thus practically eliminating all capacity effects. The operating lever is at no time in electrical contact with the carrying block which makes contact with the brushes. Price 8/- each.

You can build a better set with



ONE-HOLE FIXING WIRELESS COMPONENTS.

There is hardly a wireless enthusiast who is entirely satisfied with his set. He wants still better results—and they can be had by building with Efesca parts. Each is designed to give the maximum efficiency. A combination of Efesca components, therefore, leaves nothing to be desired. Each part is the outcome of much careful study—a real scientific instrument of unique design and first-class workmanship. They are stocked by wireless dealers, ironmongers and electricians.

Learn more of Efesca parts by sending for Catalogue 522 which contains the full range. It's FREE.

For those not interested in the constructional side there is a wide range of complete Efescaphone Sets from the simple crystal set to the multi-wave receiver for loud speaker and long range work.

Wholesale only—

FALK, STADELMANN & CO., LTD.  
Efesca Electric Works, 83-85-87,  
Farringdon Road, LONDON, E.C.1.

And at Glasgow, Manchester and Birmingham.

(Continued from page 229.)

**Periodicals**

I found a good many wireless periodicals at the bookstalls: "Radio Novita," "Radio Revista Marconi," "Radio fonia," "La Radio per Tutti," "Il Radio Giornale," "Marconifono," and "La Scienza per Tutti"—showing that interest in broadcasting was growing, though somewhat slowly. I even saw one copy of the *Radio Times* on sale, which made me suppose that, at least, someone must be trying to receive the British stations.

After a short stay at Genoa, that wonderful port on the Mediterranean with its many historical associations, I proceeded to Bordighera. Bordighera is a quaint little village that probably owes much of its fame to the proximity of a villa belonging to the Queen Mother of Italy. Most of the shops, including some of the smallest, display the Royal arms as purveyor to Her Majesty.

As I was intending to stay for some time in this delightful and restful spot, I set to work and erected an outdoor aerial. Thanks to the courtesy of Signor Goldfusso, proprietor of the "Hotel Britannique," where I was staying, a very efficient aerial was affixed. One end was secured to a standard well above the roof of the building, and the other end to the highest branches of a large cypress tree in the hotel's spacious grounds. Some kind person informed me that aeriels were not allowed in Italy without government authority. I ignored this I am afraid. At Bordighera most of the continental broadcasting stations were tuned in on this 150 ft. single-wire aerial. The land and geographical conditions generally in this part of the world were not very favourable for reception, however. Great difficulty was experienced in tuning in home stations during the daytime. As soon as the stars appeared 5XX was plainly received, as also were Radiola and the Eiffel Tower. Frankfort seemed to come through with greater strength than any of the other German, Austrian,

Spanish and British stations. This was strange, considering its small power of 1 kw. and the distance between Bordighera and Frankfort.

**Monte Carlo**

I went on from Bordighera to Mentone and Monte Carlo. The newspaper "L'Eclairer" used to have a transmitting station at Monaco. This, however, was taken down and no transmissions have been taking place from that station for the last eighteen months. The Italian wireless periodicals publishing foreign transmissions, however, continue to include this station in their list of regular transmissions, as giving a concert at 8 p.m. daily. In this respect they are not differing from British periodicals, other than those published by the Radio Press,

the other Italian cities I visited. One of our leading manufacturers of wireless apparatus has a branch there, and in their stores I saw many familiar looking instruments, condensers, frame aeriels, loudspeakers and wireless accessories.

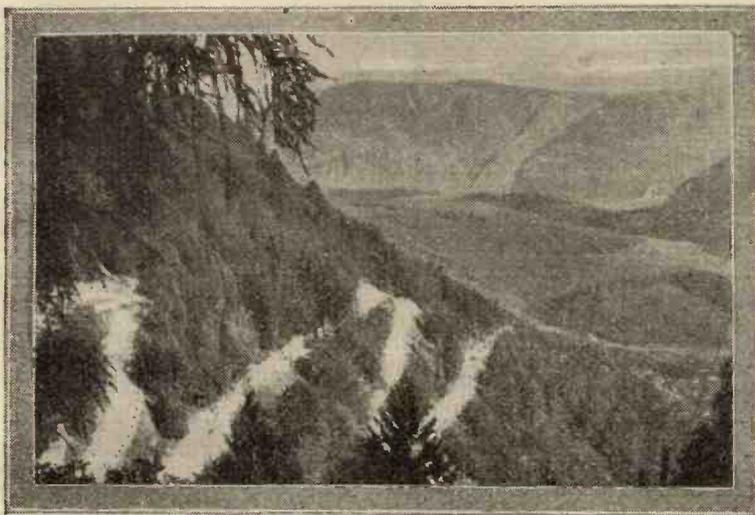
Stopping at Geneva on my way back, I finally arrived at Newhaven, where the Custom officials made no difficulties in allowing me to bring back my wireless purchases.

It is only possible in a small article of this description to give but a skeleton account of results obtained, but there appears to be no doubt that the Chelmsford station has become a great boon to listeners on the Continent. It was an admitted fact everywhere that nothing in the matter of wireless could rival the British programmes.

Since the erection of 5XX, thousands of foreign listeners, who hitherto were not able to tune in the weaker B.B.C. stations, have been able to log that station and thus realise and appreciate what is being done over here.

From many a conversation I gathered what a wonderful instrument of national propaganda 5XX had become. Most teachers of English have a waiting list of pupils, and schools advertising correspondence courses

are fast becoming prosperous; and in no place did I hear anything but praise of the wonderful service provided by the B.B.C. through their high-powered station.



Another view of the famous Dolomite road, showing some of its three hundred hairpin bends.

Ltd. that have, for the last three months, been giving continental stations—probably copied from foreign papers—as transmitting regularly, which have not sent out a carrier wave for the last twelve months.

Proceeding on to Nice and Cannes, I visited the much advertised station of Nice, owned by Radio-Nice. This station has not been working for the last two years. Attraction of outdoor life and sunshine on these southern shores must be too strong to permit of any wireless enthusiasm. It is no wonder that people spend their time far away from the valves and high-tension batteries.

**Turin**

Turin, which was the next town on my itinerary, seemed more alive to broadcasting than any of

**Our Next Number**

**TWO SPECIAL  
:: FEATURES ::**

**A SELF-CONTAINED  
AND HIGHLY EFFICIENT  
SINGLE VALVE REFLEX  
SET.** By Percy W. Harris.

**THE ROLLS-ROYCE OF  
RADIO:** How the Superheterodyne Works. By John Scott Taggart, F.Inst.P., A.M.I.E.E.

# A "Short-Wire" Valve Panel

By A. S. CLARK

*A couple of plug-in coils and a variable condenser brought in America on this little set*

As its name implies, the wiring of the panel about to be described is especially short; and short wiring is always a good point in any set. Actually, less than a foot of wire is used, which is probably the chief reason for the efficiency of the panel. As it measures only 4 in. by 4 in., and the containing box is not more than 2 in. deep, it is very suitable for incorporating in a portable set. Also, since we need no coil-holder or tuning condenser, comparisons of the efficiency of various tuning arrangements are readily made.

### Notes on Components

The components required are few:—

- 1 ebonite panel, 4 in. by 4 in. by 1/4 in.
- 1 0003μF Dubilier condenser with grid leak clips.
- 1 2Ω grid leak (Dubilier).
- 1 Lissenstat Minor.
- 10 terminals (two of which may be of the type with a circular hole for telephone tags).
- 2 Double-type W.O. terminals.
- 1 containing box.
- 1 ft. square section tinned copper wire.

In this particular panel it is

necessary that the grid leak and condenser should be of Dubilier pattern, as the panel is so drilled that the distance between the aerial terminal and the grid socket is equal to that between the soldering lugs of the grid condenser. The two double terminals serve to connect the A.T.I. and the A.T.C., this making it unnecessary to provide four terminals for the purpose. Notice that no telephone condenser is included in the list of components; no difference in signal quality or strength could be detected when this component was omitted, the self-capacity of the telephone leads proving sufficient to

by-pass the H.F. currents. One may be tried, however.

### The Construction

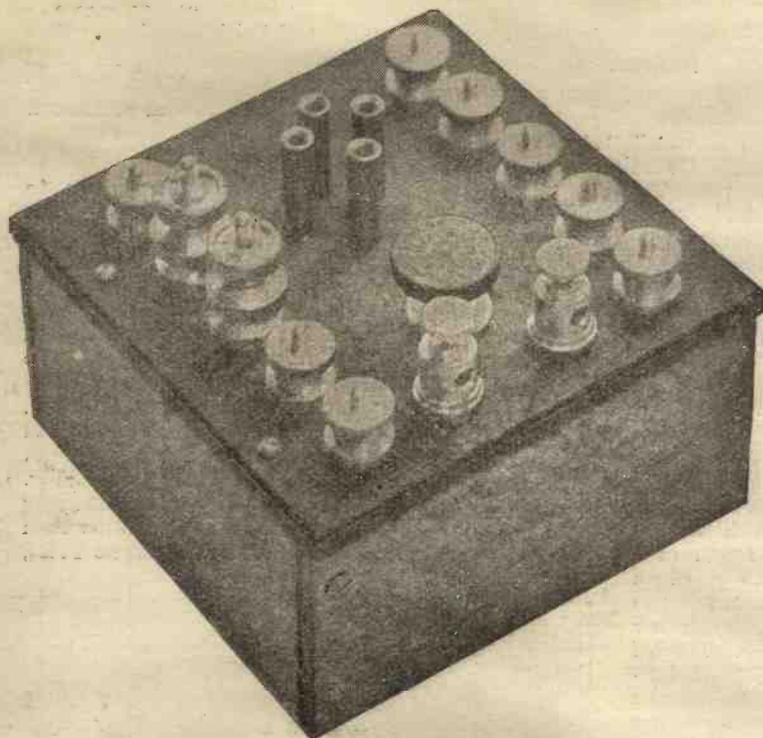
The first step to take in building the panel is to remove the surface skin from the ebonite with fine emery cloth, and then restore its original black colour by rubbing with a piece of rag damped with turpentine. If a guaranteed ebonite is purchased it can be used as bought. Now drill the panel as shown in Fig. 1, marking out the position of the holes with a scriber on the back of the panel. Make the holes of such a size as to allow the terminal shanks and other parts to pass through easily.

Having drilled all the holes required, and fitted the parts and terminals in the positions shown in Fig. 1, all that remains is to wire up the panel. Before commencing it is best to "tin" all shanks and points to which contact is to be made. The panel is wired up in accordance with the wiring diagram given in Fig. 2, the grid condenser being soldered directly to the aerial terminal and grid socket as shown. If desired, 1/4 in. may be cut off the shanks of the double W.O. type terminals, as these are longer than necessary here.

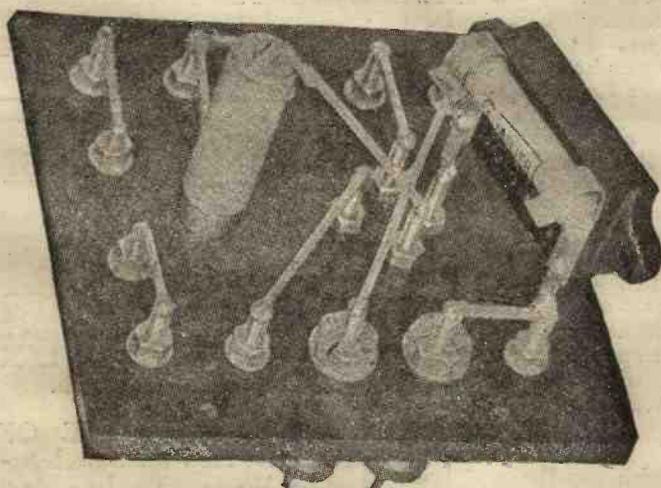
### Containing Box

The containing box need not have any bottom as it is quite small, and will be strong enough without one. The wood out of which it is made

(Continued on page 237.)



This shows the compactness of the panel.



The short wiring is a special feature.

# and now, Brussels...

To the wonderful record of long-distance reception with Neutron Crystal must now be added that of Mr. L. V. Clark, of Experimental Station 5 BT Chiswick, London, who reports receiving clear telephony from BRUSSELS on a Neutron Crystal, without the aid of Amplifiers.



## -with Neutron, the Crystal that is doubling the range of the Crystal Receiver

Sooner or later, you will use Neutron, and then stop searching for better results. You may secure a good crystal by just asking for "a crystal"; but you may also try twenty or thirty first. On the other hand, if you ask for Neutron, in the black-and-yellow tin,

you will inevitably secure optimum results at once—and save the expense of further tests. This was the experience of "W. T. T.," Harrietsham, Kent, who writes:—"I have tried crystal after crystal, but I have never had such a good result before as I have to-day with a

Neutron." The reason why you can depend upon Neutron is that each Neutron is carefully tested and selected, and before ever it reaches your crystal-cup it has been proved at maximum efficiency, for loudness, clearness, and complete sensitiveness.

Stocked by the Best Radio Dealers. Packed in airtight tin, with silver catwhisker. Insist on Neutron, in the Black and Yellow Tin **1/6**

Long Distance  
Circuit Diagram  
**FREE**

Ask your Dealer for Free Diagram (given to each purchaser of a Neutron, on request) of the circuit used by "5.B.T." in receiving Brussels from Chiswick on a Neutron. We send one direct with sample Neutron if you enclose stamped envelope and 1/6 with Dealer's name.



### The Concert-Tested and Guaranteed Radio Crystal

Sole Distributors:—V. Zeitlin & Sons, 144, Theobalds Road, London, W.C.1. Phones: Museum 3795 and 6841.

Produced by:—Neutron Ltd., Sicilian House, Southampton Row, London, W.C.1. Phone: Museum 2677.

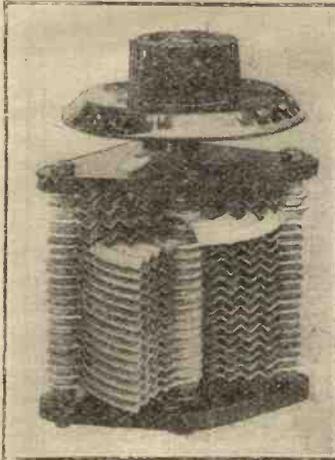
#### District Agents:

Scotland: R. F. Miller & Co., 22, York Place, Edinburgh.  
Plymouth: Mumford & Sons, 68, Mutley Plain, Plymouth.  
Birmingham: Cooke & Whitfield Wireless Ltd., St. Paul's Buildings, 24, St. Paul's Square, Birmingham.

North-East Yorks: Smith & Jordan, The Arcade, Redcar, Yorks.  
Manchester: Garnett's, Islington Grove Works, Salford, Manchester.  
Ireland: Pettigrew & Merriman Ltd., 8, Corporation Street, Belfast.

# THE FAMOUS FORMO

RADIO COMPONENTS



THE  
**FORMO-DENSOR**  
WITH  
**INTEGRAL  
VERNIER**

Coarse and Fine  
Tuning with  
**ONE MOVEMENT**

Supersedes so-called "Square Law"  
BY GIVING  
An Equally Efficient Wave Curve  
**BETTER RESULTS at LESS COST**

.001μF. ... ..	10/6	.0003μF. ... ..	8/3
.000475 ... ..	10/-	.0002μF. ... ..	7/6
.0005μF. ... ..	9/6	3-plate Vernier ... ..	5/6
Dual with Vernier ... ..	12/6	Dual, plain ... ..	10/6

The Dual Formo-Densor has two banks, each of .00025μF. capacity.

## FORMO TRANSFORMERS

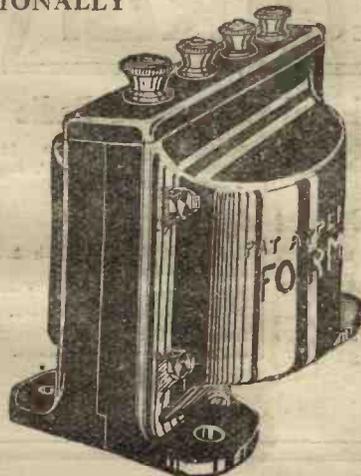
are WORLD RENOWNED for their  
CONSISTENT HIGH QUALITY  
and FINE PERFORMANCE.

You take NO risks with FORMO COMPONENTS  
They are UNCONDITIONALLY  
GUARANTEED

Shrouded Transformers.	
Ratio ... ..	1-5 18/-
" ... ..	1-4
" ... ..	1-3
" ... ..	1-2
Telephone.	
Open Transformers.	12/6
Ratio ... ..	1-5
" ... ..	1-3

**THE FORMO COMPANY**

(Arthur Preen & Co., Ltd.)  
Contractors to the Admiralty,  
War Office, Air Ministry, India  
Office, and Post Office.  
Chief Office and Works: Crick-  
wood Lane, N.W.2.  
Scottish Branch: 22, York Place,  
Edinburgh; and at Birmingham,  
Newcastle, Manchester, Bourne-  
mouth.  
Agents for Bristol and Cardiff:  
The Sloan Electrical Co., Bris.ol.



### ACCUMULATORS RE-CHARGED FREE. IN YOUR OWN HOME.



and from your ordinary electric installation, where you have DIRECT CURRENT (100 v.-250 v.). The "CHASEWAY" CHARGER (D.C.) can be connected by the merest amateur. It is automatic in action and requires no attention. Nothing as good on the market. It saves its cost in a short time by doing away with the weekly re-charging expense, besides avoiding that last minute "let down" and all the usual accumulator trouble. Whilst you are using the current for lighting, ironing or any other purpose the "CHASEWAY" automatically re-charges your accumulator (2, 4, or 6 v.) free.

Conforms to conditions of Supply and Insurance Companies. Ask your dealer to get you one, or send now 25/- for the cheapest, simplest, neatest and most practical job on the market, complete with explicit fixing instructions and diagram.

Size of "Chaseway" Charger 9 in. by 3 1/2 in.  
Cross Cheques and P.O. not negotiable.

**THE CHASEWAY ELECTRICAL MANUFACTURING CO., Ltd.,**  
184D, FLEET STREET, LONDON, E.C.4.  
Trade Enquiries Invited. V.P.

**25/-**  
Don't pay more

## BUILD SILENCE into your RECEIVERS

Of the three positions where valves are employed—Radio Frequency, Audio Frequency or as Detector—it is in the latter place that perfect valve control is especially significant. Bad control—probably through employing a leak of the wrong value—actually stifles the valve. Obviously good control requires a VARIABLE grid leak—a WATMEL.

Considerable and lengthy experiment has demonstrated that even variable grid leaks can be responsible for much bad reception. Mysterious valve noises do emanate from the grid leak. We have discovered that bad or chance contact between the plunger and the collar is the origin of noise.

Hence the WATMEL is now fitted with a refinement—a small but very effective spring which, anchored to the collar, presses firmly upon the plunger. Electrical contact is therefore always good—and noise due to a faulty connection is eradicated permanently in the WATMEL—a consideration which definitely inclines your choice for a grid leak to the



This same refinement is also standard to the



Anode Resistances.

All goods of our manufacture bear this mark. It is your only guarantee

### IMPORTANT NOTICE TO INTENDING PURCHASERS



Patent 200098

5 to 5 Megohms ... 2/6  
50,000 to 100,000 Ohms 3/6  
Other Resistances to suit any circuit.  
Send P.C. for Descriptive Folder SEE THE TRADE MARK



ON EVERY GRID LEAK  
BEWARE OF IMITATIONS

The Watmel Wireless Co. wish to notify the trade and public that their Variable Grid Leak Patent Application, No. 200098 was contested in the Comptroller's Court, and on Appeal; in both instances the Patent Grant was upheld and costs awarded.

It is the aim of this Company to protect traders, customers, and also its own interests by securing Patent protection for the novelties in its specialities, as it is these novelties, invented by experts and exhaustively tested, which are the Hall Mark of all Watmel Products.

**THE WATMEL WIRELESS CO.**  
332a, Goswell Road, London, E.C.1.  
Telephone ... .. CLERKENWELL 7990.  
Barelays 389

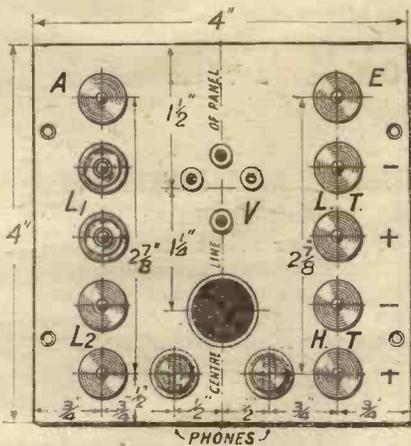


Fig. 1.—The drilling diagram.

(Continued from page 234.)

should not be more than  $\frac{1}{4}$  in. thick. This is in order to allow room for the grid condenser, which comes very near to the sides of the containing box; care must also be taken in soldering this condenser on, that it is fixed so as to allow room for the box. Fix the panel down by means of four round-headed screws passing through the holes drilled for them as shown in the drilling diagram.

**Results obtained**

Although the panel was designed chiefly for tuning with a parallel

condenser it is an easy matter to connect the A.T.C. in series with the A.T.I. This is done as in Fig. 3. by connecting the condenser between the aerial terminal of the set, instead of across the double terminals.

The panel was tested with an ordinary reaction circuit connected up. The batteries, telephones, aerial, earth and tuning coils and condenser are joined to their correct terminals, these being clearly marked in the drilling diagram Fig. 1, L<sub>2</sub> being the reaction coil. On what must certainly be called a poor aerial, at

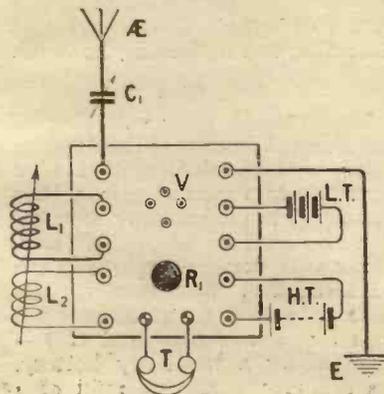


Fig. 3.—Showing how the tuning condenser may be placed in series.

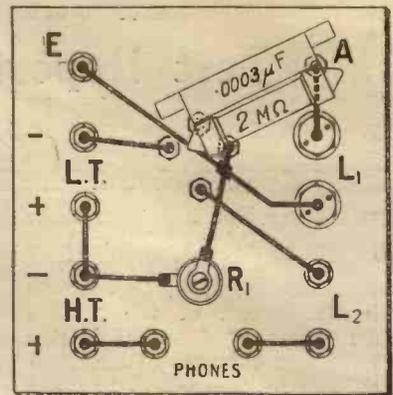
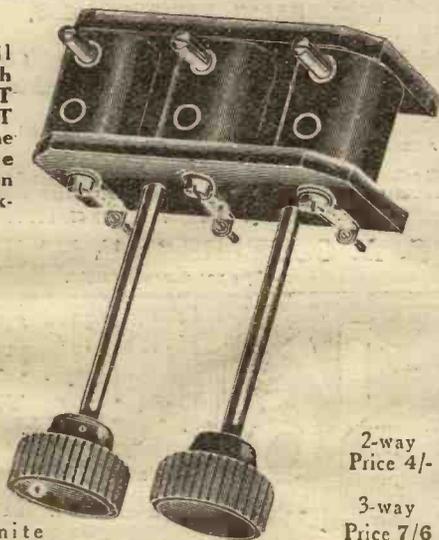


Fig 2.—The wiring diagram.

about nine miles from 2I.O, this station was almost too loud for the 'phones. All the other B.B.C. main stations were obtained, most while 2I.O was working. Several Continental stations came in well, including Le Petit Parisien, Ecole Superieure, Hamburg and Madrid. In addition music and speech from the American station WGY were also received one morning at 5 a.m., when conditions were favourable. This, of course, cannot be regularly achieved. So it will be seen that this panel gives all that can be expected of a single valve, and will amply repay trouble and time spent in making it.

## SHIPTON NEW TYPE VERNIER COIL HOLDER

The only Coil Holder with PERFECT ADJUSTMENT—ensuring fine tuning. The construction eliminates backlash.



Prov. Pat. 24392

2-way Price 4/-

3-way Price 7/6

Made of ebonite throughout. May be wired above or below panel—no loose connections.

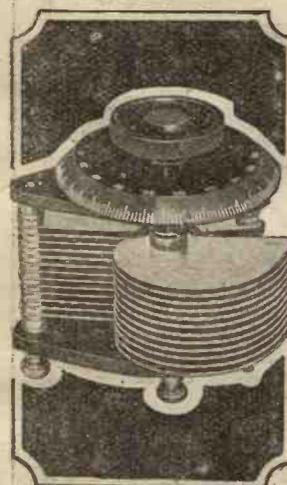
GET THE SHIPTON from your dealer—or write or call direct to:

**E. SHIPTON & Co., Ltd.**  
37, TOTHILL STREET, WESTMINSTER, S.W.  
Telephone—VICTORIA 7. Telegrams—RENTFONES PARL.  
Also at 14, King Street, Covent Garden, W.C.

Barclays 300

## CONDENSERS AND STOLEN EFFICIENCY.

Badly designed condensers can steal considerable efficiency from your receiver. Variable condensers, well constructed mechanically, may still rob your set of range and power. Efficiency is only safe if you fit Condensers which are designed both mechanically and electrically.



Technical and constructional authorities are definite in their advice—a panel free from surface leakage and equally positive to use only condensers with low losses.

Ebonite (sic) end plates of doubtful insulating properties can absorb the feeble pulsations which strike your aerial—and you wonder why your receiver is dumb! See the condensers you use have very low dielectric loss. Remember J.B. have negligible losses—0.05 ohms. The end plates are of guaranteed non-hygroscopic and low loss hand-polished Ebonite.

This fact alone makes J.B. instruments indispensable to an efficient receiver

SQUARE LAW.			
001	9/6	00025	6/9
00075	9/-	0002	5/6
0005	8/-	0001	5/3
0003	6/9	Vernier	4/6

J.B. Condensers are sold throughout the world. If in difficulty send direct. Post, one, 6d.; two, 9d.; three, 1/-.

**JACKSON BROS.**  
8, POLAND ST- OXFORD ST  
LONDON - W.1.  
(First Floor)  
Telephone: GERRARD 7414

Barclays 397

## Test Report on the "Polar Blok" Twin Valve Receiver

**T**HIS receiver has been built with "Polar Blok" units, a product of the Radio Communication Co., Ltd., to conform with the circuit of the "Twin Valve Receiver" described in this issue of THE WIRELESS CONSTRUCTOR. The set was tested 13 miles east of 2LO, and the following report indicates the capabilities of the receiver.

The aerial system employed was of average size and efficiency, with normal local conditions. In the first tests, constant aerial tuning was used and a common high-tension voltage of 50 volts applied to the anodes of the two valves; no external grid bias was used, the terminals G.B.+ and G.B.—being connected together. A No. 50 coil was plugged into the aerial socket, a No. 75 in the reaction socket, and an H.F. transformer of correct size was inserted in the socket provided. Under these conditions difficulty was experienced in producing oscillation, and the

No. 75 reaction coil was consequently replaced by a No. 100, when adequate reaction was obtained without very close coupling of the aerial and reaction coils. It was then possible to tune in 2LO with ease, at good loud-speaker strength, the music and speech being easily audible in any part of the house. Slight distortion was noticeable, however.

### Grid Bias

It was found, upon switching off the filament current of the detector valve, that the dual valve tended to rectify to a marked extent, thus indicating the desirability of negative bias on the grid of this valve. The anode voltage applied to the terminal HT, was therefore increased to over 90 volts, and the wire between G.B.+ and G.B.—replaced by a small dry battery. An ordinary flashlamp refill of 4 volts was found suitable, and much purer reception resulted, together with an increase in signal strength.

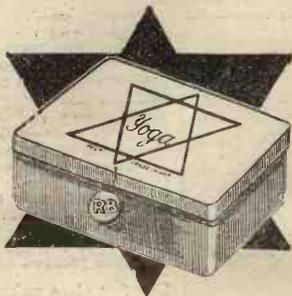
### Best Conditions

It was now evident that the set was working under favourable conditions, and some long-distance tests were carried out. In a short time, and without expending much care, two Continental stations were tuned in on the loud speaker, and two British stations. Each of these was comfortably audible all over a small room. With care, others could doubtless have been picked up in the same manner. With the telephones, of course, the range of reception is greatly extended.

Using ordinary parallel tuning, distant stations were not received with the same ease owing to the greater difficulty in producing oscillation.

Many dual circuits suffer from the disadvantage of howling at the least provocation. In the present case, however, it was possible to get well past the oscillation point before setting up a low-frequency howl.

## The Ideal Crystal for Distance, Volume or Reflex Circuits



A Super Crystal.  
Triple Tested.

Loud, Clear.  
Everlasting.

**E**ACH Crystal is fully tested and guaranteed. A spiral contact of a special alloy is included, and we recommend its use, although this crystal will function with any wire contact or with zincite as a perikon detector.

Obtainable from all Wireless Stores, or post free from any of our addresses below.

Sealed boxes 2/6 each

**ROSE BROS.**  
Electrical Co., Ltd.

LONDON: 25, Milton St., E.C.2  
GLASGOW: 194a, St. Vincent St.  
MANCHESTER: 25-27, Miller St.  
BRISTOL: 83a, Redcliffe St.

S.S.A.

## XMAS & NEW YEAR GREETINGS

TO ALL OUR CUSTOMERS AND  
THE BEST OF RECEPTION  
TO YOU IF YOU BUILD YOUR SET TO  
RADIO PRESS DESIGNS,

USING

S.A.C. CABINETS, PANELS AND COMPONENTS.

Send 2d. Stamp for our new 102-page list and folder descriptive of Radio Press Sets.

Example.	Cabinet	Ebonite Panel.	Radion Panel.
Transatlantic Four	26/-	14/-	17/6

(Packing and carriage extra.)

All cabinets are best seasoned walnut, hand-made and polished. Panels are guaranteed electrically, edges squared, accurately drilled & engraved.

RADION PANELS A SPECIALITY.

"S. A. CUTTERS," 15, RED LION SQUARE  
LONDON, W.C.1  
Phone: Chancery 8042.

1/6

## THE CRYSTAL SUPREME!

Experimenting with crystals is a thing of the past—for why seek to improve on perfection?—if you buy the

**VALPO**  
(Valve Power) CRYSTAL

Trade Enquiries Welcomed.

Super-sensitive all over—no dodging around the crystal during the "star" item! Use a "VALPO" Crystal and your catwhisker becomes a fixture. Each "VALPO" Crystal tested and GUARANTEED. Loud reception on crystal alone; beautiful pure tone for an illustration by one, two, or more valves complete with silver catwhisker. Of all reliable Wireless Stores, or post free direct from

Price 1/6  
MERTON DAVIS, PARNELL & CO. 359 STRAND, LONDON, W.C.2. Regent 4232



# INDISPENSABLES TO MAXIMUM RADIO EFFICIENCY



*Good Components  
deserve a Good Panel*

TESTED AND RECOMMENDED BY "MODERN WIRELESS"

**PARAGON** Radio Quality  
Post Office Specification

"The Best Made." **EBONITE PANELS**

UNIFORM FINE GRAIN, DEAD MATT  
FINISH, GUARANTEED NON-METALLIC  
SURFACE, FREE OF LEAKAGE.

Special panels for Receivers described in this or any  
previous issue—CUT, EDGES SQUARED and GROUND,  
1d. per sq. in. Postage 6d.

STANDARD SIZES.

8 x 6 x	2/6	24 x 10 x	14/6	18 x 6 x	6/9
8 x 6 x	3/3	24 x 12 x	17/6	12 x 8 x	6/-
10 x 8 x	5/3	8 x 5 1/2 x	2/9	10 x 8 x	6/9
12 x 10 x	7/3	10 1/2 x 7 x	4/7	7 x 5 x	2/3
12 x 12 x	8/6	12 x 6 x	4/6	10 x 9 x	5/8
14 x 12 x	10/-	22 x 11 x	15/3	9 x 5 1/2 x	3/5
16 x 12 x	11/6	16 x 9 x	9/-	10 x 5 x	3/3
18 x 12 x	13/-	12 x 11 x	8/3	12 1/2 x 9 1/2 x	7/6

**PARAGON POLISHED  
MAHOGANY EBONITE**

is NOT a composition, but GUARANTEED POST OFFICE  
QUALITY EBONITE, and is of similar specification  
to the now universally used PARAGON EBONITE.  
PANELS CUT TO SIZE, Squared, edges ground, 1d. per square inch.

**Paragon - Curtis One  
Piece Mica Condenser**



**Guaranteed Uniform Accuracy  
Under All Conditions.**

The duty of fixed condensers in wireless receiving circuits is one of paramount importance. While so small a component may appear innocent of reducing the efficiency of any receiver, the function of a fixed condenser is such that it requires a guaranteed uniform accuracy. The manufacture is of so precise a nature that any two Paragon-Curtis Condensers of the same stated capacity picked out at random are guaranteed to be of uniform accuracy.

AS USED IN THE 3-VALVE REINARTZ DESCRIBED  
IN THE DECEMBER ISSUE OF "MODERN WIRELESS."

.0068 to .006	2/6
Complete with Grid Leak Clips	2/9
Grid Leak	1/3

## CURTIS CONSTANT-TUNED H. F. AMPLIFIER



Changes the whole character and  
quality of Wireless Reproduction.

The Curtis "Constant-Tuned" High-Frequency Amplifier is the only automatic high-frequency amplifier which guarantees high efficiency for two stages of radio amplification on any wave-length between 300 and 3,000 metres, and requires no additional controls, NOR MORE SKILL OR PATIENCE IN TUNING THAN IS REQUIRED FOR THE OPERATION OF THE USUAL SINGLE STAGE TUNED ANODE CIRCUIT.

For the greater convenience of the constructor, and so as to conform with existing panel design, the Curtis Constant-Tuned High-Frequency Amplifier is designed to replace (and must be connected up in exactly the same way) an ordinary High-Frequency Transformer.

Type A 300 to 500 Metres ... Price 15s. 0d.)  
Type B 500 to 3,000 Metres ... Price 17s. 6d.) Postage 6d.

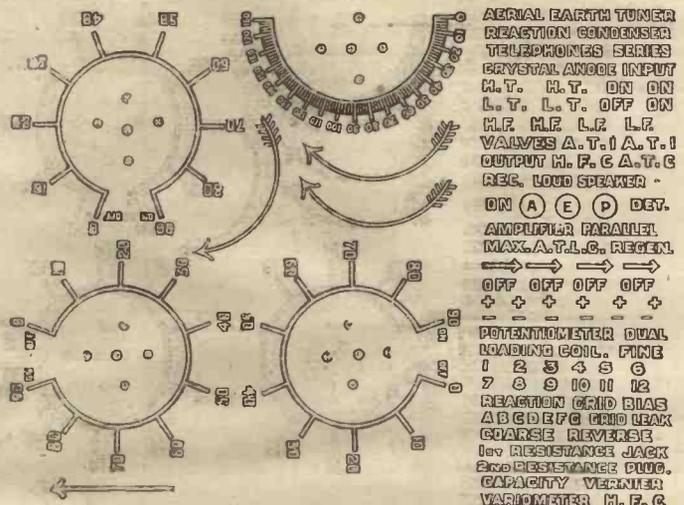
Circuit diagrams supplied with every model.

**BUILD** your own automatically tuned LONG  
DISTANCE RECEIVER. Complete set of  
parts, including drilled and engraved Paragon Panel  
and Polished Mahogany Cabinet, with suitable circuit  
diagrams. From £4 15s. 0d.

## THE "NU-GRAVING" PANEL MARKING PROCESS.

This name on every envelope is  
your only guarantee against spuri-  
ous imitations. Nu-graving is  
guaranteed for an indefinite period  
against chipping or cracking.

COMPLETE AS SHOWN (Series No. 10), 6d.



REDUCTION IN PRICE.

The following reduced prices for Nu-graving series operate from 15th November:  
Series 1, 2 and 8, 3d. each. Series 3, 4, 5, 6 and 7, 2d. each.

Home constructors who wish to build a successful receiver should apply for our  
10 pp. catalogue of "Essential Raw Materials and Accessories" free on request.

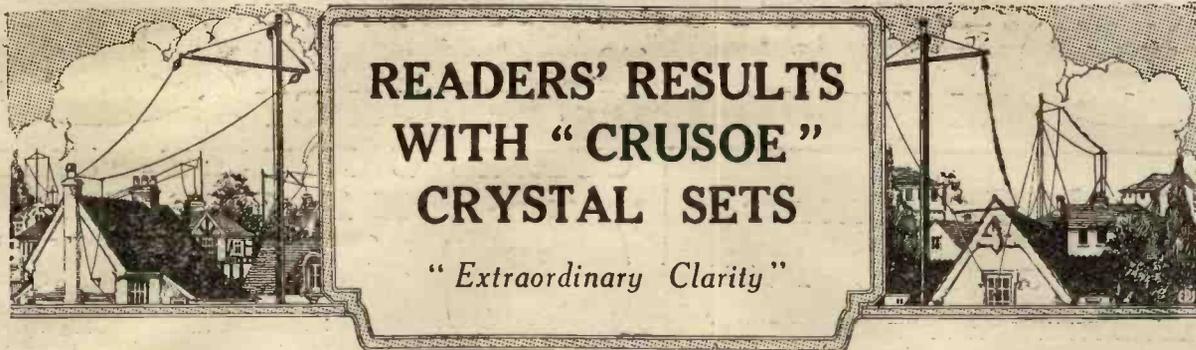
**PETER CURTIS, LTD.**  
**75, Camden Road, N.W.1**

Telegrams: "Paracurtex." Phone: North 866.

BIRMINGHAM: 76, Newall Street. Central 7236.  
MANCHESTER: 312, Deansgate. Central 5095.

In conjunction with

**THE PARAGON RUBBER MFG. Co., Ltd.**



DEAR SIR,—I regret very much that I did not see THE WIRELESS CONSTRUCTOR for November before purchasing my first crystal set for receiving 2BE, two weeks ago. Two days ago I constructed a "Crusoe" set as per your first article, and from the instant of connecting up earth and aerial have received 2BE with double the volume that I ever got it on the set I paid 17s. 6d. for. As further co nparison, the signals I get on my "Crusoe" (a jolly

fine name for it, too) when using my wire mattress for an aerial are just equal in volume to those of my bought receiver under the best conditions, *i.e.*, attached to my overhead aerial of 90 ft. Am looking forward to No. 2 of "T.W.C." as I am a totally disabled soldier and confined to bed most of the time. Wireless broadcasting has given me new life. Many thanks for the "Crusoe" article.

Lishburn, Ulster.

Yours truly,

JOSEPH ROY.

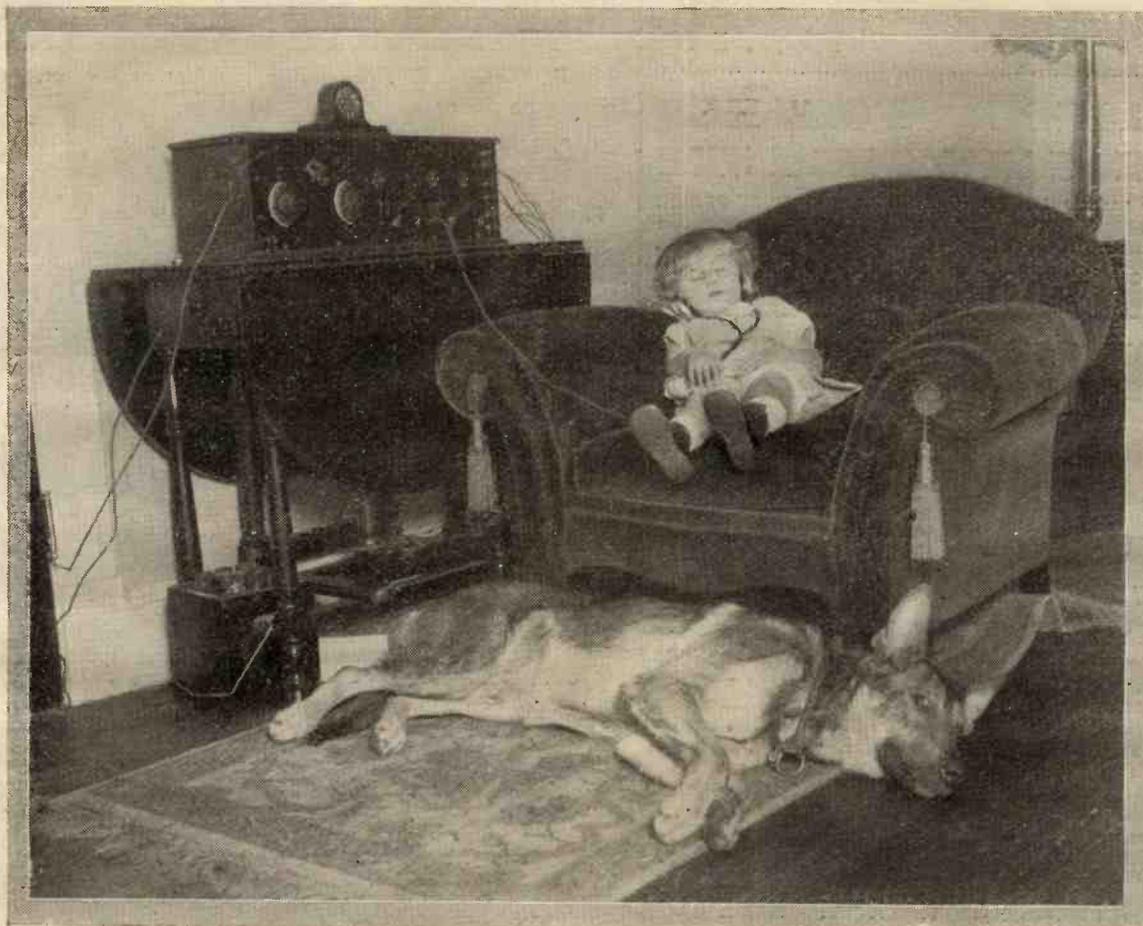
DEAR SIR,—I am very pleased to tell you that by following your instructions about making "The Crusoe Set" in the November issue of THE WIRELESS CONSTRUCTOR, I have received London with extraordinary clarity; in fact, the set receives the signals clearer than with my . . . . Crystal Receiver.

Wishing you every success with your wonderful new monthly.

Yours, etc.,

J. SEYMOUR.

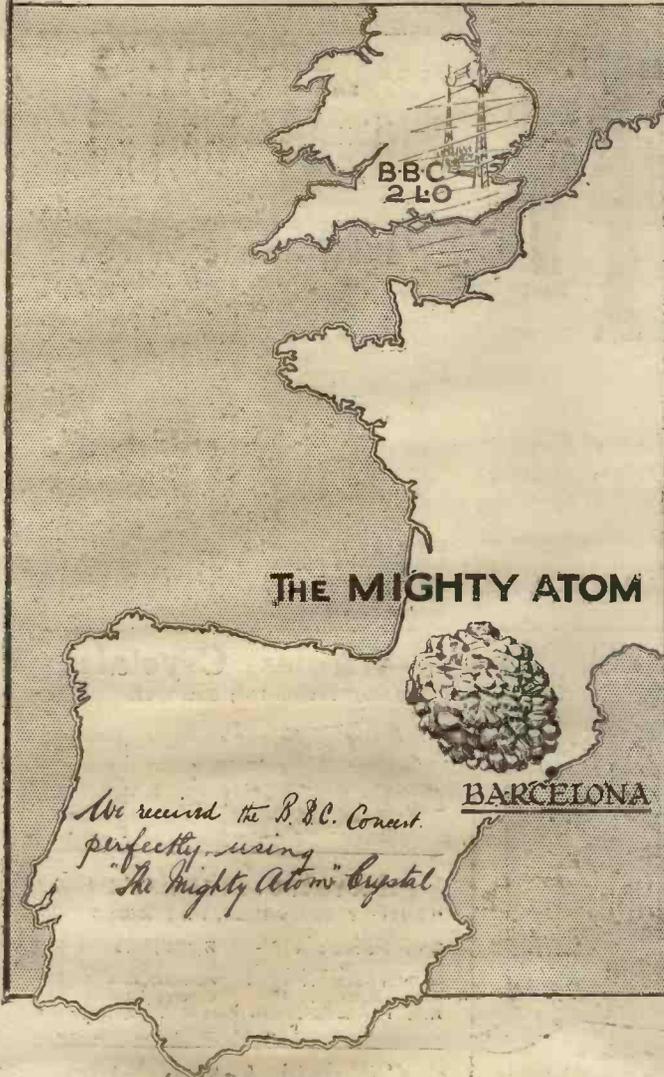
Lee, S.E.



Bedtime stories. Rover is not asleep, though!

# "THE MIGHTY ATOM"

*A Triumph of Science*



Vide the Press.

**"THE CRYSTAL THAT MADE WIRELESS HISTORY"**

**2LO HEARD IN SPAIN ON**

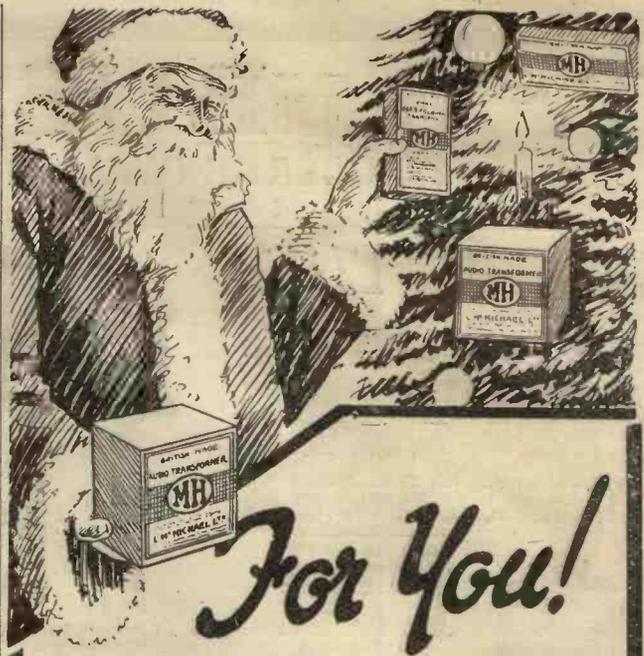
**"THE MIGHTY ATOM" THE SUPREME CRYSTAL**

Every Crystal Guaranteed Tested and packed in sealed box with a special Cat's-whisker in tube. Tweezers & Directions OBTAINABLE FROM ALL WIRELESS DEALERS.

**1/9**

Or Post Free from

**BRITAIN'S BEST CRYSTAL, LTD.**  
234/5, Salisbury House, London Wall, E.C.



—or your friends who are interested in wireless nothing will give greater pleasure and satisfaction than just the set of components desired. A seasonable and reliable gift is assured provided M.H. products are chosen.

### PLUG - IN TRANSFORMERS

A series of H.F. Plug-in Transformers in six ranges of wavelength. They are made of our highly polished non-loss ebonite. The windings are carried in staggered slots, well protected, ensuring low self capacity and high efficiency.

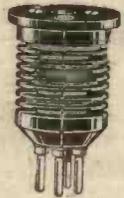
Each and every transformer is tested to a standard oscillation and any not coming within very narrow limits are rejected. Perfect matching is thus ensured.

PRICES (in cartons)		each	
No. 00, 80 to 150 metres	10/-	No. 2, 550 to 1200 metres	10/-
" 0, 150 " 300 "	10/-	" 3, 1100 " 3000 "	10/-
" 1, 300 " 600 "	10/-	" 4, 2500 " 7000 "	10/-

Complete set Nos. 00 to 4, 65/-.

Any number of each transformer can be supplied, matched, at no extra cost, if specified when ordering.

Write for particulars of our Presentation Cases, H.F. Transformers, Grid Leaks, Condensers and Clips.



### REVERSINE COIL HOLDER

A beautifully made, perfect action coil-holder. It is made of polished ebonite with lacquered brass mountings. The contacts with the moving coil, are by rubbing spring brushes, terminals at one end provide for the circuit connections of both the fixed and movable coils. Standard plugs and sockets take the ordinary type duo lateral coils.

This M.H. coil holder enables the moving coil to be completely reversed in both its physical and electrical relationship with the fixed coil. It is a perfect variometer as well as a loose coupler and means of applying reaction. If you need to reverse reaction there is no need to reverse the movement of the moving coil.

PRICE (in carton): 2-coil, 21/-; 3-coil, 29/-.



HIGH GRADE SETS AND COMPONENTS ARE WORLD FAMOUS.

Our standard receiving apparatus is used in every quarter of the globe, and our components are in demand everywhere. We have sets and components for every requirement.

**L.M. MICHAEL LTD**

IN CONJUNCTION WITH B. HESKETH LTD

Wireless Engineers, 179, Strand, London, W.C.2

# T. O. BUSS, Scientific Instrument Maker,

77, CLERKENWELL ROAD, LONDON, E.C.1.

Established—1850.

## HEADPHONES 17/11

Telefunken 4000 ohms

Adjustable diaphragms, most sensitive obtainable with cords, weight 8oz. (Double Receivers), post free. N. & K. HEADPHONES.—4,000 ohms, 12/9; 6,000 ohms, 13/3.

**LOUD SPEAKERS.**—27/6 Junior Amplion; 42/- Junior de Luxe; 55/- Baby Sterling; N. & K. 21/- IGRANIC.—Coils, 25, 5/-; 35, 5/-; 50, 5/2; 75, 5/6; 100, 7/-; 150, 7/10; 200, 8/8; 250, 9/-; 300, 9/5; 400, 10/3; 500, 10/-; 600, 11/-; 750, 11/10; 1,000, 12/8.

**VALVES.**—Cossor P.1, P.2, 12/6; Mullard Ora, 12/6; Ediswan, 12/6; Marconi R. and R.5, 12/6; Dull Emitter, D.E.R., 21/- . Post 6d. each.



Assembled Complete for Cabinet Mounting. With Ebonite Dial.

Capacity Microf.ds.	Price.
.001	7/5
.0005	5/11
.0003	5/2
.0002	4/6
.0001	4/2

With Vernier, 2/- extra or Square Law, 2/- extra, Post 6d. set

**FIXED CONDENSERS.** .0003, .0005, .002, .003, 10d. and 1/- each. .004, 1/6 each. Post, 3d.

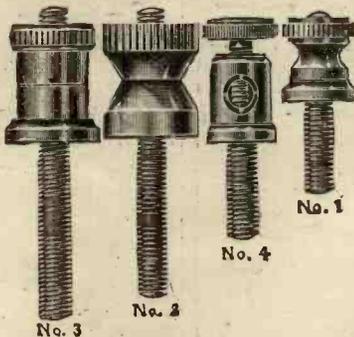
### EDISON BELL

.002 to .006 .. 2/- DUBILIER each  
.001 to .0005 .. 1/3 .001 to .006 3/-  
Grid Leak and Clips 1/3 .0001 to .0005 2/6

## WIRELESS PARTS AND ACCESSORIES.

Aerial Wire, 7/22 bare copper, stranded. Price per 100 ft., 2/6 and 2/4. By Post, 3/6.  
Aluminium Vanes, 1 doz., 5d. By Post, 8d.  
Basket Coils, 7 in. set, 2/3 set. By Post, 2/7.  
Brass Washers, 2, 3, 4 or 5 B.A., dozen, 2d.  
Nuts, 2 B.A., 2 dozen, 3d.  
Nuts, 3, 4 or 5 B.A., 2 dozen, 3d.  
Rod (screwed)—  
2 B.A., in 12 in. lengths, each 2 1/2d.  
3 B.A., in 12 in. lengths, each 2 1/2d.  
4 B.A., in 12 in. lengths, each 2d.  
Contact Studs, 1 in. by 1/2 in., complete with nut and washer, 5d. doz.  
Copper Foil Sheets, uniform thickness, 12 in. by 3 in, 3d. each.  
Crystal Detector, cup enclosed with glass cover, dust-proof, 3/6. By Post, 3/9.  
Double Phone Cords, 72 in., 1/11.  
D.P.D.T. Switch, 2/6.  
Ebonite Coil Plugs, 2 for 1/6.  
Empire Tape, 1/2 in., 12 yds., 9d.  
Ebonite Dials, with engraved scale 0-180, 1/- each. By Post, 1/6.  
Engraved Ivorine Scales, 0-180 round ends, 4d. each.  
Filament Resistance, 1/6, 2/6 each. By Post, 1/10 and 2/10.  
Inductance Coils Wound Enamel Wire, 12 by 4, 3/- . By Post, 5/-.  
1 1/2 Insulating Sleeving, 4d. yd. By Post, 4/- doz. yds.  
Insulators, Egg, 4 for 11d., 2/6 doz. By Post, 3/6 doz.  
Insulators, Reel, 1 1/2d each. By Post, 6d. doz. extra.  
Knobs, with brass nut (2 B.A.), 3d. each. By Post, 3 1/2d.  
Lead-in Tubes, ebonite with brass terminals, 0 in., 1/- . By Post, 1/4. 12 in., 1/4. By Post, 1/8.  
Lead-in Wire, 10 yds., 1/6.  
Nickel Panel Switches D.P.D.T., 1/5; ditto, S.P.D.T., 1/2.  
Porcelain S.P.D.T., Switch, 1/11.  
Slider and Plunger, 4d. By Post, 6d.  
Slider Knob Plunger and 13 in. rod, 8d. the set. Cannot be sent by Post.  
Spacer Washers, Large, 3 doz., 9d. By Post, 1/-.  
Spacer Washers, Small, 6 doz., 1/- . By Post, 1/4.  
Spade Terminals, 4d. doz. . Post, 1 1/2d.  
Switch Arms, with polished knob, bushed 2 B.A. nut, laminated blade, spring coil washer, nuts and bush. 1/- and 1/6 each. By Post, 1/3 and 1/9.

## Terminals.



No. 3 Terminals, 2 B.A., with nut and washer, 2/- doz. By Post, 2/6.  
No. 2 Terminals, War Office Pattern, with nut and washer, 1/0 doz. By Post, 1/6.  
No. 4 Terminals, Telephone, with nut and washer, 1/3 doz. By Post, 1/9.  
No. 1 Terminals, with nut and washer, 1/- doz. By Post, 1/6.  
Terminals (large), aerial and earth, complete with 2 nuts and 2 washers (2 B.A.), 2 for 8d. By Post, 1/-.



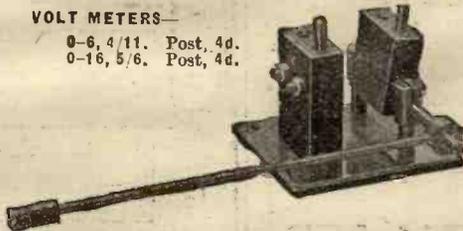
USE THE BUSS TRANSFORMER—Ratio 5 to 1. Is thoroughly Tested and is Guaranteed for a period of two years. 18/6 each.

### VARIOMETERS.

Ebonite 200/650, 4/6.  
Spade Tags, doz., 5d.  
Twin Flex, 12 yds., 1/11.  
Tin Foil, free from lead. Sheets, 17 in. by 11 in., 4d. each.  
Valve Legs, with nuts and washers, 1d. each. 9d. doz.  
Valve Holders, ebonite, complete with nuts, 1/- .  
Valve Pins, split, 7d. doz.

### VOLT METERS—

0-6, 4/11. Post, 4d.  
0-16, 5/6. Post, 4d.



Two-way and Three-way Coil Holders, Best quality ebonite. 2-way, 4/6; 3-way, 5/6.

## “EBONITE”

Postage free. Any size cut.

s. d.		£ s. d.	
8x1x1/2	0 7	12x10x1/2	0 7 6
4x4x1/2	1 3	17x8x1/2	0 8 9
7x6x1/2	2 8	18x18x1/2	0 15 9
10x6x1/2	3 9	30x18x1/2	1 7 6
17x5x1/2	5 3		

3/16 in.—25% off above prices. Post free.

## Instrument Wires

British Made Copper Wires.

Prices per lb.

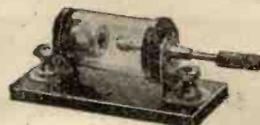
Other sizes in stock. A charge of 3d. extra is made for reeling off in small quantities. Postage extra.

S.W.G.	per lb.	per 1,000 yds.	S.C.C.	D.C.C.	S.S.C.	D.S.C.	Enam.
18	1/000	3/-	—	—	—	—	—
20	—	3/-	—	—	—	—	—
22	140	39	2/9	3/-	4/-	5/-	2/7
24	230	63	3/-	3/6	4/6	6/-	2/8
26	340	95	3/7	4/1	5/-	8/-	3/2
28	530	140	4/4	4/8	6/-	9/-	3/6
30	716	200	5/-	5/6	7/-	10/-	3/10
32	950	262	6/1	7/3	8/-	12/6	4/2
34	1,300	362	7/-	8/3	9/-	13/6	4/4
36	2,000	530	8/8	10/-	12/-	15/6	4/8

D.C.C., I.R.C., Bell Wire, .. 10 yds. 1/-  
Lead-in Wire Rubber .. 10 yds. 2/6  
Lead-in Wire .. 10 yds. 1/6  
Twin Flex .. 12 yds. 1/11  
Tinned Copper Sq. .. 16 gauge, 18 ft. 1/-

## Wireless Crystals

“Herizite,” Shaw’s, 1/-; Buss’s, 6d.



Crystal Detectors, Mounted on Ebonite. Also in parts Unmounted. 1/3 Postage, 6d.

## Intervalve Transformers

“BUSS” TRANSFORMER, 5 to 1, 18/6; ROYAL, 5 to 1, 20/-  
Radio Instruments 25/- Brunet, Shrouded 11/9  
Igranic, Shrouded 21/- Silvertown .. 21/-  
General Radio .. 14/11 Powquip, Shrouded 18/-  
Formo, Open .. 11/9 Formo, Shrouded 18/-  
H.F. TRANSFORMER, Plug-in Type, from 4/6 Post, 4d extra.

## Celluloid Accumulators

BEST BRITISH MAKE

4 v. 40	..	..	17/6	Post 1/- each.
4 v. 60	..	..	26/-	..
6 v. 60	..	..	40/-	..
6 v. 80	..	..	50/-	..
6 v. 100	..	..	60/-	..

H.T. BATTERIES 30 v. H.T. Batt. 4/6 Post, 1/3  
60 v. H.T. Batt. 7/6 .. 1/-  
Wander Plugs 6d.

## Inductance Tubes

Cardboard.

12 x 2 1/2, 4d.	Post 2 1/2d.	12 x 3 1/2, 6d.	Post 4d.
12 x 3, 5d.	Post 3 1/2d.	12 x 4, 8d.	Post 5 1/2d.

Dutch Valves Tubular 4/9. Dutch Valves “R” type 5/-.

## N. & K. LOUD SPEAKER

## Mahogany Boxes

Any size and shape to order. Price on application

# More Help for the Home Constructor

SOME NEW RADIO PRESS PUBLICATIONS

### Two New Envelopes

**R**EADERS who have already bought one or more of the Radio Press envelopes will welcome the two new envelopes that have just appeared; while for those who have not yet tried them they present an excellent opportunity of discovering their great utility. These two envelopes are Nos. 8 and 9.

#### Envelope No. 8

Envelope No. 8 contains complete instructions for the construction of a single-valve reflex set, by Herbert K. Simpson. This circuit is one that has proved itself extraordinarily popular with our readers, probably for two reasons. First, it gives not far short of "three-valve" results with the consumption and ease of control of one valve only; and, secondly, as it employs a crystal detector, the quality of reproduction is very good. The

single-valve reflex stands in a class by itself, for it is a set that is very stable in action and yet extremely sensitive. Here in London it has been possible not only once but several times to receive Birmingham on a reflex set with a frame aerial only two feet square, and other stations have also been received at times, while 2I.O. is just clearly audible in the loud-speaker. This is a set that will prove of great interest to any experimenter who has not yet made up a receiver on these lines, while the beginner who wishes to try out this circuit will find the detailed instructions given will enable him to complete a set from which he can obtain valuable experience with the certainty of making a success of it.

#### Envelope No. 9

Envelope No. 9, by the same author, gives all the necessary

directions for making an efficient single-valve receiver. Although many hundreds of circuits have appeared from time to time, the single-valve set still retains a large measure of popularity because of the reliable and efficient results that can be obtained with it. It is one of the easiest sets to handle after the humble crystal set, and owing to the employment of reaction is extremely sensitive. In this set reaction is magnetic, and the usual two-coil holder serves to couple the reaction coil to the aerial coil. Terminals are provided for constant aerial tuning, and a further refinement is provided in the form of a variable grid-leak; this will be found of help in making final adjustments when receiving distant or weak transmissions. With this set, favourable conditions obtaining, all the B.B.C. stations can be received on an average P.M.G.

## RAULAND WORLD FAMOUS TRANSFORMERS

OVER A MILLION IN SERVICE

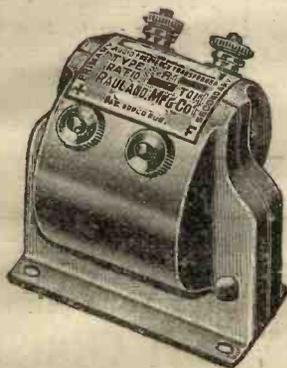
EQUIPMENT WITH MACMILLAN'S NORTH POLE EXPEDITION

### NEW PRICES

3-1 **18/9**

5-1 } **20/-**  
10-1 } EACH

INPUT OUTPUT LONG-WAVE } **25/-**  
EACH



**GUARANTEE.**—Each product is thoroughly tested before leaving the factory, and is guaranteed to be electrically and mechanically perfect. If any defect develops within one year from date of purchase, the instrument will be repaired or replaced without charge when returned to the factory, providing it has not been tampered with or mutilated.

Full particulars on request to:

**GASTON E. MARBAIX**  
27-28, ANNING STREET, LONDON, E.C. 2

## The "HERALD" L.F. TRANSFORMER

This new Radiax Component is built to the proved most efficient design. It is manufactured with the utmost precision and care, and it is subjected to all reasonable and practical tests.



PRICE . . . 15/-

It will give a high amplification without distortion, and if in these respects it does not equal any first class transformer against which it is compared we will refund cash if returned within 10 days.

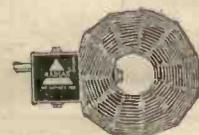
### Fit Radiax Square Law Condensers



Of splendid quality and finish, very strong construction and highest possible electrical efficiency, this new Radiax production will Revolutionize Your Tuning. The use of a good square law condenser facilitates the tuning of that portion of the scale hitherto difficult or impossible, and gives uniform results over the whole range. A Radiax Chart FREE with Each,

enables you to identify by wavelength each station you tune in. It includes valuable hints on logging all stations heard.

	Without Vernier.	With Vernier.
.001	9/-	—
.006	7/6	—
.005	7/-	8/6
.003	6/6	8/-



### RADIAX DUPLEX BASKET COILS

For more efficient than honeycomb or any other type of coil. Exceedingly strong and rigid, mounted on standard ebonite plugs. Brown finish, no wax or shellac used. MOUNTED.

No.	Price.	No.	Price.
25	1/6	75	2/3
35	1/9	100	2/9
50	2/-	150	3/-

**RADIAX LTD.**, 44, Radio House, Percy St., Tottenham Court Road, LONDON, W.1. Museum 490.  
3 mins. Tottenham Court Rd. and Goodge St. Tube Stns.



aerial, and many Continental stations as well.

Both the above receivers have already been built by our readers, and many extremely favourable reports have been received.

**Radio Press Transfers**

How many an experimenter has looked at a finished set with pride and thought: "If only I could get this engraved cheaply and without trouble." This is now possible. Results equal in every way to engraving can be obtained by a means which he can employ himself. The Radio Press Transfers, costing but a humble sixpence, provide him with an adequate solution to this problem. Each set of transfers is placed in a sealed envelope for protection, and contains 80 different transfers. Full instructions are given how to apply them, and they can be put on to a set in a few minutes, and so give the completed instrument an appearance of professional finish.

**Our Blue Print Service**

If you are contemplating building any valve set it is now possible for you to obtain blue prints which have been made from the actual sets and original drawings of the author. The veriest beginner in

wireless work is enabled to profit by the experience of technical wireless experts. The actual layout of the set is shown on one blue print, which is full size, and can therefore be used as a drilling template, while the other gives a complete wiring diagram, which is copied direct from the original set itself, and is a full-size reproduction of the back of the panel with all the connections appearing. These blue prints are 1s. 6d. each, post free, and will be found well worth this. We have started this service specially for the benefit of those readers who like to be able to obtain exact information of sets as made up by members of our technical staff. If you will write to the Sales Manager he will be pleased to send you a complete list of all these blue prints.

**The Special Test Department**

So confident are we in the design of our sets and so sure that the public will find them satisfactory, that we have opened a special test department. This department is completely equipped with up-to-date precision instruments of various kinds.

Would it not be worth time and money to you to be able to benefit

by the use of such apparatus in testing out a set that, for some reason or another, has proved faulty?

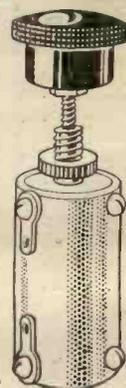
If, then, you make up a set from our design which you feel is not up to what you expected, you may send it to us, and for the nominal sum of 2s. 6d. per valve we will test the set out thoroughly and send you a complete report. This small charge we make is actually only a fraction of the cost to us for this highly-skilled work, and this offer is an earnest of the confidence we place in sets built and designed by our technical staff.

**What Coil shall I Use ?**

A good deal of doubt frequently arises as to the right size coils to use so as to receive a certain transmission. The Radio Press have published the *Modern Wireless Coil Table*, by means of which this difficulty can be solved at a glance.

In order that this table may be kept as a permanent record, it has been printed on stout card, and may be obtained at 6d. each.

Other data and useful information can be obtained as to our series of books and envelopes, and a card to the Sales Manager, Radio Press, Ltd., Bush House, Strand, will bring you a list of these.



**THE ORIGINAL L.E.S. MICRO-CONTROL**

THIS resistance has a range of approximately 0 to 50 ohms, and will give micro-metrical control over filament potential on every type of valve. We claim it to be absolutely the best control of its type on the market to-day. Issued only in special cartons, complete with direction sheet. Price **3/6**

You are requested to purchase from your local dealer. If he cannot supply, please send name and address to us.

LONDON ELECTRIC STORES, Ltd.

**THE L.E.S. MICRO-VERNIER (2-WAY) COIL HOLDER**

THE secret of the success of this Coil Holder lies in the wonderful perfection of the Vernier movement—one complete turn of the small knob only moving the Coil through 1°15 degrees. Price **7/6**

It has been specially recommended by the Wireless Press.

With L.E.S. Patent Sub-Panel Connections **9/6**

Send for special leaflet dealing with L. E. S. Wireless Components.

Oxendon St., Haymarket, S.W. 1  
Phone: Regent 2505 and 2509.



Barelays 414.

**PANELITE**

Will withstand 5,000 Volts. Black Finish. WILL NOT FRACTURE.  
6 x 6 x 3/8 in. 1/-, 7 x 5 1/4, 8 x 5 1/2, 9 x 5 1/4, 9 x 6 1/6,  
10 x 9 2/2, 12 x 10 2/9, 14 x 12 4/6 post paid.

Other sizes and thickness pro rata.  
**CROIX L.F. SHROUDED TRANSFORMERS.**  
Ratios 4-1 and 5-1, 50,000 already in use. New improved 9.6.  
Super Model 11/6 post paid.

Send for Price List of H.T. Batteries, Headphones, Valves, etc.  
**RADIO PANEL CO., Dept "C", 143, Fetter Lane, London, E.C. 4**

**COUPON**

**QUESTIONS AND ANSWERS**

This Coupon must be accompanied with a 2/6 P.O.

"Wireless Constructor," JANUARY, 1925.

**WIRELESS EXPERIMENTER'S HIGH-GRADE TOOL EQUIPMENTS**

Good Tools you really need

**THE BEST CHRISTMAS GIFT!**

Set No. 1 contains:—3 Taps, Tap Wrench, 3 Spanners and Screw-driver combined, 3 Files and File Handles. Price 5.6 nett., postage 5d.

Set No. 2 contains:—3 Taps, Tap Wrench, 5 double Spanners, Screw-driver, 3 Files and File Handles, combined Pliers and Wire Cutters, Soldering Iron, 3 Drills, Centre Punch. Price 9. nett, postage 6d. **19 High-grade Tools for 9/-**

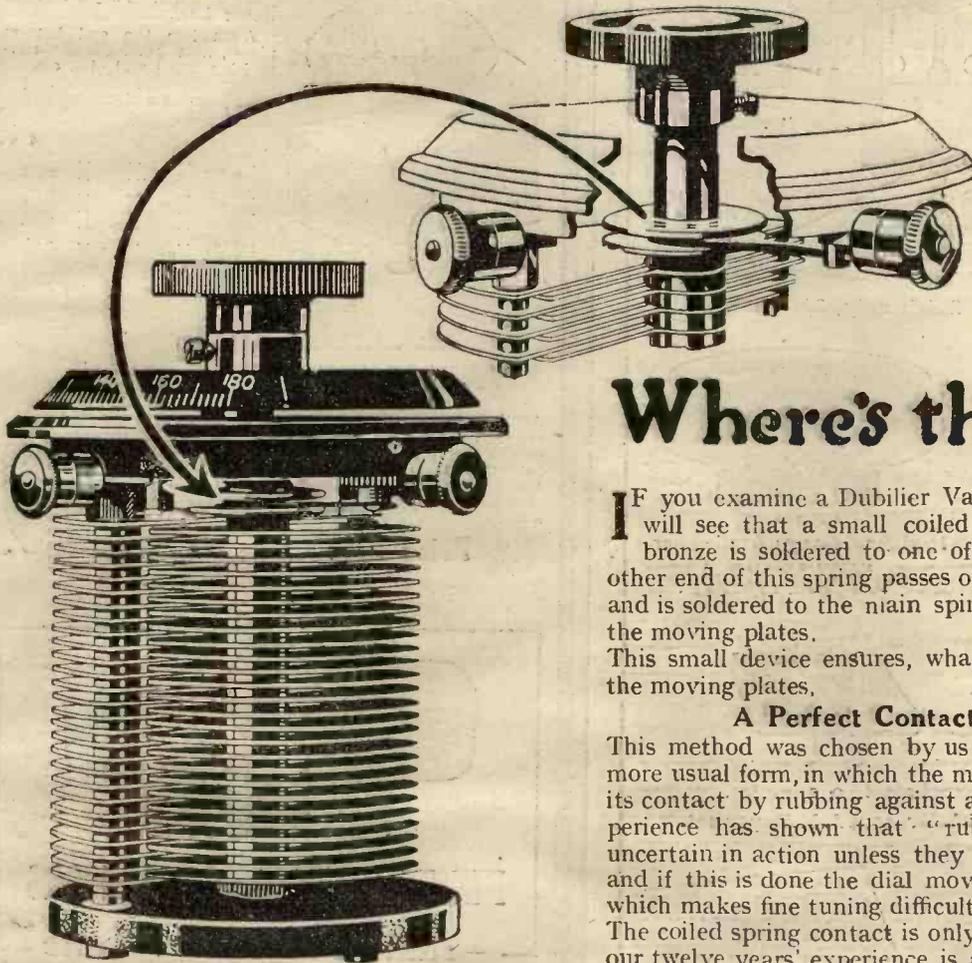
Set No. 3 contains:—All Set No. 2 and nine additional tools including 4 in. Hand Vice and Round Nose Pliers. Price 18/- nett, postage 9d.

Ask your dealer or send a Postal Order direct to:—

**ENGINEERING TOOLS LTD., 11b, Upper Thames St., LONDON, E.C.4. ENG.**



# DUBILIER PRODUCTS



## Where's the rub?

**I**F you examine a Dubilier Variable Condenser you will see that a small coiled spring of phosphor bronze is soldered to one of the terminals. The other end of this spring passes over a guiding bobbin, and is soldered to the main spindle, which carries all the moving plates. This small device ensures, whatever the position of the moving plates,

### A Perfect Contact Always

This method was chosen by us in preference to the more usual form, in which the moving spindle obtains its contact by rubbing against a contact plate. Experience has shown that "rubbing" contacts are uncertain in action unless they are screwed up tight, and if this is done the dial moves in a jerky manner, which makes fine tuning difficult.

The coiled spring contact is only one instance of how our twelve years' experience is at your service whenever you

**Specify Dubilier.**

Ducon Works,  
Goldhawk Rd.  
London, W.12.

# DUBILIER

CONDENSER CO. LTD

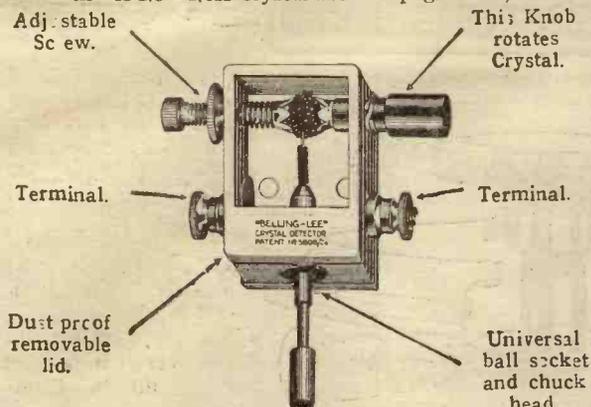
Telephone:  
Riverside 1084.

Telegrams:  
Hivoltcon, Phone,  
London.

# "BELLING-LEE" RADIO REFINEMENTS.

## ROTATING DETECTOR

(as described in the December issue of "MODERN WIRELESS" in "A Low-Loss Crystal Set" on page 802.)



In Nickel Plated finish only, 3/9 each.



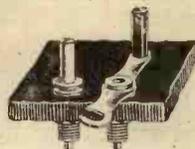
Patent No. 5807/24.  
3d. Brass, 4d. N.P.  
16 different engravings.



Registered Design Applied For.  
Price 4 1/2d. each.  
16 different engravings.



Silk Wound, 4/6.  
Cotton ,, 4/-



Patent No. 17423/21.  
6d. Brass, 8d. N.P. per set.

Our Crystal Receivers embody all the components shown here, and are mounted in plain-finish mahogany boxes, rubber feet on box base.

Price 25/- each.



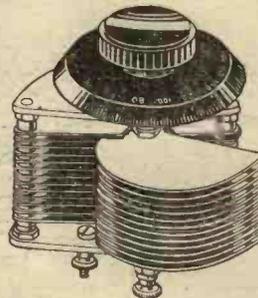
Your dealer has stocks, or will order for you, but if not write direct to:—

**BELLING & LEE, Ltd.,** Queensway Works, PONDERS END.



## SQUARE LAW CONDENSER

A handsome unit of the Finston series of components, thoroughly efficient and possessed of those qualities which serve to make all Finston products immune from trouble in the most exacting and protracted use. They stand the test of time.



Aluminium top and bottom plates, high grade ebonite composition knob and dial, cleanly engraved 0-180. Vanes .98 per cent. pure aluminium.

### PRICES.

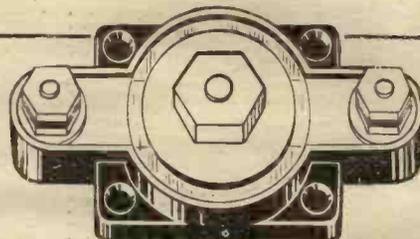
.001	9/-
.00075	8/6
.0005	8/-
.0003	7/6
.0001	6/6
.00005	6/-

## Finston Standard VARIOMETER.

Another trustworthy component, far above the usual run of variometers and highly commendable. Extremely moderate price. Ebonite stator, high-grade ebonite moulding rotor, engraved dial and knob.



Price 5/6.



## FINSTON FIXED CONDENSERS

—stand the Test of Time—

Guaranteed within 5% of stated capacity, this accuracy has never before been obtainable by the public. Buy one. Test one. It will prove our statements and thoroughly satisfy you.

### FEATURES:

Reliability of Capacity. Finest grade ruby mica dielectric. Highest quality Copper Film. Adapted for Terminal or soldered connections.

### CAPACITIES:

.001 to .0005. Price 1/3 each.  
.002 to .0006. Price 2/- each.

If your local dealer cannot supply Finston components send your order to us together with his name and address.

**LIGHTING SUPPLIES CO.,**  
2, Finsbury Avenue, LONDON, E.C.2



## Practical Workshop Hints

*How to use your vice—How to treat the soldering iron—Large holes in ebonite.*

**N**EITHER ebonite nor brass should ever be gripped between the bare jaws of a metal vice. Both are comparatively soft substances and, as the jaws are roughened, deep marks will be made which are most difficult to remove. The best tip is to obtain a piece of sheet lead of the same width as the jaws of the vice and to cut two pieces about 4 in. in length. These are bent to fit the jaws so that they remain in position when the vice is opened. If for any reason sheet lead is not available, thick cardboard can be used quite well in an emergency. When it is desired to hold the shank of a terminal or a screw in the vice, bend a thin strip

of lead into a V-shape and push the threaded part into it. The lead can now be screwed up tightly and it will grip the threads without injuring them in any way. When a brass nut has to be gripped, always place a screw in it first of all, otherwise it may be crushed out of shape by the jaws of the vice. The screw serves to prevent it from being distorted.

### Don't Forget the Oil

Always keep the screw of the vice well oiled. If it is allowed to become dry, a considerable amount of wear will take place and the jaws are apt to become rather wobbly. Be careful when filing a small piece of work not to cut

the jaws of the vice. The best tip here is to make a pair of covers of sheet brass of the same size and shape as the lead ones recommended for holding brass and ebonite. Do not use lead covers when filing, for this soft metal clogs up the file and spoils its keenness very rapidly. It is very important that the vice should be firmly fixed to the bench so that there is no movement in it whilst work is being done. If it is of the type provided with a clamping screw, a plate of iron or stout sheet brass about 3 in. square should be placed between the head of the screw and the underside of the table. When this is not done the wood will be crushed and the vice

# A Set of Wireless Parts as a Present for Xmas OR NEW YEAR IS MOST ACCEPTABLE TO YOUNG AND OLD

Think of the pleasure in making, followed by happy months of pride of accomplishment as one's relatives and friends listen in with keen enjoyment! And that sense of boredom on Winter evenings will be banished together with the "want to go somewhere" feeling.

## RADIO "STOCKS" (B. HAINE, Proprietor) of LONDON

GUARANTEE EFFICIENCY and CERTAIN SATISFACTION

IF YOU BUY RADSTOCK COMPONENTS AND FOLLOW THE SIMPLE INSTRUCTIONS WITH EACH SET

All Goods on 24 Hours' Approval to Post Customers.

Money Refunded if not Satisfied.

	No. 1	No. 2	Cabinet and drilled Ebonite Panels Extra supplied for
	[PARTS ONLY.]		
CRYSTAL SETS	9 8	7 6	6 6
ONE VALVE SETS	£1 10 9	£1 3 6	11 9
TWO " "	£2 5 9	£1 17 6	15 0
THREE " "	£3 8 9	£2 15 6	15 6
FOUR " "	£5 3 9	£3 15 6	£1 2 6
S. T. 100 (Two Valve and Crystal Reflex)	£4 16 9	£3 14 6	£1 6 0

COMPLETE WITH WIRING DIAGRAM, FULL INSTRUCTIONS AND ALL NECESSARY PARTS; CABINETS OF BEST POLISHED HEAVY OAK. BEAUTIFUL JAPANESE CABINETS QUOTED FOR; SEND SIZES REQUIRED.

(Phones, Batteries, Valves and Coils extra—See Lists.)

Any Circuit quoted for.

N.B.—No. 1 Sets are with Best well-known Parts. No. 2 Sets are with "Radstock" Guaranteed Parts. If parts Nos. 1 or 2 are sold with cabinet and ebonite as "a complete set of parts" Marconi Royalty of 12/6 per Valve must be added to above prices.

EVERYTHING FOR WIRELESS AT ROCK-BOTTOM PRICES.

SEND FOR FREE LISTS.

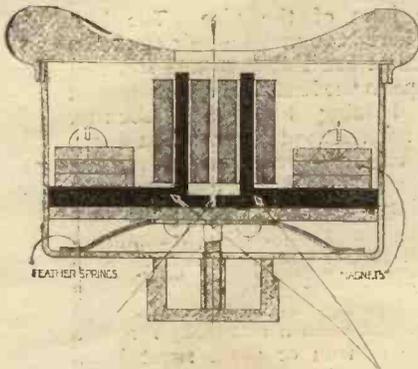
**RADIO "STOCKS"** (B. HAINE, Sole Proprietor),  
**RADIO HOUSE, NEWMAN STREET, LONDON, W.1**

PHONE: MUSEUM 3205

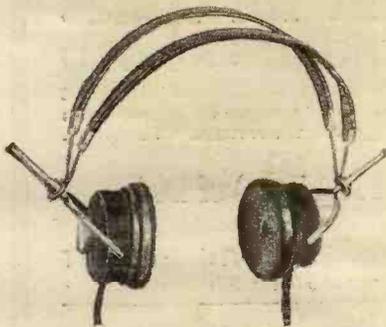
# ULTRA

REGISTERED TRADE MARK

**ADJUSTABLE  
PHONES**  
are still the **BEST**



- FIRSTLY.**—Because the Pole Shoes are laminated, thus minimising eddy currents.
- SECONDLY.**—A Magnetic Shunt-Pass is provided, which eliminates distortion.
- THIRDLY.**—The Vernier Adjustment is perfect in its action.



4,000 Ohms.

THESE ADVANTAGES ARE EXCLUSIVE TO "ULTRA."

**20/-** per pair.

**ASK YOUR DEALER FOR THEM**

Should you have any difficulty in obtaining same, write direct to

Messrs.

**EDWARD E. ROSEN & CO.,**  
158/160, City Road, London, E.C.  
with the name of your Dealer.

will come loose as soon as any effort is exerted on the work which it holds. The metal plate protects the wood and allows the vice to be fixed quite firmly to the table. Vices of the type not provided with a clamping screw are best fixed by bolts to the bench. Wood screws, even if of large gauge, do not give a satisfactorily firm grip. Bolts  $\frac{1}{2}$  in. in diameter are generally suitable, and care should be taken to place a large washer below each nut so that the wood may not be crushed when it is tightened up. When buying a vice, screw it up as tightly as possible and then hold the jaws up to the light. If they fit badly, any "gape" will be detected without difficulty. Badly made vices frequently gape at one end or the other. These are a great nuisance since it is impossible to hold very thin work securely in them.

\* \* \*  
Take good care of your soldering iron. An iron that is allowed to

of a heavy one. The disadvantage of using a small iron is that it cools very rapidly. Later, when the soldering iron has ceased to feel unwieldy, provide yourself with a good-sized one. Most soldering irons are sold with the points not sufficiently trimmed up for wireless work. The shape that I find most useful is something like a screw-driver. The point is filed to a flat edge about  $\frac{1}{4}$  in. wide and  $\frac{1}{16}$  in. thick. This enables one to do fine work even with a large iron, and the solder flows very nicely from it. The advantage of having a point of this kind is that it has two fairly big surfaces on to which a large blob of solder can be run for



Mr. F. G. Kellaway, the new Managing Director of the Marconi Company. Inset: Mr. Godfrey Isaacs, the retiring Managing Director.

become dirty and pitted will never do the quick, neat work that is essential in wireless construction. When you buy an iron, do not save a penny or two by purchasing a common article fitted with a bit made of poor-grade copper. Copper that contains a proportion of impurities is most unsatisfactory; it does not take a good coating of tin and solder does not flow well from the point when joints are being made. You will probably begin by purchasing a small, light iron. This is quite a good thing to do, since one gets the "feel" of such a tool much more easily than

soldering wires to the points of terminals.

\* \* \*

Both the life of a soldering iron and the quality of the work done by it depend very largely upon the way in which it is treated when it is first acquired. When trimming up the point in the way recommended in the last paragraph, you may come across a few small pits in the metal. Always file these right out and polish up the surface roughly with emery cloth. Then give the bit a really good tinning. As good a way as any of doing this is to cut a piece from a flat

biscuit tin, punching a hole at each corner. This should be fastened to a piece of wood with a sheet of asbestos millboard between the tin and the wood in order to prevent charring. To tin the bit, place a little resin or prepared flux on the metal, heat the iron up until green flames show round it and then rub each face in turn over the surface of the tin. The plate may be kept in the workshop toolbox for future use. As its original tin is removed a few chips of hard solder should be added from time to time to the flux upon its surface.

**Hard Solder**

Hard solder makes for better tinning of the iron than soft, but it is not suitable for making wireless connections. Blow-pipe solder requires no great heat to make it flow, but the stuff sold in triangular sticks needs a very hot iron. Blowpipe solder makes perfectly sound joints, and if it is used, ebonite panels are not liable to be injured by overheating during the process of soldering. Care must be taken not to use for wireless work a flux which has a corrosive action upon metals. The spirits of salts employed by tinmiths and workmen in other trades, though it makes for neat work, is quite unsuitable. If it is used corrosion will set in around and within the joints made, with the result that a very high resistance may be set up, or even that connections may come adrift of their own accord in time. Powdered resin makes a good flux; but perhaps the easiest thing for the beginner to use are ready-made preparations such as Fluxite, which will be found very satisfactory and quite easy to work with. Avoid as far as possible covering the under surfaces of your panels with the splutterings of whatever flux is used. The best way of keeping ebonite free from flux is this: Before soldering is done take some pieces of blotting paper and push them over the shanks

of terminals, valve legs and so on. They will catch and mop up any splutterings, and when soldering has been done they can be removed by simply tearing them away. If a greasy flux does get on the ebonite it is rather difficult to remove. The easiest method, I think, is to wipe off as much as you can and then rub the panel over with a rag that has been dipped in petrol or benzine.

It happens sometimes that one requires to make large holes in ebonite panels for the accommodation of certain kinds of components. Round holes up to  $\frac{3}{8}$  inch in diameter can be made with the breast

**Things to Remember about Variable Condensers**

A variable condenser gives the maximum capacity when the moving plates are right in the stationary plates.

Fitting a larger capacity condenser does not increase your range in miles, it only increases the band of wave-lengths over which you can receive.

If you have two condensers you wish to use together, connect them in parallel to get a higher maximum capacity and in series to get a lower one.

Always connect the moving plates of a variable condenser in the aerial circuit to earth, or, if used in a tuned anode or high-frequency transformer circuit, connect them to H.T.+. This will help in eliminating hand capacity. The term "hand capacity" is used to denote the effect on the tuning of a receiver due to the presence of the hand near the control knob of a variable condenser. When the hand is taken away, the set may burst into oscillation, or the received signal may vanish.

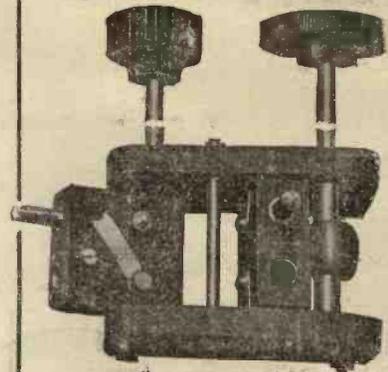
Dust between the plates of a variable condenser may make a set noisy and inefficient. An easy method of removing such dust is to use a woolly pipe-cleaner with a trace of vaseline. Use very little vaseline or the plates will get greasy and get dusty more easily than before.

drill, provided that its chuck will take drills of this size; but when we come to holes 1, 2 or 3 inches in diameter direct drilling is out of the question. To make round holes of large size proceed as follows: Make a punch mark in the panel where the centre of the hole is to be. Run the smallest drill you have right through at this point. Take a pair of dividers, and on each side of the panel scratch a line to mark the circumference. The small hole drilled will, of course, be used as a centre for this

(Continued on page 251.)

In replying to advertisers, please mention THE WIRELESS CONSTRUCTOR.

**Quality RADIO**



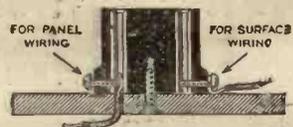
Prov. Protected.  
**CAM-VERNIER COIL HOLDER**  
With Reaction Reverse and Shorting Switch.  
Price 12/6. Without Switch, 9/-  
Postage 4d



**BASKET COIL HOLDER**  
Price 1/3. Postage 2d.



PROV. PROT.  
**CONDENSER & SET CLEANER**  
Price 6d. each. Postage 2d



**LEGLESS VALVE HOLDER**

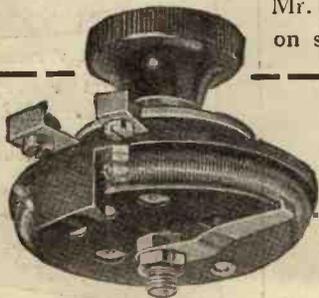
This new pattern valve holder is a great time saver for the home constructor, no marking out for the legs being necessary. With Insulated Plate Socket. Prov. Prot.  
Price 1/6. Postage 2d.  
Fitted on square ebonite base for table use, 6d. extra.  
If your dealer has not got them we send post free if you mention his name and address.

**GOSWELL ENGINEERING CO., Ltd.**  
12a, Pentonville Rd., London, N.1.  
Liberal Trade Terms. Phone North 3051

# Build your set the Burndept way

*Burndept Components are a little dearer but they are a lot better*

**W**HEN you build your set, use Burndept Components to ensure getting the best possible results. You can buy them from any Burndept Agent and they are exactly the same as those used in the Burndept Receivers, which have a world-wide reputation for their great efficiency and power. The fact that the demand for Burndept Apparatus has increased considerably this year should be a clear guide to you in the choice of components for your set. Furthermore, notice that sets described in *Wireless Constructor*, *Modern Wireless*, and *Wireless Weekly* frequently incorporate Burndept Components, their use being strongly advocated by Radio Press writers. Mr. John Scott-Taggart, F.Inst.P., A.M.I.E.E., has commented favourably on several of them.



### The Dual Rheostat

**T**HIS Burndept Component makes possible the use of bright or dull-emitter valves in a set, no alteration of any kind being required. One half of the element is wound to a resistance of 5 ohms and is used to control a bright valve, the other half being wound to a resistance of 25 ohms. The whole 30 ohms resistance is used to control a dull emitter valve. The movement of the brush over the windings is practically noiseless.

No. 222. Dual Rheostat, 5—30 ohms, for fitting to any panel from  $\frac{1}{4}$  to  $\frac{3}{8}$  inch thick 7s. 6d.

### Use GUARANTEED Components

All Burndept Components are fully guaranteed. This makes doubly sure that you will get good results. Any piece of apparatus developing a defect within twelve months of purchase will be replaced free of charge. An important point is that the capabilities of any Burndept Component are always described with strict accuracy, the facts being supplied by the Burndept Research Laboratory. Thus you can rely with absolute confidence on the performance of any component. It is true that Burndept Components cost a little more than others; but that "little more" is well spent because of the splendid results you get.

Many of the Burndept Components have unique features. The Dual Rheostat (see panel) enables you to use bright or dull-emitter valves without alteration to your set; the Variable Condensers have special patented bearings which take up wear without changing the capacity and give a particularly smooth movement; the Anti-Phonic Valve Holder entirely eliminates the microphonic noises associated with dull-emitter valves; and so on.

### Latest Catalogue sent FREE

The Burndept 84-page Catalogue contains illustrations, descriptions and prices of Components and auxiliary apparatus, accessories, receivers for home assembly and receivers ready for use as well. Whatever you want for radio, you can look it up in the Burndept catalogue, a copy of which will be sent free on receipt of a postcard. It is a handy publication to have by you and contains a great amount of interesting data which you will find very useful. Write for the Burndept Catalogue to-day.

Your nearest Burndept Agent will be willing to demonstrate Burndept Apparatus to you and to advise you on any matters concerning radio about which you may be in doubt.

**BURNDEPT LTD.,** Aldine House, Bedford Street, Strand, London, W.C.2.

Telephone: Gerrard 9072.

Telegrams: Burndept, Westrand, London.

LEEDS: 12, Basinghall Street (near City Square). CARDIFF: 67, Queen Street. NORTHAMPTON: 10, The Drapery.

# BURNDEPT

## WIRELESS APPARATUS

**Purchase Burndept by its name—substitutes are not the same**

(Continued from page 249.)

purpose. Now put your largest drill into the chuck. Inside the line scratched on the panel make a number of punch marks, placing them so that holes drilled will just not cut the circumference. Drill holes fairly close together all round. Now place the panel in the vice and with a small round file run each hole into the next until the unwanted portion in the middle is cut away. You have now a rough hole, with very ragged edges, slightly less in size than that which is required. Take a coarse half-round file and trim away most of the superfluous ebonite, then finish with a fine D file and with emery cloth. It is surprising how quickly holes up to 3 inches in diameter can be made in this way.

**Square Holes**

Rectangular holes are made in much the same way. Mark out the position of the hole required on one side of the panel, then run a very fine drill through at each corner. This will help you to do the marking-out on the other side of the panel as well. Now drill the biggest hole you can close to each corner and cut along close to the scribed lines with a fretsaw. If you do not possess a fretsaw, drill a good many

holes along the edges and run them into one another with a small rat-tailed file as before. The purpose of marking out either round or square holes on both sides of the panel is to enable you to do the final trimming up without any difficulty. If marking is done on

one side only it will be found that the edges of the hole are not quite perpendicular to the surface of the panel. Large, round holes in wood may be made in the same way as in ebonite, though by far the best way of doing this kind of work is to use an expanding bit in the brace.

**Those Puzzling Letters**

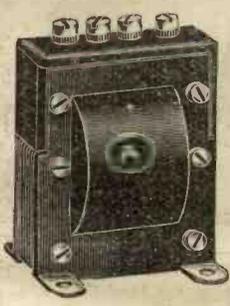
To save time, and the repetition of numerous phrases, a kind of shorthand, employing Greek letters and other symbols, is used in wireless. This notation is less complicated than many imagine, and an explanation of the chief symbols used is given here to aid those who have hitherto found it puzzling.

- $\mu F$ —microfarad (a convenient unit of capacity).
  - $\mu\mu F$ —micro-microfarad (a millionth of a microfarad).
  - $\omega$ —ohm (a unit of resistance).
  - $\Omega$ —megohm (a million ohms).
  - $\lambda$ —wavelength.
  - $\mu$  or  $M$ —amplification factor of valve.
  - $L.F.$ —low-frequency.
  - $H.F.$ —high-frequency.
  - $R$ —with a numerical suffix refers to a resistance, e.g.,  $R_1$ .
  - $L$  " " " " " an inductance, e.g.,  $L_2$ .
  - $C$  " " " " " a condenser, e.g.,  $C_3$ .
  - $Z$  usually indicates a choke coil.
  - $IP$ —inside primary
  - $OP$ —outside primary
  - $IS$ —inside secondary
  - $OS$ —outside secondary
- } of low-frequency transformer windings.

**Trade only Supplied.**

Write for our Illustrated Catalogue, comprising a comprehensive list of all Wireless Accessories.

**THE "ALTO" SHROUDED TRANSFORMER.**



This Transformer represents the last word in efficiency for low-frequency amplification, it embodies a patent winding process and is tested to withstand 500 volts between windings. Being shrouded, it enables the transformer to be guaranteed absolutely free from distortion when used singly or in cascade. The core is of the best stalloy iron. Made in two ratios for first and second stages of amplification. Designed to meet the demand of the discriminating buyer. 14 each.

**"ALTO" ONE HOLE FIXING RESISTANCE.**

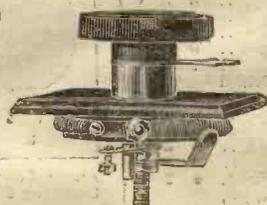


Illustration shows appearance when mounted. Does not fall to pieces when unassembled for mounting. Supplied with special nickel-plated one hole-fixing bush. Velvet action. Specially recommended. 2/3 each.

**THE WHOLESALE FITTINGS Co., Ltd.**

23, 25 and 27, COMMERCIAL ST., LONDON, E.1.

Phone: London Wall 1191. Telegrams: Catoles, Norton, London.

South London Depot: 56, NEWINGTON BUTTS, LONDON, S.E.11.

Phone: Hon 773.

MANCHESTER: 71-80, High Street.

BRISTOL: 2 m.f., 16, 136 m.f. 9d.

**ALL POST FREE at CALLERS' PRICES**

Ebonite Panels	COMPLETE	TRADE	Var. Condensers
Matt 9" x 6" 2.2 1.10	P 4,013 ohms.	E	100 Innet Type 7/-
12" x 6" 4.6 3.9	R	N	00075 Vernier 6/-
12" x 12" 5.9 5/-	I	O	0003 Blade 5/-
13" x 12" 5.6 4.9	O	U	0003 16 4.6
13" x 12" 7.8 5.6	E	I	0002 Extra 3.6
4" x 4" 8.6 6d.	L	R	Knobbed dial 1 - ex.
7" x 7" 1.6 1/2	I	L	Stock "Pallon" &
6" x 6" 1.10d.	S	E	"J.H." usual prices
Any Size Cut.	T	S	Vernier, no dial 2.6
Sq. in. 4" x 4" 1" 1d.	FREE	INVITED	5 vane 3/3 7-8
			"Polar" types 10.6



Headphones	Transformers	Jacks 4 Contact
4,013 ohms.	L.F. Silver Town 21/-	Bank of 2 1/-
Brown's P.B.T.H.	Radio Inst. (new) 25/-	Bank of 2 1.6
Siemens's Brandles.	Igramic 21/- 20	Standard Plugs 13
Sterling all 25	Burdett (new) 24/-	Potentiometer 300
General Radio 20	Reliability 10- 12.6	ohms ex-Govt. 4.6
Fellows 18.6	Ferranti 17.6	Hydro meters 3.6
Airweight 10.6	Xtraordinary 8/-	Microphones 2
Adjustable 12.6	Tangent 12.6 14.6	Tapping keys 2
R.F. Batteries	Royal 20	Hypodermic Cords 1
With Winder Plugs	R.A. Modulation	Alum. P.Hands 2.6
60v. 4/- 36v. 4.10	Telephone, and 10h.	Edison Bell "Atlas"
30v. 4/- 15v. 2/-	Uni-tone 8/-	"Edison Bell" "Atlas"
4v. F.L. Btry. 5d.	H.F. Tangent 5.6	Edison Bell "Atlas"
60v. Ever-Ready 13.6	McMichael's 10/-	Edison Bell "Atlas"
36v. 8/- 16v. 3.6	Ogih 300 m. 5.6	Edison Bell "Atlas"
Siemens same price.	600 and 300 m. 4.6	Edison Bell "Atlas"
	Formers only 1/-	Edison Bell "Atlas"
	Switches, Ebonite	Edison Bell "Atlas"
	Tumbler 1 1/-	Edison Bell "Atlas"
	D.C.O. 1.6	Edison Bell "Atlas"
	S.C.O. 5d.	Edison Bell "Atlas"
	Dewar D.C.O. 3.3	Edison Bell "Atlas"
	D.P.S.T. 2.9	Edison Bell "Atlas"
	Utility 2-way 4/-	Edison Bell "Atlas"
	3w 5' 3w 6' 6w 8'	Edison Bell "Atlas"
	Lever Type Stocked	Edison Bell "Atlas"
	Miniature Turn 6d.	Edison Bell "Atlas"
	Lissen 2-way 2.9	Edison Bell "Atlas"
	Series parl. 3.9	Edison Bell "Atlas"
	Double arm do. 2/-	Edison Bell "Atlas"
	X.P. Panel 9d.	Edison Bell "Atlas"
	New Lines	Edison Bell "Atlas"
	Eureka Transforms.	Edison Bell "Atlas"
	nos. 2 2.6	Edison Bell "Atlas"
	Concert Grand 30/-	Edison Bell "Atlas"
	R.I. Chokes 10/-	Edison Bell "Atlas"
	Shaw's Hertzite 1/-	Edison Bell "Atlas"
	Tungstallite 1.6	Edison Bell "Atlas"
	Mica .002 Doz.	Edison Bell "Atlas"
	2" x 1 1/2" 4d.	Edison Bell "Atlas"
	Under 5.6. 2d. per 1 - packing, etc.	Edison Bell "Atlas"
	Orders 5.6 value, carriage paid.	Edison Bell "Atlas"



# The Single Valve

## SOME INTERESTING CIRCUITS OF HIGH EFFICIENCY

Practical notes on several arrangements which will be found to give good results with very little apparatus

THE beginner, as well as the amateur with limited facilities, is naturally anxious to use and get the maximum results from the most simple instruments. In this article are described half-a-dozen single-valve sets, all of which are efficient. All are "straight" circuits, and have all given good results in actual practice.

### The Valve as Detector

Fig. 1 is the circuit of a loose-coupled receiver using the valve as a detector, with reaction. This enables distant stations to be received, and makes the set ever so much more selective and sensitive.  $L_1$  is the aerial coil, and is

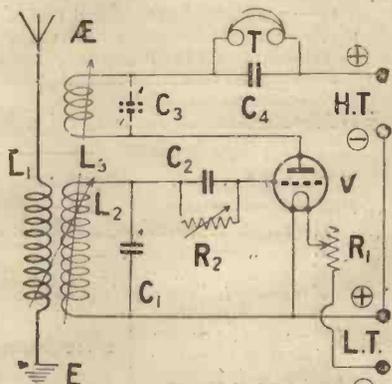
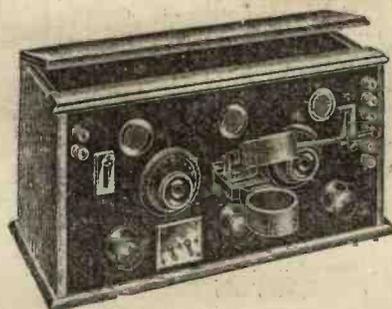
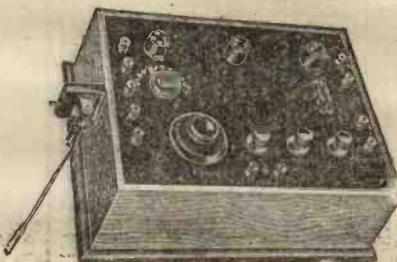


Fig. 1.—A loose-coupled single-valve set employing reaction.

shown as being untuned. There is, therefore, only one actual tuning control,  $C_1$  in the secondary or closed circuit  $L_5C_1$ . The grid condenser can be of the usual value of  $.0003\mu F$ , and a variable grid leak is connected across it. This latter allows of making fine adjustments when bringing in a distant station. The correct values of the coils for broadcasting will be  $L_1$  a 25 or 35,  $L_2$  a 50 or 75, and  $L_3$  a 50 or 75, while  $C_2$  may be  $.0005$  or  $.0003\mu F$ . A three-coil holder provides a handy means of mounting and coupling these coils, but should the constructor desire to make his own coils and mounting, he can use whatever method is most



ALL CONCERT DE LUXE. All components supplied. Including Sterling Condensers. (Envelope No. 4)



THE SIMPLICITY 3-VALVE. All components supplied. (Envelope No. 3)

Radio Press Envelopes. Post free.	
No. 1. S.T. 100 .. .. .	1/8
No. 2. 4-Valve Family .. .. .	2/9
No. 3. Simplicity 3 .. .. .	2/9
No. 4. All Concert de Luxe .. .. .	2/9
No. 5. .. .. .	1/8
No. 6. .. .. .	1/8
R.P. Hot Pad Transfers .. .. .	8d.

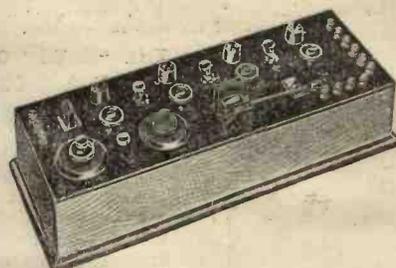
## Anglo-American Receiver

as described in this issue by Mr. Percy W. Harris.

	£	s.	d.
1 Polished Mahogany Cabinet with base-board as described .. .. .	3	7	6
1 Ebonite Panel (guaranteed), 36x9x1/4, Drilled .. .. .	1	5	0
1 Var. Sq. Law Condenser, B. Lowe, .0005 .. .. .	0	17	0
1 Var. Sq. Law Condenser, B. Lowe, .0003 Dual .. .. .	1	9	0
1 Var. Sq. Law Condenser, B. Lowe, .0003 Single .. .. .	0	16	0
1 Igranite New Type Intervalve Transformer .. .. .	1	1	0
3 Magnum Neutrodyne Condensers .. .. .	0	13	6
6 Burndept Anti-Phonic Valve Holders .. .. .	1	16	0
3 Magnum Valve Holders .. .. .	0	3	9
6 Dual Rheostats Burndept .. .. .	2	5	0
1 Dubilier 80,000 ohms Resistance, complete .. .. .	0	5	6
3 Dubilier Condensers, .0003, mfd. .. .. .	0	7	6
3 Dubilier Grid Leaks, 2 Meg. and Clips .. .. .	0	7	6
1 Dubilier Condenser, .0001, mfd. .. .. .	0	2	6
1 Dubilier Condenser, .001, mfd. .. .. .	0	3	0
1 Mausbridge Condenser, .25, mfd. .. .. .	0	3	6
2 Angle Brackets .. .. .	0	1	0
1 Ebonite Strip, 11x3x1/4, Drilled .. .. .	0	3	6
6 Nickelled Valve Windows .. .. .	0	4	0
15 Nickelled Terminals, complete (Drilled 8/16s) .. .. .	0	3	6
1 Magnum Single Coil Holder .. .. .	0	1	9
2 Double Jacks .. .. .	0	7	0
1 Single Jack .. .. .	0	2	2
2 Plugs .. .. .	0	7	0
1 Connective On and Off Switch, Nickel .. .. .	0	2	3
3 Magnum H.F. Transformers (new type), matched .. .. .	1	1	0
1 Bretwood Var. Grid Leak .. .. .	0	3	0
20 yards No. 16 sq. sec. T.C. Wire .. .. .	0	2	6
1 Set Radio Press Transfers .. .. .	0	0	6
Assorted Screws and Nuts .. .. .	0	0	7

Carriage and Packing Free on RETAIL Orders value £2 and over.

**BURNE-JONES & Co., Ltd.**  
Magnum House, 288, Borough High Street  
Telephone HOP 6257. LONDON, S.E. 1



THE 4-VALVE FAMILY. All components supplied. (Envelope No. 2)

**MAGNUM COIL HOLDERS.**  
As used in Simplicity 3, All Concert de Luxe, Transatlantic 5, Puriflex, etc., etc.  
2-way 9/6, 3-way 12/6.  
Post 6d. When ordering please state name of set.



**MAGNUM TAPPED COIL.**  
No. 1 12/6, No. 2 15/-.  
No. 1 equivalent to Nos. 25, 5, 50, 75 Plug-in coils.  
No. 2 equivalent to Nos. 100, 150, 200, 250 Plug-in coils.

Anode Coil Tapped and complete as used in Simplicity 3 and T.A.T. ... 8/- post free.  
1-lb. Hank No. 16 D.C.C. Wire 3/- post free.  
Magnum H.F. Transformers, Improved type, with protected windings, 7/- each, 14/- per pair. Guaranteed Matched.  
Magnum Neutrodyne Condensers 4/6 each.

Send stamp for illustrated List and set of leaflets dealing with S.T. 100, 4-Valve Family, Simplicity 3, All Concert de Luxe, Omni, Transatlantic 4, Transatlantic 5, Puriflex, All-Britain, 3-Valve Neutrodyne, Tri-Cell, P. W. Harris Crystal Set, Magnum Coils and Coil Holders.

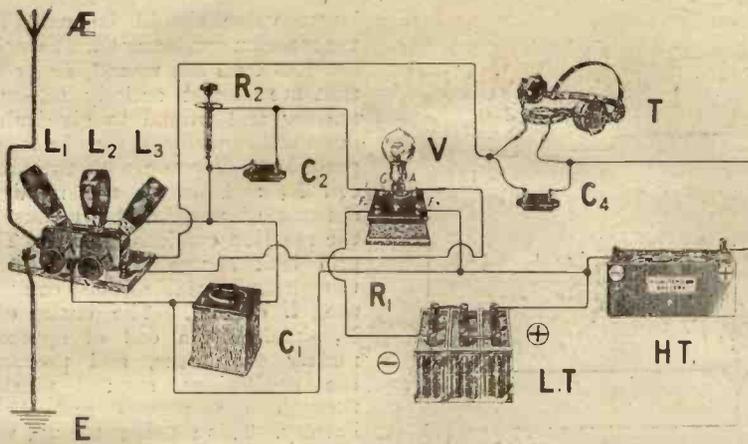


Fig. 1a.—The pictorial arrangement of the circuit shown in Fig. 1.

convenient to obtain the movements of the primary and reaction coils relative to the secondary or closed circuit. Searching should be carried out on this set with the reaction coil well away from the grid coil, or else the set is likely to oscillate and interfere with nearby listeners. With a little care it will soon be found easy to search for distant transmission with the set just off

the oscillation point. A condenser  $C_3$  may be connected across the reaction coil, as shown in dotted lines, and frequently helps to give fine control of reaction. If interference from the nearest broadcasting station is met with, the coupling between  $L_1$  and  $L_2$  should be loosened. This makes the set much more selective; at the same time it makes it more easy to

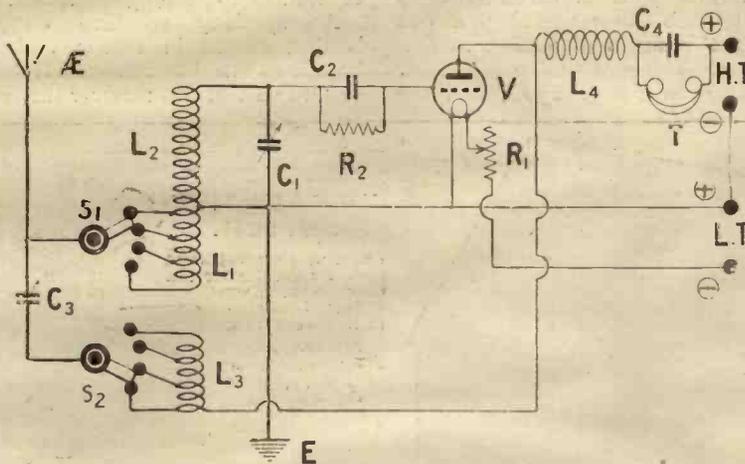


Fig. 2.—The Reinartz Receiver, a selective and sensitive set.

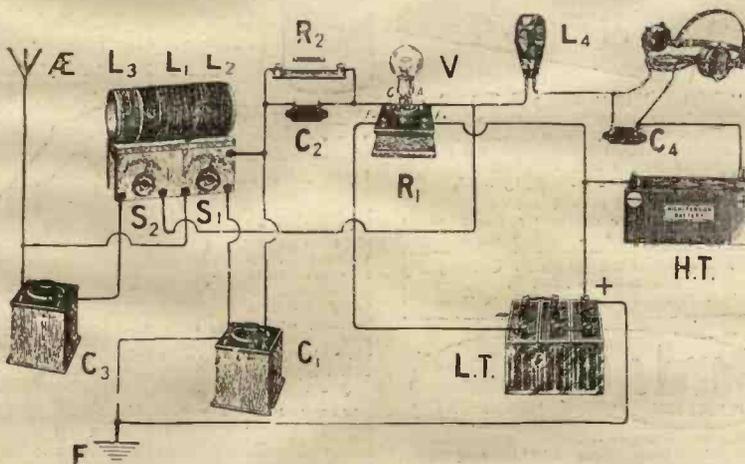
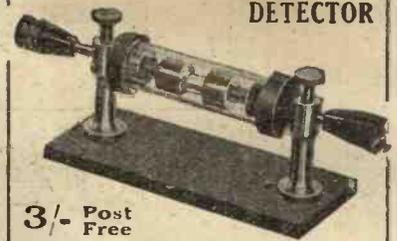


Fig. 2a.—This shows the Reinartz Receiver in pictorial form.

THE  
**LION**  
DETECTOR



3/- Post Free

Uses neither Catswhisker, Zincite, Bornite, nor Copper Pyrite. Practically everlasting, and guaranteed 100% efficient always.

**FOR CRYSTAL SETS or REFLEX CIRCUITS**

Fully guaranteed for six months against all defects.

**TEST IT AT OUR EXPENSE**

*Cash refunded without question if not entirely satisfactory*

**AGENTS FOR:—**

FALLON CONDENSERS

AIRMAX BARE WIRE COILS

CROIX TRANSFORMERS

RADIO .06 3v. VALVES

THE ROLLS PORTABLE

INSULITE PANELS

Good Stocks carried. FULL DISCOUNT TO THE TRADE

For illustrations look up previous issue of this paper and M.W. Nov & Dec. issues

**BUY YOUR VALVES FROM US**

ALL POST BREAKAGES REPLACED WITHOUT QUESTION.

British Valves at List Prices.

RADIO .06 amp. 3V. 30—100 H.T.,	14/11
S.E.V. .2 amp. 2 V. 30—80 H.T.,	9/11
DUTCH .07 amp. 2-3 V. 30—80 H.T.,	10/11
FRENCH .07 amp. 2-3 V. 50—100 H.T.,	12/11
PHILLIPS .04 amp. 1.8 V. 30—100 H.T.,	16/11

Send for Latest List

(ALL POST FREE. BREAKAGES REPLACED)

We have 1,000 Agents throughout Gt. Britain if you know one buy through him. If not send to us direct. We guarantee prompt attention to all enquiries and orders received.

**WE HAVE SOME REAL BARGAINS IN SOILED & SLIGHTLY USED SPEAKERS, 'PHONES, TRANSFORMERS, Etc**

Any article can be had on approval against cash and is fully guaranteed for six months. We are always open to buy or take in part exchange first-class components, except valves, batteries or sets on which Royalties have not been paid.

**ASK FOR SPECIAL BARGAIN LIST AND TERMS TO PRIVATE DEMONSTRATION AGENTS**

Vacancies still available in many districts

**H. LLOYD MARSHALL & CO.,**  
8, Westmoreland Buildings, E.C.1.

**WE CAN SUPPLY ANYTHING**

AND SPECIALISE IN SETS OF PARTS FOR RADIO PRESS CIRCUITS

Quotations by return.

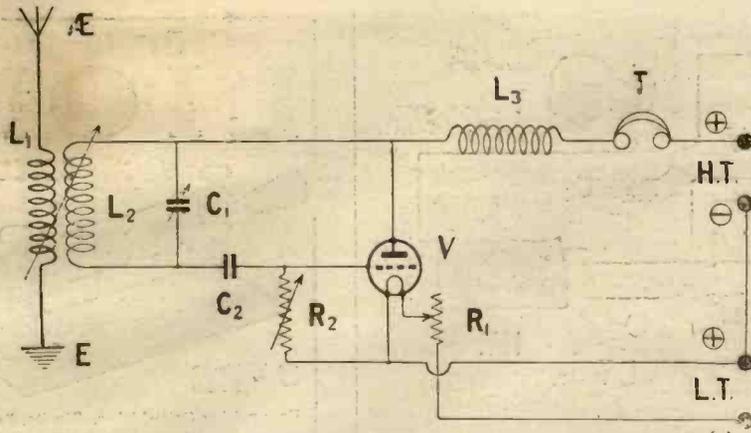


Fig. 3.—A circuit worth experimenting with is the Ultraudion.

oscillate; and it may be necessary to move the reaction coil further away from the secondary. Under favourable conditions this set will receive most of the B.B.C. transmissions, as well as many Continental stations, and gives the amateur valuable experience in tuning and handling a set.

The well-known Reinartz receiver is shown in Fig. 2. Here the aerial is auto-coupled to the grid coil, both coils being wound continuously on the same former, a common earth connection being

made at E. The aerial coil is tapped, and thereby gives control of the coupling, allowing increased selectivity to be obtained when necessary. The plate coil  $L_3$  is wound in the same direction as  $L_1$  and  $L_2$ , being connected as shown in the figure. For broadcast wavelengths  $L_1$  may consist of 30 turns,  $L_2$  of 60, and  $L_3$  45, wound on to a former 3 in. in diameter or a spider-web former giving a coil with this mean dimension as diameter. The grid tuning condenser can be .0003 or .0005  $\mu$ F, and the

larger value should be used for the reaction condenser  $C_3$ . If special low loss coils are wound, i.e., coils that are almost entirely self-supporting and wound to give minimum self capacity, it may be found possible to dispense with the plate coil  $L_3$ , and obtain the required amount of reaction by means of the reaction condenser alone. The grid leak shown is 2 megohms, though a variable one can be used if desired. The choke coil  $L_4$  should be a coil of approximately 250 turns, and prevents the oscillations from passing through the phones and H.T. battery. This set, if made up, will be found to be most selective and to give a most delightful and smooth control of reaction, and with suitable values for coils and condensers it makes a very successful short-wave receiver. The condenser  $C_4$  is optional, and rarely needed. This set may also be used with a small condenser of .0001  $\mu$ F capacity inserted in the aerial lead if it should be found difficult to get the set to oscillate smoothly over the whole wave band covered by the tuning condenser.

A specially selective circuit is that shown in Fig. 3 and is known as the Ultraudion. It will be seen that in this receiver the two



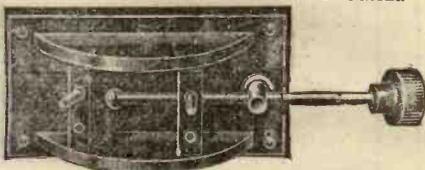
**"GOLTONE" LOW FREQUENCY TRANSFORMER.**

Unsurpassed for silence, efficiency and reliability. Provides remarkable amplification with freedom from noise and distortion. Equally suitable with every type of valve. No make of Transformer gives better results.

Price 17/6

**"GOLTONE" Micrometer Regulating COIL HOLDER.**

P. Patent.



Enables the finest possible tuning, considerably increasing the Efficiency, Selectivity and Reliability of the Receiving Set.  
Two Coil Type, 9/- Three Coil Type, 12/6

**PANEL SWITCHES.**

Excellent Finish, Attractive Appearance, Neat Design.

Size 1 1/2 x 1 in.  
2/- each.

These lines are stocked by all High Class Radio and Electrical Stores.  
Write direct if unobtainable.



**"GOLTONE" WAVE TRAP.**

An extremely effective instrument, when used in conjunction with a variable Condenser .0005, for eliminating signal interference up to 600 Metres. Easily attached.

No. R5/750 - - 12/6 each.

As illustrated, fitted in polished case, Ebonite Panel, with Variable Condenser ready fitted.  
No. R5/1750 32/6 each.

Fully illustrated 32pp. Radio Catalogue post free on request.

Enclose Business Card for Trade Terms.



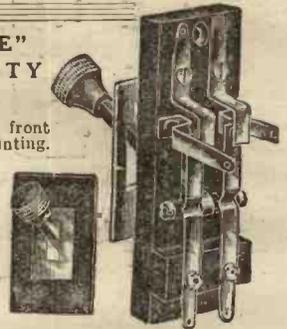
Address all communications to Head Office & works: **PENDLETON, MANCHESTER.**  
Stocks also held at Glasgow Depot:—  
95, PITT STREET.

**"GOLTONE" NO CAPACITY SWITCH.**

Fitted with screwed front plate for Panel Mounting. Compact. Easy Fitting. Good Contact. Sweet action.

No. R17/100  
2 Way Double Pole.  
3/6 each.

No. R17/110  
4 Way Double Pole.  
5/6 each.



**RADIO WIRES**

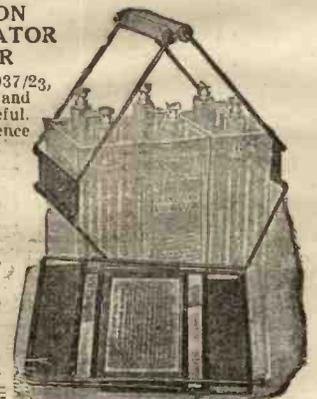
of every description including Silk, Cotton and Enamelled Wires, Aerial Wires, Leading-in Wires, Telephone Receiver and Loud Speaker, Cords, etc.

SEND YOUR ENQUIRIES.

**SAMPSON ACCUMULATOR CARRIER**

Patent No. 214037/23, Light, strong and exceedingly useful. The inconvenience of handling weighty cumbersome accumulators is entirely obviated. Suitable for any size accumulator. Folds flat to fit the pocket, 3/- each.

**WARNING.**  
Rigorous proceedings will be taken against infringement of this patent.



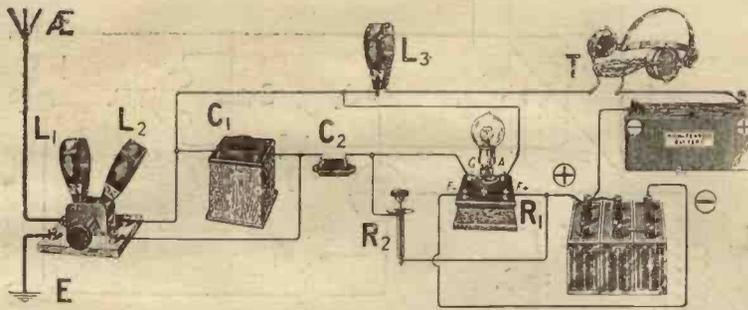


Fig. 3a.—The Ultraudion is here shown pictorially.

leads from what is frequently called the grid coil go to grid and plate instead of grid and L.T. positive, and that the grid leak is connected between the grid and the positive leg of the filament. It is almost essential in this receiver that the grid leak should be variable, and, when getting one, make sure that it is made by a reliable firm. A

coils. It should be possible to vary the coupling of the aerial to the closed circuit as this helps in the control of oscillation. The tighter the coupling the less will be the tendency of the set to oscillate. In operating this receiver the valve should be turned to a little below its normal brilliancy, the H.T. battery is then plugged into the

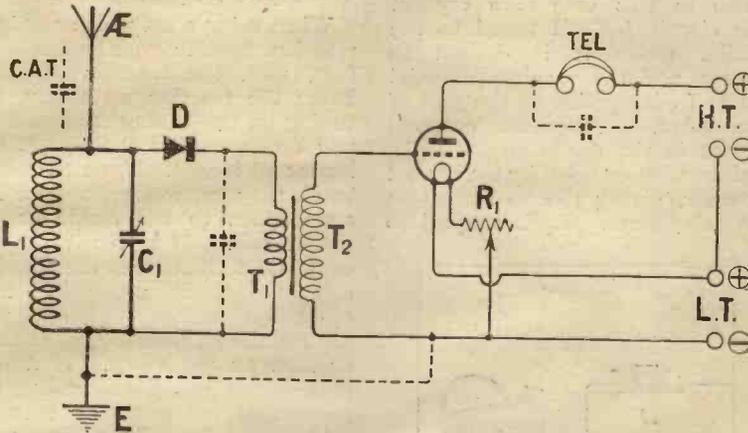


Fig. 4.—A crystal receiver with one stage of low frequency amplification. The C.A.T. condenser can be inserted in the aerial lead where shown.

poor grid-leak can ruin reception. The grid condenser is of the usual value. The choke coil  $L_3$  should consist of a low self-capacity coil of about 250 turns and is placed in the plate lead as shown.  $L_1$  and  $L_2$  may be 25 and 50 or 75 coils respectively, although better results have been obtained with this set

when using single-layer home-made highest value that the set will take without oscillating. This will then make it possible to get the set to oscillate by turning up the filament just a little (or by varying the variable grid leak), over the whole scale of the tuning condenser. This last will be of the usual value of .0005 or .0003  $\mu$ F. It should be noted that this set is extremely

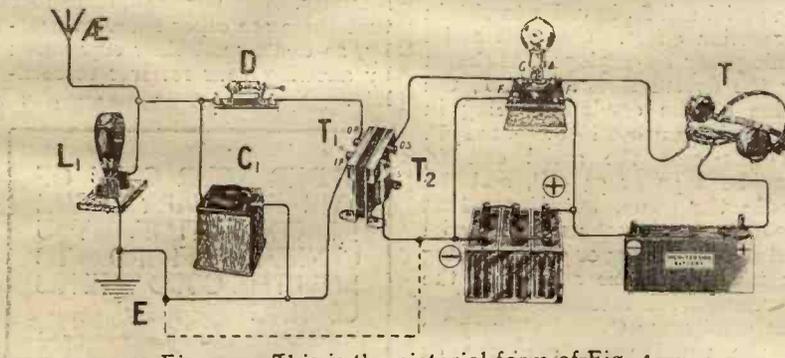


Fig. 4a.—This is the pictorial form of Fig. 4.

# THE BOOKS for Beginners and Experts.

## The Radio Press Series.

- | No.   | Price |
|---|-------|
| 1 Wireless for All<br>By John Scott-Taggart, F.Inst.P.,<br>A.M.I.E.E.                           | 9s.   |
| 2 Simplified Wireless<br>By John Scott-Taggart, F.Inst.P.,<br>A.M.I.E.E.                        | 1/-   |
| 3 How to Make Your Own Broadcast<br>Receiver<br>By John Scott-Taggart, F.Inst.P.,<br>A.M.I.E.E. | 1 6   |
| 4 How to Erect Your Wireless Aerial<br>By B. Mitchell, A.M.I.E.E.                               | 1/-   |
| 5 The Construction of Wireless Receiving<br>Apparatus<br>By P. D. Tyers.                        | 1 6   |
| 6 The Construction of Crystal Receivers<br>By Alan L. M. Douglas.                               | 1 6   |
| 7 How to Make a "Unit" Wireless Re-<br>ceiver<br>By E. Redpath.                                 | 2 6   |
| 8 Pictorial Wireless Circuits<br>By Oswald J. Rankin.   | 1 6   |
| 9 Wireless Valves Simply Explained<br>By John Scott-Taggart, F.Inst.P.,<br>A.M.I.E.E.           | 2 6   |
| 10 Practical Wireless Valve Circuits<br>By John Scott-Taggart, F.Inst.P.,<br>A.M.I.E.E.         | 2 6   |
| 12 Radio Valves and How to Use Them<br>By John Scott-Taggart, F.Inst.P.,<br>A.M.I.E.E.          | 2 6   |
| 13 500 Wireless Questions Answered<br>By G. P. Kendall and E. Redpath.                          | 2 6   |
| 14 12 Tested Wireless Sets<br>By Percy W. Harris.   | 2 6   |
| 15 More Practical Valve Circuits<br>By John Scott-Taggart, F.Inst.P.,<br>A.M.I.E.E.             | 3 6   |
| 16 Home-Built Wireless Components<br>By E. Redpath.   | 2 6   |
| 17 Wireless Sets for Home Constructors<br>By E. Redpath.  | 2 6   |
| 18 Tuning Coils and How to Wind Them<br>By G. P. Kendall, B.Sc.                                 | 1 6   |

## RADIO PRESS PANEL CARDS.

- |   |     |
|---|-----|
| 1 How to Make the W.I. Receiver<br>By Herbert K. Simpson. | 1/- |
|---|-----|

## SIMPLEX WIRING CHARTS.

- |                   |     |
|-------------------|-----|
| 1 For 2-Valve Set | 1/- |
| 2 For 3-Valve Set | 1/- |
| 3 For 4-Valve Set | 1/- |

## RADIO PRESS WIRELESS PANEL TRANSFORMERS

- |                     |     |
|---------------------|-----|
| * "MODERN WIRELESS" | 6s. |
|---------------------|-----|

## COIL TABLE for Aerial, Anode and Reaction Coils

- |     |
|-----|
| 6s. |
|-----|

## RADIO PRESS ENVELOPES.

- |  |     |
|--|-----|
| 1 How to Build an S.T. 100 Receiver<br>By John Scott-Taggart, F.Inst.P.,<br>A.M.I.E.E. | 1 6 |
| 2 How to Build a 4-Valve Receiver<br>By Percy W. Harris                                | 2 6 |
| 3 How to Build the "Simplicity" 3-Valve<br>Set. By G.P. Kendall, B.Sc.                 | 2 6 |
| 4 How to Build the All-Concert-de-Luzio<br>Receiver. By Percy W. Harris                | 2 6 |
| * 3 How to Make a 1-Valve Reflex Receiver.<br>By Herbert K. Simpson                    | 1 6 |
| * 9 How to Build an Efficient Single Valve<br>Set. By Herbert K. Simpson               | 1 6 |

The Radio Press Envelopes are the most complete guide to wireless construction ever devised. They contain exact size panel and wiring blue prints, complete working drawings, sheets of instructions regarding construction and working, lists of components, and many photographs on beautiful art paper showing the set and wiring from every possible angle. Every possible detail is explained and you cannot go wrong.

\* Just Published.

Any of the above publications can be obtained from principal wireless dealers and through any bookseller—or direct (plus 2d. postage, or, on Radio Press Envelopes 3d.) from

**RADIO PRESS LTD.**  
BUSH HOUSE, STRAND,  
LONDON, W.C.2.

Barclays Ad.

liable to cause interference and the tuning is exceedingly critical. It is therefore hardly a set for a novice to commence with.

**For Crystal Enthusiasts**

There are, no doubt, many crystal users who wish to obtain greater volume from their sets without having to alter their receiver in any way, and also want to be able to get this additional volume without complicating the tuning. Fig. 4 then shows a crystal set with the addition of a valve functioning as a low-frequency amplifier. If the constructor already has a crystal set and merely wishes to add this amplifier, it can be made up as a unit in a box to match the set, or, on the other hand, an amateur who wishes to make the whole set complete, can mount both crystal receiver and amplifier on the same panel. The intervalve transformer should be a good one if it is to ensure the greatest volume consistent with quality being given. The connections shown in the figure are very easy to follow, and it may be found an advantage to connect the L.T.—to Earth, as shown by the dotted line. Constant aerial tuning as shown in dotted lines at C A T may also be found an

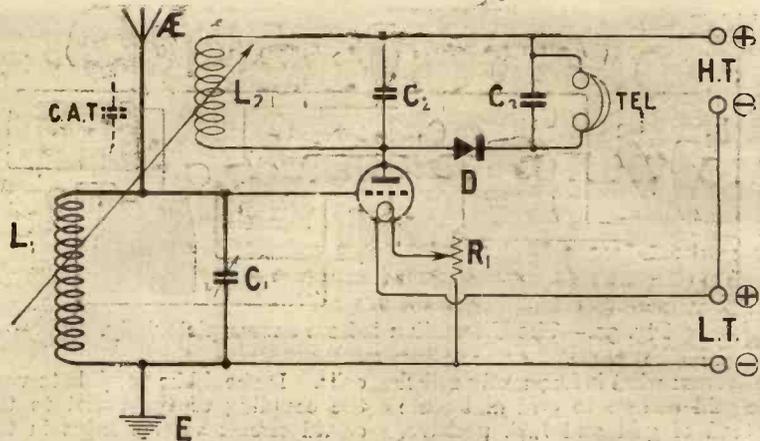


Fig. 5.—High frequency amplification precedes a crystal detector.

to be used. In this set the valve is used as a high-frequency amplifier, amplifying the signals before they are rectified by the detector, which in this case is a crystal. The circuit  $L_1C_1$  is tuned to the station which it is desired to receive, and the varying potential across  $L_1$  is applied to the grid of the valve. Amplified currents appear in the anode circuit  $L_2C_2$  and are then rectified by the crystal detector, giving rise to sounds in the telephones.  $L_1$  is coupled to

$.0003\mu F$ , and it will be noticed that no grid condenser is used in this circuit.

**Tips on Operating a Set**

When using a set which employs reaction, tune in your local station first, with the reaction at zero. Bring the reaction up slowly, re-tuning on the tuning condenser as you do so, and if the signals get louder all is well. If, on the other hand, they get weaker, reverse the connections to the anode or reaction coil. If a receiver spills over into oscillation as the reaction coil is brought up, going into oscillation with a "plonk," you are probably using too much H.T. or L.T. on the valve. If it still persists on readjusting these, try connecting the grid leak between grid and L.T. + or replace with a variable leak. Use your wander plug on a distant transmission; you will then be able to get the most suitable value of H.T. for the particular valve you are using. Then leave it alone. When tuning or searching move controls of variable condensers, or move coils slowly. You are then not likely to pass over a transmission without hearing it. Keep dust away from your set. It spoils the efficiency of the receiver, helps to run down your H.T. battery, and may make the set noisy. And, above all, remember that there are other listeners nearby, so don't spoil their enjoyment by allowing your receiver to oscillate.

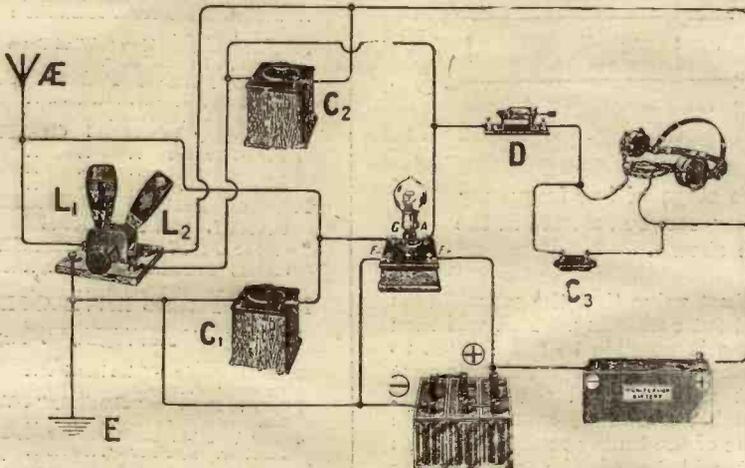


Fig. 5a.—The circuit shown in Fig. 5. appears pictorially here.

advantage, in which case the value of the condenser will be about  $.0001\mu F$ . Another thing that may be tried is reversing the two leads from the secondary of the intervalve transformer to the valve. Under favourable conditions this receiver will work a small loud-speaker from your local broadcasting station if this is within five or six miles and the aerial is a good one.

If it is desired to make a set that will give range rather than volume, Fig. 5 shows the circuit

the aerial coil  $L_1$  in order to obtain a reaction effect. Constant aerial tuning may be employed, as shown by the dotted lines at C A T, the value of the condenser being in the neighbourhood of  $.0001\mu F$ . In this case the aerial coil  $L_1$  may be a 50 or 75 coil, and the anode the same, but if constant aerial tuning is not used the aerial coil will be a 25, 35 or 50, depending on the size of the aerial and the wavelength it is intended to receive. The condensers  $C_1$  and  $C_2$  may be of the usual value of  $.0005$  or

ORDER YOUR COPY OF THE FEBRUARY ISSUE IN GOOD TIME. YOU CANNOT AFFORD TO MISS THE GOOD THINGS COMING



## Ebonite with a pedigree !

THAT is the best description of Radion we can give you. Every panel of Radion that is issued is made in one of the big factories of the American Hard Rubber Company—the largest manufacturers of high-grade Ebonite in the World. Every panel is marked Radion—we are proud of it and are only too glad to back it with a reputation that is second to none.

Every panel is fully guaranteed leakproof, free from warp, and is supplied with a beautiful polished surface which need not be removed before use.

Indeed, the surface should *NOT* be removed because it prevents the formation of dust or moisture—both of which are sworn enemies of clear reception.

Scientific tests have proved that Radion has the lowest dielectric constant and the lowest absorption of moisture of any panel material in the world. It is these two qualities particularly that are responsible for the excellent results obtainable from Radion-built Sets.

All first-class Dealers are stocking Radion, which is conveniently sold in 21 different sizes with edges ground square and packed in stout manila envelopes. Radion is sold in black and mahoganite—the latter being a beautiful simulation of old mahogany with all its tints and colours. Dials and knobs can be obtained to match.

Why risk building a good set on an unknown piece of ebonite or even on an ebonite made to a specification not necessarily most suitable for wireless when at little—if any—greater cost you can use a Radion Panel guaranteed in the fullest sense of the word?

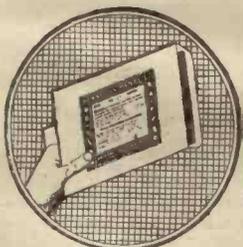
### RADION SIZES AND PRICES:

Size	Black Maho-	Size	Black Maho-	Size	Black Maho-
	ganite		ganite		ganite
6" x 7"	3/6	7" x 14"	8/-	8" x 26"	17/6
6" x 10 1/2"	5/3	7" x 18"	10/6	9" x 14"	10/3
6" x 14"	7/-	7" x 21"	12/3	10" x 12"	10/-
6" x 21"	10/6	7" x 24"	14/-	12" x 14"	13/3
7" x 9"	5/3	7" x 26"	15/-	12" x 21"	19/9
7" x 10"	5/9	7" x 30"	17/3	14" x 18"	19/9
7" x 12"	7/-	7" x 48"	28/-	20" x 24"	39/6
					48/-

Special Note:—All 1/8" thick—quite sufficient owing to Radion's tremendous strength.

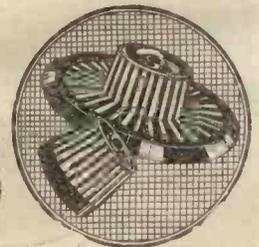
Sole Agents for Radion in Ireland:  
Pettigrew & Merriman, Ltd.,  
8, Corporation Street, Belfast.

AMERICAN HARD RUBBER CO. (BRITAIN), LTD.,  
131, Fore Street, London, E.C.2.



# RADION PANELS

TRADE MARK



In replying to advertisers, please mention THE WIRELESS CONSTRUCTOR.

# Set building

## —details of a new scheme

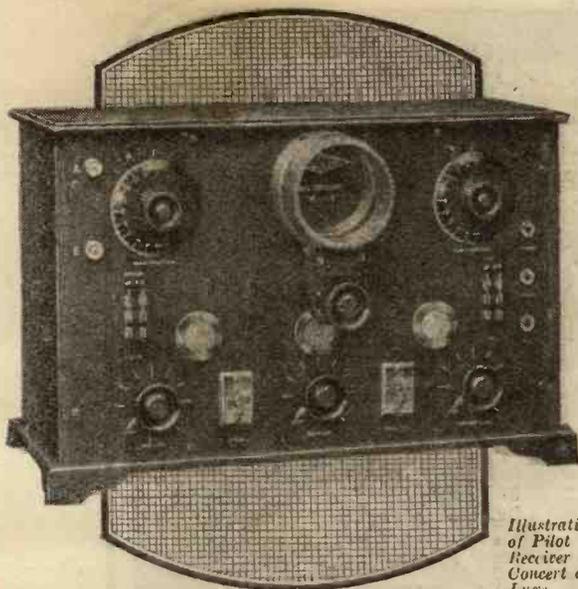


Illustration of Pilot Receiver All Concert de Luxe.

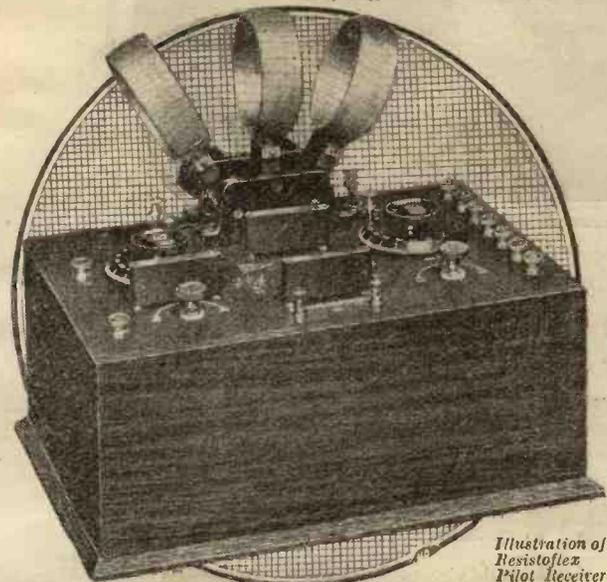
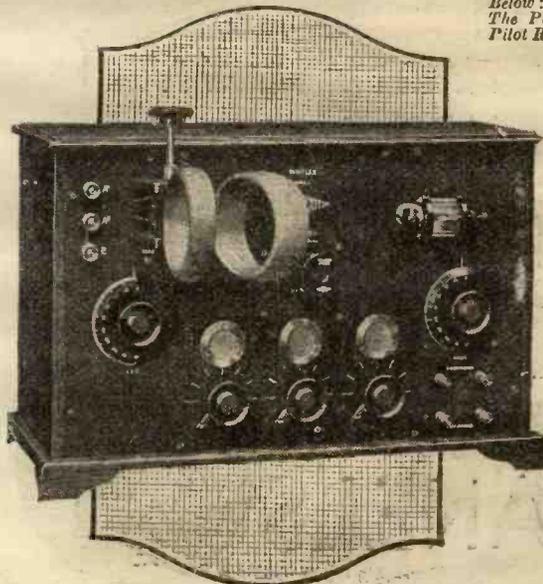


Illustration of Resistoflex Pilot Receiver  
Below:  
The Puriflex Pilot Receiver.



WHEN a man decides to build a good Receiving Set he immediately comes up against the difficulty of a suitable cabinet and the drilling and engraving of the Panel. Cabinet making is a skilled man's job, and many a perfectly good piece of ebonite has been spoiled by a hole in the wrong position or because it has been incorrectly cut to size.

To eliminate most of the difficulties in Set-building we have instituted the PILOT Service. In future all Sets described in *Modern Wireless*, *Wireless Weekly* or the *Wireless Constructor* will be available in sets of parts for the Home Constructor with panels ready drilled, tapped and engraved. Two types will be placed on the market—Type A following the author's literal specification and using his actual components, and Type B an adaptation using Peto-Scott guaranteed components. In each case the panels can be obtained quite plain with squared edges and matt finished ready for use or drilled, tapped and engraved without components.

If all Peto-Scott components are used and our instructions carefully followed, we will positively guarantee that any Pilot Receiver Type B will give identical results to any Type A Set. The Pilot Service, therefore, enables any wireless enthusiast—irrespective of experience—to build a Receiving Set equal in every respect to the ready-made Instrument costing considerably more. There is absolutely no need for anyone to be afraid to build up a Pilot Receiver, because full wiring instructions are supplied and nothing can possibly go wrong.

### 6 Exclusive Pilot Advantages

- 1 Absolutely no previous Wireless skill required—the only tools necessary are a screwdriver, soldering iron (optional) and a pair of pliers.
- 2 Every Set when completed is quite the equal in efficiency of the original.
- 3 Provides a high-grade Instrument at the cost only of the components.
- 4 Success guaranteed—failure quite impossible if instructions are followed.
- 5 Every Instrument designed by a recognised expert.
- 6 The only System for the Home Constructor backed by a Service Department.

### “Red Triangle” Panels

The following sizes are now available for all Radio Press Receiving Sets. Every Panel is ready for immediate use, with edges squarely cut and surface carefully matt-finished.

		£	s.	d.
All Concert de Luxe	16 x 8 x 1 1/2	0	8	0
Transatlantic V	22 x 11 x 1 1/2	0	15	0
All-Britain	10 x 9 x 1 1/2	0	9	0
S.T. 100	12 1/2 x 9 1/2 x 1 1/2	0	7	0
Puriflex	14 x 10 1/2 x 1 1/2	0	9	2
Resistoflex	12 x 8 x 1 1/2	0	6	0
Transatlantic 4	16 x 8 x 1 1/2	0	8	0
Anglo-American	26 x 9 x 1 1/2	1	0	0
Neutrodyne Tuner	12 x 10 x 1 1/2	0	7	6
Neutrodyne Receiver	12 x 10 x 1 1/2	0	7	6
3-Valve Dual	24 x 10 x 1 1/2	0	15	0
Harris Crystal Set	8 x 5 1/2 x 1 1/2	0	4	4

(Modern Wireless, Sept.)



# made easy- for the Home Constructor

In cases where a Pilot Set does not work after it has been built, it may be returned to our Service Department for their expert examination. If the fault is due to an error in wiring, the instrument will be put in working order at a nominal cost. On the other hand, should the fault be due to one of the components it will be replaced and the set put in working order without charge.

## Prices of Pilot Receivers

<b>All Concert de Luxe (Type A).</b>		<b>All-Britain Receiver (Type B).</b>	
	£ s. d.		£ s. d.
Polished Mahogany Cabinet	1 7 6	Polished Oak Cabinet, with baseboard	0 17 0
Pilot Panel, drilled, tapped and engraved	0 13 0	Pilot Panel, matted and engraved	0 13 0
Mahogany Base-board	0 2 6	Complete kit of components	4 9 0
Complete kit of components as specified by Author	6 17 6		
<b>All Concert de Luxe (Type B).</b>		<b>Resistoflex (Type A).</b>	
Polished Oak Cabinet fitted with 7-ply baseboard	0 17 0	Polished Oak Cabinet (mahogany 2.-extra)	0 7 6
Pilot Panel, matted, squared and engraved	0 13 6	Pilot Panel, matted, drilled and engraved	0 10 6
Complete kit of components	4 17 6	Complete kit of components	3 15 0
<b>Puriflex (Type A).</b>		<b>Transatlantic V (Type A).</b>	
Polished Mahogany Cabinet	0 12 6	Mahogany Cabinet with sliding back	1 12 6
Pilot Panel, matted, drilled and engraved	0 14 6	Pilot Panel, drilled, tapped and engraved	1 4 6
Complete kit of components as specified by Author	5 11 0	Complete kit of components as specified by the Author	8 0 0
<b>Puriflex (Type B).</b>		<b>Transatlantic V (Type B).</b>	
Polished Oak Cabinet, fitted with 7-ply baseboard	0 17 0	Polished Oak Cabinet with baseboard	0 17 0
Pilot Panel, matted, squared and engraved	0 12 6	Pilot Panel matted and engraved	0 13 6
Complete kit of components	4 5 0	Complete kit of components	5 4 6
<b>All-Britain Receiver (Type A).</b>		<i>Large illustrated Folder describing all Pilot Receivers sent free of charge on receipt of post card.</i>	
Polished Oak Cabinet	0 15 6		
Pilot Panel, matted, drilled and engraved	0 16 0		
Complete kit of components, as specified by the Author	4 16 3		

Prices given for complete kits of components do not include panels, cabinets, coils or H.F. Transformers.

## Parts for the Anglo-American Set described by Mr. Percy Harris

The splendid 6-Valve Set described in this issue is available under the Pilot Service in two models.

Model A, using the identical components specified by the Author. Model B, using Peto-Scott components and positively guaranteed to give equally good results.

Model A. Price of complete kit of components	£12 9 9
Model B. Price of complete kit of components	8 1 0
Mahogany Cabinet, extra in each case	3 3 0

These prices are necessarily provisional and subject to confirmation. Send for detailed prices now so that you can commence building the Set without waiting for the next issue of the Magazine.

# Peto Scott Co. Ltd.

Registered Offices (for all Mail Orders):—

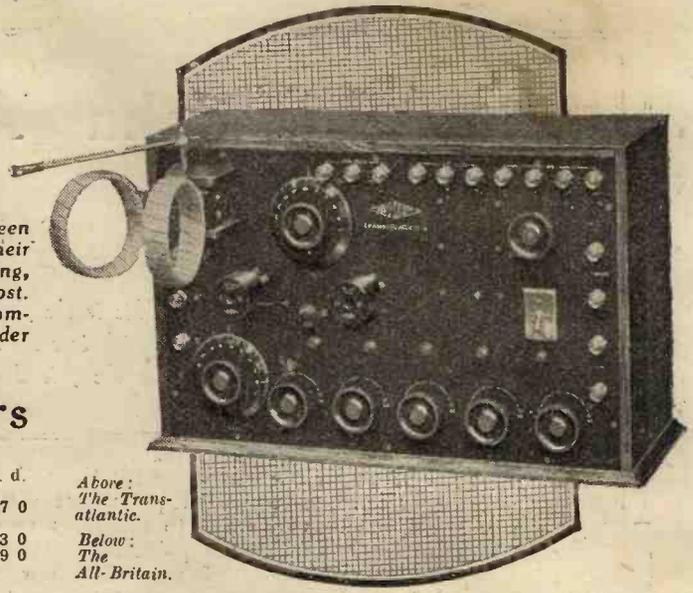
77, CITY ROAD, LONDON, E.C.

Branches:—

LONDON: 62, High Holborn, W.C.1, and 230, Wood Street, Walthamstow.

CARDIFF: 9<sup>1/2</sup>, Queen Street. LIVERPOOL: 4, Manchester Street.

PLYMOUTH: Near Derry's Clock.



Above: The Transatlantic.

Below: The All-Britain.

Marconi Royalties are payable on all orders for complete outfits to build any of these instruments as they naturally involve Messrs. Marconi's patents and are payable at the rate of 12/6 per valve.

## "Red Triangle" Ebonite

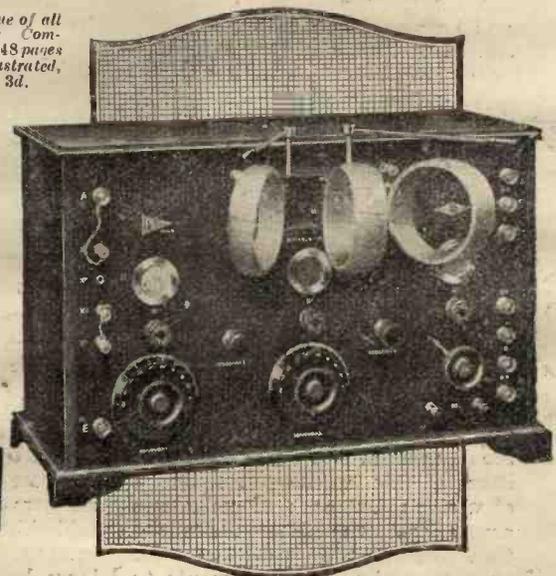
We have recently made arrangements to take over the whole of the output of a well-known firm of ebonite manufacturers. This Ebonite will be named "Red-Triangle" Ebonite and every piece, whether in panel or sheet, will carry our registered design of a red triangle for ready identification. "Red Triangle" Ebonite is being used exclusively for all Pilot Panels.

"Red Triangle" Ebonite has these figures definitely prove the immense superiority of been certified by Professor A. M. Low to have passed the "Red Triangle" Ebonite. Remember every Panel fully guaranteed to be free from surface leakage, and is quite ready for use. All edges are squarely cut and the surfaces possess a smooth matt finish. Supplied in the following stock sizes—each panel being 1/4 inch thick sealed and packed individually:—

<b>Insulation tests at 500 volts.</b>			
Megolins per cubic centimetre 2,700 x 10 <sup>9</sup> .			
<b>Breakdown test.</b>			
A sheet 1 mm. thick broke down at 29,700 volts.			
6 x 8	3/-	7 x 10	4/3
6 x 18	8/-	8 x 6	2/-
7 x 5	2/3	8 x 10	5/-
8 x 12	6/-	10 x 12	7/6
12 x 14	10/6	10 x 24	15/-
12 x 16	12/-	12 x 18	13/6

Catalogue of all Wireless Components 48 pages fully illustrated, post free 3d.

Peto-Scott's Wireless Book with 80 diagrams post free, 1/5





## John Anstruther Talks

By

R. W. HALLOWS, M.A.

*This is the first of a series of popular chats on subjects which interest every listener. John Anstruther will soon be the friend of every "Wireless Constructor" reader*

IT is some little time now since John Anstruther first came to live amongst us. He is a quiet, modest person, always ready to lend a helping hand, though he never airs his knowledge or thrusts unwanted advice upon others. He is, in fact, the sort of man who would be popular anywhere. He kept rather to himself in the early days, and all that we knew of him was that he was something rather big in the electrical world. None of us realised that he knew much about wireless until one night, when the Ainsworths had a party of half a dozen to listen to a broadcast programme and something went wrong with the set. Several of us tried unsuccessfully to locate the trouble, and then Ainsworth asked Anstruther if he could help.

### How it Started

"I'll try," said John, and he went over to the set. He asked a question or two, ran over the wiring and put his finger on the defect in a moment. Since then we seem gradually to have fallen into the habit of taking our wireless troubles, great and small, to him. We used to drop in casually to his rooms in the evening, but now we have formed a kind of informal club which meets once a month at Anstruther's to discuss all kinds of points that crop up. Those of us who attend are all more or less beginners. We have a fair working knowledge of wireless, but each of us comes across just the little difficulties that beset the path of the average enthusiast who wants to

increase his theoretical and practical acquaintance with the subject and to bring his receiving set to the point of greatest efficiency.

I remember our first meeting very well, for John Anstruther was

nearly always between his teeth, and said:—

"You fellows need not worry on that score. So long as you promise to kick me if I show any signs of becoming a 'superior person,' you just fire away your questions and I will answer them to the best of my ability. As a matter of fact, the obligation is largely on my side, for to be able to explain things properly one must have a very clear idea of them in one's head. You will help me to keep up to the mark, for I shall have to have all my ideas definite and clear cut, and that's just what I want. Now, then, who's going to fire the first problem at me?"

What was Wrong?

"I wonder," said Morris, "if you could tell me why I don't get better results with my set. My aerial is a jolly good one and the set ought to be efficient. It is one of the *Radio Press* two-valve designs very carefully made up. We are just twenty-five miles, as you know, from 2LO, and he comes in at fair strength; but other stations are most difficult to get hold of. Another thing is that the set is apt to be rather unstable."

"What valves are you using?" asked John.

Morris mentioned a well-known pattern and John nodded his head. "Nothing wrong with them," he remarked. "But tell me, are you satisfied with your

earth? What sort of an arrangement have you got?"

"Oh, I think the earth is all right," smiled Morris, "but I cannot say that I have ever bothered

(Continued on p. 262.)



Captain Ian Fraser, M.P., with his little daughter.

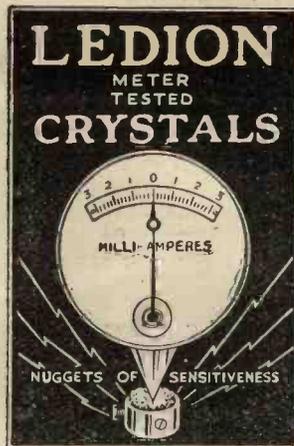
The famous chairman of St. Dunstan's, himself blind, has done wonders in alleviating the lot of the sightless. He is a keen wireless experimenter in transmission as well as reception.

at his best. I felt somehow that we were making use of him in an unwarrantable kind of way, and told him so. He paused for a moment in the process of filling the large briar of which the stem is

# GOT IT!!

That's what you say at once whenever, and wherever, your Catswhisker touches Ledion meter-tested crystals.

**The Reason.** No guesswork in our meter test. We reject all crystals below our standard test, so that you receive guaranteed sensitive crystals only, thereby saving time and money. Buy Ledion tested crystal, and be safe to enjoy Radio to the full.



# GET IT!!

FROM YOUR LOCAL DEALER AT ONCE. PRICE—1/6

SOLD IN GOLD BOX SEALED WITH GREEN LABEL



Sole Distributors of Ledion Crystals—

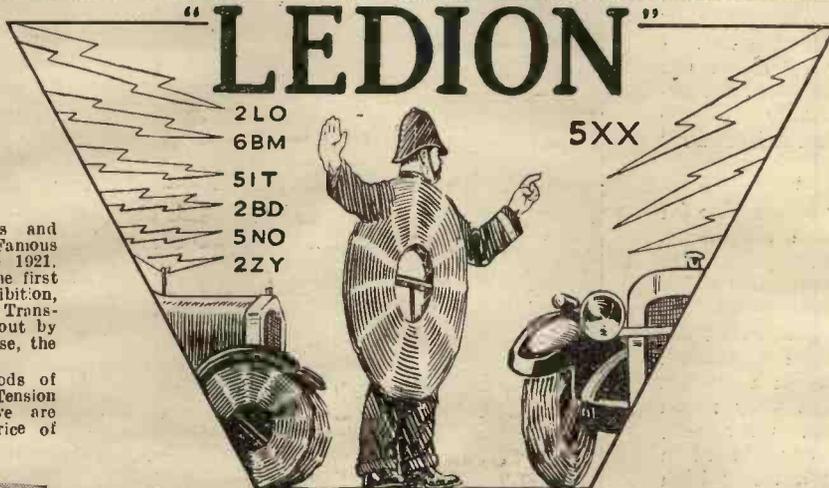
LIGHTING SUPPLIES COMPANY, 4 & 5 Finsbury Avenue, London, E.C.4

## REDUCTION IN PRICES.

LEDION Diamond-Weave Low-Capacity Coils (Calibrated by Faraday House). Trade Mark 452008

Original Manufacturers and Producers of the Famous Diamond Weave since 1921. As shown in use at the first Central Hall Radio Exhibition, 1921, on Reception and Transmission Work carried out by J. Ford for L. E. Douse, the originator of the coil.

Owing to new methods of Production (Still Tension wound machinery), we are again reducing the price of Ledion Coils.



"Ledion Coils, The Policemen of the Air."

## REDUCTION IN PRICES.

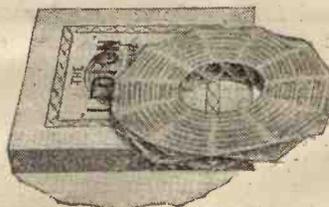
Giving sharp tuning and having low capacity, Ledion coils are the coils you need for selectivity. They allow you to pass by unwanted stations and easily select the particular one you desire. These are the only coils capable of this at the low prices we offer to the public to-day.



Set of 5 coils 155-876 m. (1/2 in. for Basket Coil Mounting)

Price .. 2/- the set.

Supplied in Cartons clearly marked with wavelengths.



Ledion 5XX Coils, 155-1700m (1/2 in. or 1/4 in.)

Price 1/3 Each.

Supplied in Cartons clearly marked with wavelengths.



Set of 5 coils 155-820 m. (1/2 in. for ordinary plug mounts)

Price .. 2/3 the set.

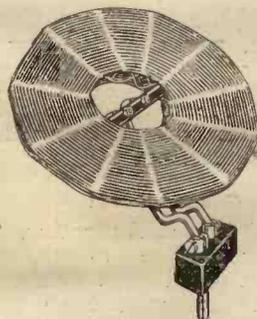
Supplied in Cartons clearly marked with wavelengths.

## LEDION UNIVERSAL COUPLING COIL HOLDERS.

The enormous advantage of the Ledion method of mounting embodied in this universal holder is at once apparent. The coil can be turned from vertical to horizontal, while the angle of support from plug can be varied through 0-90 degrees.

Price each .... 2/3 (Patent Pending.)

Distributors: Lighting Supplies Company, 4/5, Finsbury Avenue, London, E.C.4.



## ASK FOR LEDION SPECIALITIES

Distributors: Lighting Supplies Company, 4/5, Finsbury Avenue, London, E.C.4.

Home and Export enquiries for Trade Terms should be addressed to:—

LEDION LIMITED, Sales Dept., Vernon House, Southampton Row, London, W.C.1

Telegraphs: "Govapor. Westcent, London." Telephone: Museum 3791.

(Continued from page 260.)

very much about it. I bought a couple of ex-army telephone earth pins, drove them in about a yard apart, ran a heavy wire between them and joined the earth lead to that."

"If you will forgive me for saying so," went on Anstruther. "you are making just the mistake that ruins the reception of an enormous number of amateurs. You think that the earth does not matter very much. Believe me, it makes an immense difference. A bad earth, and yours is a bad one, is enough to account for all the symptoms that you have described. Try the effect of discarding the earth pins and using in their stead an old zinc bath buried three feet or so down immediately under the aerial." "I use that," said Painter, "and I find it very good. I wonder if you would tell me one thing that I do not quite understand. Is it necessary to use insulated wire for the earth lead?"

#### A Problem

John puffed away at his pipe for a few seconds before answering. "That is a problem," he said, at length, "on which opinions differ a little. For transmitting stations there is no doubt about it that the earth lead should be insulated. In the receiving station I do not think that it matters very much in the ordinary way. Of course, if the earth lead consists of a wire dropping from a fairly high window it is bound to swing in the wind so that it sometimes touches the walls and is sometimes right away from them. In this case I think that insulated wire is probably better. Anyhow, you cannot do any harm by using insulated wire for your earth lead. It will certainly not give worse results than bare, and it may be an improvement. As there is not really much difference in cost between the two, I should be inclined to plump for the covered stuff myself."

"Talking about earth pins, as we were a moment or two ago," said Richmond, "I used to use much the same arrangement as Morris and, curiously enough, I got quite good results with it. In fact, when I rigged up an improved earth on really sound lines there was not a great deal to choose between its performances and those of the original ground connection. How do you explain that?"

#### Different Soils

"It is very largely a question of the soil," John replied. "Your house is in quite a different part of

the town from Morris's, and the soil in your garden is probably of a damper nature, so that you get quite a good connection even though the actual contact surfaces may be small. In some places the soil seems to offer a much lower resistance than others, and in these almost any kind of earth will do. Still, I think that on the whole you will find that, especially for long-distance work, you do get better results with the new arrangement than with the old."

#### Earth Pins

"There is something in that," Richmond admitted, "for now you come to mention it, I remember

of a receiving station is simply a second aerial slung below the main set of wires. Its height from the ground should not be under six feet, and it is better to make it seven or eight, for there is then plenty of room to walk about underneath it. There are few more unpleasant things to encounter than a low counterpoise on a dark night! It should contain quite as much wire as the aerial itself, and it should be just as carefully insulated. How does it work? Well, in the ordinary aerial-earth system you have a condenser of large dimensions, but with a small capacity. The capacity of the average amateur aerial is in the



Ex Warrant Officer Collins, who was seriously injured in the war, is now a bed patient in a hospital in Ducane Road, Wood Lane. He is an expert in making crystal sets, and had one on show at the Wireless Exhibition at Shepherd's Bush.

that I had very great difficulty in getting any of the American stations last year when I was using the earth pins, though now I generally pick some of them up on anything like a favourable night."

"What do you think of the counterpoise?" asked Ainsworth. "Is it usually an improvement or not for receiving purposes?"

"Before you answer Ainsworth's questions," I interposed. "perhaps you would not mind telling us just what a counterpoise is and what it does. I have heard quite a lot about it, but I cannot say my ideas on the subject are very clear."

#### Counterpoises

"Well," smiled Anstruther, "I had better take the two questions, Cartwright's and Ainsworth's, as one, and deal with them both together. The usual counterpoise

neighbourhood of .0003 microfarads. In this system the suspended wires form the top plate and the ground itself is the bottom plate of the condenser.

#### A Condenser Effect

In the counterpoise we have again a condenser, but the bottom plate is formed by the lower set of suspended wires. It has several advantages over the earth system, and in many cases its adoption leads to an increase in signal strength. If your set is of the unstable kind, or if you have not the skill to do your tuning without oscillating, the counterpoise is best left alone. For the really skilled man it is excellent, and it is most useful in places where earth induction noises are bad. Those are really the main points about it."

(To be continued.)

**H. T. EFFICIENCY AS IT "WASN'T ON WEDNESDAY"**

**PLUG HOLE**



**GRIP**

**1/6**

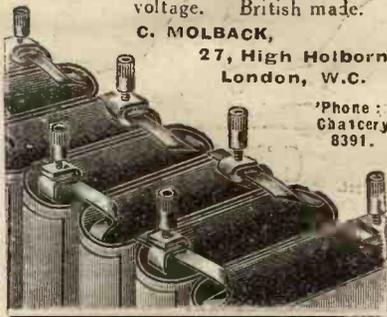
Per Dozen From Dealers or Direct.

Asked the meaning of the word revolution, a small boy said that it was "something on Saturday as it wasn't on Wednesday."

**HOVIMO CONNECTORS** are a revolution in H.T. Efficiency. Their use avoids soldering and cheapens cost of complete battery by from 25 per cent. to 50 per cent. The **HOVIMO** also ensures perfect "silent" working, is everlasting, allows easy replacement of units, will take ordinary wander-plug, and makes it possible to keep your H.T. at an equal voltage. British made.

**C. MOLBACK,**  
27, High Holborn  
London, W.C.

'Phone :  
Chancery  
8391.



**WIRELESS CABINETS**

In 5/8 in. Oak, French polished, very low prices for half-dozen lots

**Lambert Robinson & Sons,**  
Gisburn Street, BARNOLDSWICK.

**EBONITE BUSHES**

For mounting on Wood Panel. Perfect insulation. Price 1/- for 12 (post free) Easily fixed by drilling a 1/8" hole



**DAREX RADIO Co.,**  
STANDARD WORKS  
Walden Rd. Forest Hill.  
London, S.E. 23

Trade Supplied

**CABINETS**

Trans-Atlantic 4 14/6 Post Free.  
Neutrodyne Rec. 9/6

Send Your Requirements  
WE WILL QUOTE YOU

**CATTERMOLE BROS.**  
17, WALLER STREET, HULL

**WARNING !!**

Don't delay, buy at once the

**TEMPLE VARIOMETER**

Unique Design, Solid Construction, Effective Performance. At half the cost of less efficient types. One-Hole Fixing Terminal Connections. 4/6, Post Free.

**HEADPHONES** 4,000 ohms, comfy to wear, long life, high sensitive. Price 15/-, post free.

**TEMPLE TAPPED INDUCTANCES** for all B.B.C. stations, well made, 3/-. For Chelmsford 5x3. 4/-, post free.

**Amplifywhisk**, the six-in-one cat whisker. Price 6d.

Our guarantee: Money refunded 3 days if not satisfied.

Agents Wanted. Liberal Trade Terms

**M. TEMPLE,**

Walmar House, 296, Regent Street, W.1



**21/-**

**TRUE MUSIC : MINOR :**

"An infinite capacity for taking pains" is still our motto, and never was it better illustrated than in the TrueMusic Minor.

This wonderful little instrument gives ample volume and perfect articulation for all ordinary purposes. Its sensitiveness can be judged from the fact that excellent results have been obtained 6 miles from 21/0 on a crystal set.

No illustration can do justice to its appearance. The whole of the outside—horn and base—is finished in nigger brown, and the inside of the horn (which is of copper) is sand-blasted. The wonderfully rich and warm effect of the brown and copper must be seen to be appreciated.

The TrueMusic Minor is the Loud Speaker for every home.

You can get yours from the nearest dealer. If you have any difficulty write to us direct.

**LOUD SPEAKERS.**

TrueMusic Minor	...	...	...	...	£1 1 0
TrueMusic Junior	...	...	...	...	2 10 0
TrueMusic Standard	...	...	...	...	5 0 0
TrueMusic Concert Grand	...	...	...	...	6 10 0

T.M.C. No. 3 Lightweight Headphones ... .. 1 2 6



The Telephone Manufacturing Co., Ltd., Hollingsworth Works, West Dulwich, S.E.21

E.P.S. 265

# HOME CONSTRUCTORS



Turn Ratio 3,000/15,000

PETER CURTIS, L<sup>TD.</sup>

have no hesitation in confidently recommending the

## CAMDEN INTERVALVE TRANSFORMER

for maximum power amazingly free from distortion.

*This component carries our FULL GUARANTEE.*

**PETER CURTIS, L<sup>TD.</sup>**  
**75, CAMDEN ROAD, N.W.1.**

Telegrams: "Paracurtex." Phones: North 3112 and 3113.  
 BIRMINGHAM: 76, Newall Street. Central 7236.  
 MANCHESTER: 312, Deansgate. Central 5095.

In conjunction with

**The PARAGON RUBBER MFG. CO., Ltd.**

Barclays 422.

# LOW SELF-CAPACITY?

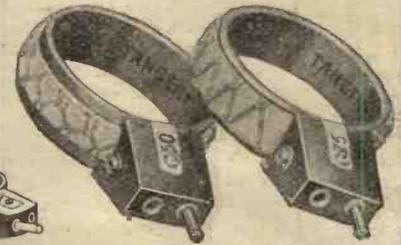
TO BE EFFICIENT YOUR TUNING COILS MUST HAVE A MINIMUM.

This is guaranteed if you use

## "TANGENT" TUNING COILS

### THE REASON—

Owing to the method of manufacture, the impregnated cord not only passes between each layer to give the air-spacing, but also firmly braces up the whole coil—thus no swathing or shellac is required.—The immediate result—**LOW SELF-CAPACITY.**—Ask your dealer—**Take no substitute.**



UNSHROUDED EFFICIENCY.

RIGID AS A MOTOR WHEEL.

Complete Sets (4 Concert Coils. (W/L 250-1070) 16/0 the set. 11 Concert Coils. (W/L 250-8750) £3/7/0 the set.

**GENT & Co., Ltd. Est. 1872**  
 Manufacturing Electrical Engineers  
**FARADAY WORKS, LEICESTER.**

London: 25, Victoria St., S.W.1.  
 Newcastle/Tyne: "Tangent House," Blakett St.

### WHY WASTE MONEY?

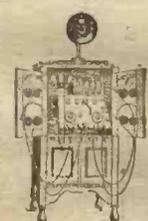
You will do so if you buy a cheap set or shoddy components. For a few extra pence you can buy goods that are fully guaranteed. Send stamp without delay for our new illustrated catalogue **RADIO FOR ALL**, which describes a wide range of Complete Sets, Amplifiers, Sets of parts for Constructors, and everything required for a complete installation.

**ONE VALVE RECEIVER**, Complete with Coils, Marconi D.E. 3-Valve, Siemens H.T. and L.T. Batteries, 1 Set Brandes Phones, Aerial Equipment, Marconi Royalty Paid. Fully tested and guaranteed.

£7 15 0 Carriage Paid.

**S. A. NOEL, Wireless Mfrs.**  
 (Members of the British Broadcasting Co.)  
**Radford Semele, Leamington Spa**

### "MORRIS" SOLID OAK STANDARD CABINET WITH LOCK



for any kind of receiver. Bottom cupboard with lock for accumulators and screws. Height 3 ft 6 ins.; width 2 ft; depth 15 ins. Back panel removable. Further particulars on application.

PRICE **£4 10s.**  
 part car large and packing 7s. 6d. extra.  
 Same pattern, 24 ins. wide inside 5s. extra.

**Solid Oak Wireless Table** with large drawer and bottom shelf for accumulator.

Length 55 in., width 16 in., height 26 in. 27/6 car. pd.

**M. VERSTRAETEN**  
 (Dept. 20) Melvil Chambers, 50a, Lord St., Liverpool

# SUPER CRYSTAL DETECTION

Permanent—Certain

EVERY ONE GUARANTEED



**3/6**  
 POST FREE

# HOVIMO CRYSTAL VALVE

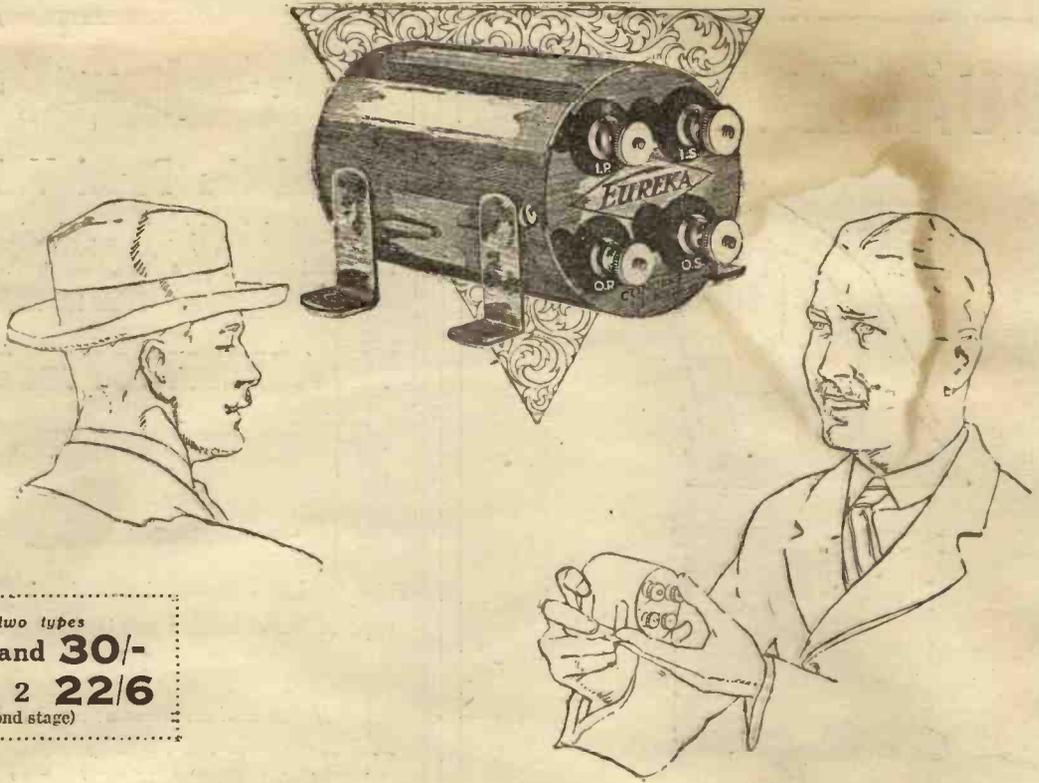
This wonderful Crystal Valve make: the frequently trying work of detection perfectly simple. Just a turn of the milled screw and you have the finest reception a crystal can give you—and it stays like it even if you move the set!

ONCE INSTALL THIS WONDERFUL INVENTION AND YOUR DETECTION TROUBLES ARE AT AN END

**NO BATTERIES!** **NO MORE DELICATE ADJUSTMENTS!**  
**FINEST RECEPTION IN AN INSTANT ONCE RIGHT—ALWAYS RIGHT**

Can be simply adjusted to suit any and every set employing crystal detection or rectification. The "Hovimo" Crystal Valve must not be confused with the ordinary "permanent" crystal detector, neither is it to be compared with Silicon-Bornite and other similar combinations.

**C. MOLBACK, 27, High Holborn, London, W.C.1.** Phone—Chancery 8391



Made in two types  
**Concert Grand 30/-**  
**Eureka No. 2 22/6**  
 (For second stage)

Do you know  
 ?

That there are two methods in use for obtaining volume from L.F. Transformers? One economises in wire by using a high step-up ratio between primary and secondary windings. The other utilises a very low step-up ratio and extremely massive coils. The former is adopted in cheap Transformers but the latter is the method employed in the Eureka. Of course, it costs very much more, but the results are incomparably better and entirely free from distortion.

Do you know  
 ?

That most Transformers break down owing to the frequent surges of current which find out the weak spot in the soldered joints of the secondary winding? The wire used in the Eureka is absolutely joint-free and therefore more expensive to buy. But it is well worth it, because it permits the Eureka being guaranteed indefinitely against breakdown as against others carrying only a 12 months' guarantee.

Do you know  
 ?

That two Eureka Transformers can be clamped together without the possibility of interaction? This proves the exceptional efficiency of its design. In reflex Sets such as the ST100 this is an immense advantage.

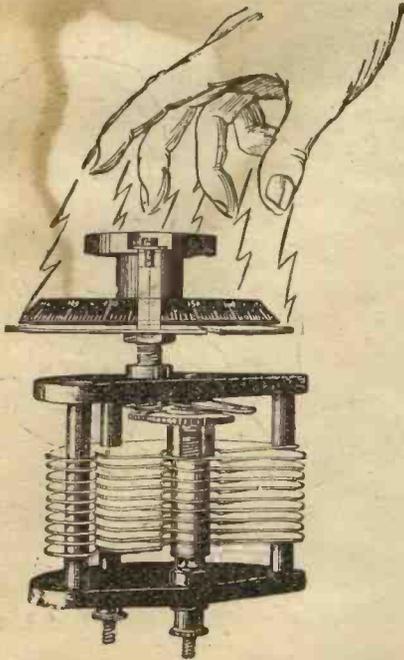
Do you know  
 ?

That a Eureka can be immersed in water for a fortnight without harm? No other Transformer in the world could withstand such a drastic test. Obviously such super-insulation qualities will enable the Eureka to stand up to ordinary conditions of use with ease.

Sold by all Dealers and manufactured only by  
**PORTABLE UTILITIES CO., LTD.**  
 7 & 8, Fisher St., LONDON, W.C. 1  
 Scottish Agents: **FULLER, BLACKIE & RUSSELL, LTD.**, 30, Gordon St., Glasgow.

Transformer **EUREKA** De Luxe

# GUARANTEED—



## TO ABOLISH HAND CAPACITY

The Naylor "Fulstop" Condenser is the only Condenser which entirely eliminates hand capacity effect. That irritating distortion you hear every time your hand approaches the operating knob cannot exist if you have a "Fulstop" Condenser.

Get the best out of your set by getting a "FULSTOP" SQUARE LAW CONDENSER

The abolition of hand capacity effects is *guaranteed unconditionally* by the makers and money will be refunded if any instrument does not give absolute satisfaction.

### PRICES.

.001	- -	13/6	.0003	- -	10/3
.0005	- -	11/3	.0002	- -	9/6

Stocked by most Wireless Dealers. If you have any difficulty send direct to

**J. H. NAYLOR, L<sup>TD.</sup>, WIGAN**



VARIABLE CONDENSER

TRADE **AERMONIC** MARK

## Behind the Panel Valve Holder

as described by Mr. P. W. Harris in his article on the construction of a Two Valve Amplifier.

Price 1/6 each. Post, etc., -/2

## The AERMONIC Four Point Valve "Template"



For the constructor who wishes to drill

his panel to accommodate valve legs or the ordinary type of valve holder this tool is invaluable.

Price 1/- each. Post, etc., -/2

If your local dealer cannot supply, obtainable from

**V. R. PLEASANCE, 60, FARGATE SHEFFIELD**

'Grams: Aermonic, Sheffield

Sole Distributors in the Midlands, North of England and Scotland

## YOURS FOR 20/-

Send 20/- to-day, together with your order for the "Tenyphone," and this wonderful set, which receives all B.B.C. stations, will be delivered complete, including all accessories. You pay a further £1 each month afterwards. The total cost is only £15 9s., or, if you prefer, £14 5s. cash.

'TONYPHONE' SUPER Two-Valves Complete with Accumulator, H.T. Battery, Aerial, 1 pair 4,000 ohms Headphones, and two Valves—one High Frequency and one Detector. All Royalties paid.

Send to-day and enjoy broadcasting NOW!  
**BRITISH ENGINEERING PRODUCTS CO.**  
(Battery Dept.), WINDSOR HOUSE, VICTORIA STREET, LONDON, S.W. 1



BUY THE "F.A.R."  
—the Best by Far.

The "F.A.R." L.F. TRANSFORMER

(SHROUDED) Ratio 5—1. **15/-**

Ratio 1—1	..	13s. 3d. each
Ratio 3—1	..	14s. 3d. each
Ratio 10—1	..	16s. each

Acknowledged to be the finest on the Market.

Sole Agent: **M. BOBIN,**  
21, WARWICK LANE, LONDON, E.C. 4

OF ALL DEALERS.

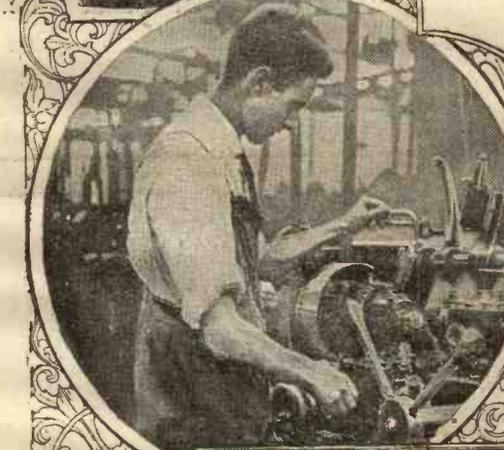
Telephone: CENTRAL 4872.

# Brown



### *Experientia docet.*

It takes all these processes—and many more besides—to make the **Brown Loud Speaker** the perfect instrument that it is. When selecting your Loud Speaker remember the old Latin saying "*Experientia docet*" and appreciate that the very first Loud Speaker built for Wireless use was a product of S. G. Brown, Ltd. Every good Dealer stocks the **Brown** in its several sizes and will be glad to give you an actual Demonstration of its superlative tone.



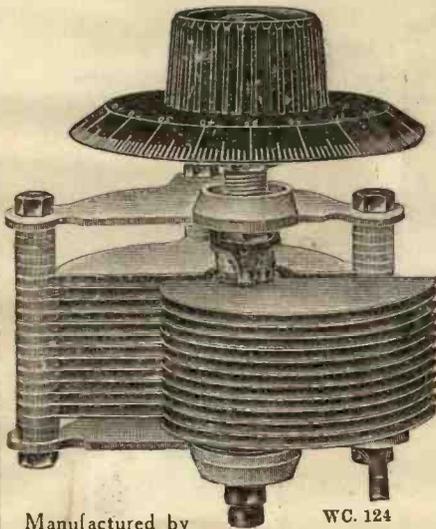
# LOUD SPEAKERS

Advt. of S. G. Brown, Ltd., Victoria Road, North Acton, W.3.

Gilbert Ad. 1775



# "UTILITY" VARIABLE



PRICES  
SQUARE LAW  
OR  
ORDINARY.

	each
WC. 123	
.001	12/6
WC. 144	
.00075	11/9
WC. 124	
.0005	10/6
WC. 125	
.0003	8/9
WC. 145	
.0002	7/9
WC. 146	
.0001	7/6

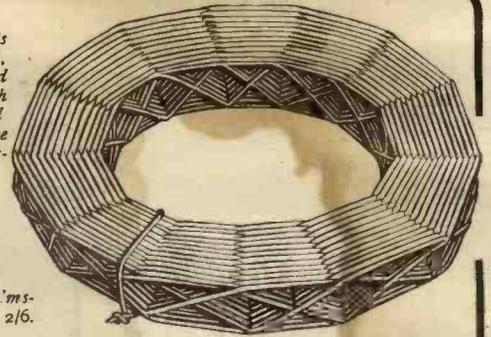
Vernier 2/6 extra  
FITTED WITH  
"RADION" Dials

Manufactured by **WC. 124**  
**WILKINS & WRIGHT, LTD.,** Utility Works,  
Kenyon Street, BIRMINGHAM.  
**CONDENSERS**

Supplied in sets  
of 5 (Nos. 25,  
35, 50, 75, and  
100), and each  
set is boxed  
Be sure to see  
the name "Re-  
actone."

4/6

No. 150 (Che'ms-  
ford), Price 2/6.



## Highest Efficiency Coils are TENSION WOUND

Each Reactone Coil, besides having a special formation to yield maximum air-space, is wound by special process under a constant tension.

A Coil is thus formed that is absolutely standard and true to calibration. Also extreme rigidity is attained without the use of shellac or wax. You therefore get an inductance that is practically free from self-capacity, and thus gives louder signals, sharper tuning and readier reaction, besides being rigid and unvarying.

# Reactone

TENSION-WOUND  
*Inductance Coils*

Ask your Wireless Dealer: In case of difficulty send P.O. for 4/6 (or 2/9 for No. 150), with your Dealer's name and address, to Sole Distributors for U.K. & Ireland:

V. Zeitlin & Sons, 144, Theobalds Road, London, W.C.1.  
Phones: Museum 3795, 6841.

Manufactured by Lewis Harforth & Co., London.



## The new wireless invention NO MORE HEADPHONE -ACHES

### NO PAINFUL HEAD BANDS

At last the highest science of Acoustics has been applied to Wireless Earphones and the outcome is the "MIC."

A perfect pair of earphones, the "MIC" phones are negligible in weight and have no headbands; consequently there is no uncomfortable pressure on the head nor unpleasant and dangerous perspiration in the ears.

The reception with "MIC" phones is clearer than with the now obsolete headphone and the volume of sound is adjustable. Yet the "MIC" phones are so tiny that they fit easily into a corner of the waistcoat pocket.

Full particulars from:—

# "EARLUX"

58-60 WIGMORE ST. LONDON W-1

Telephone:  
MAYFAIR 4435



3200  
OHMS

The "MIC"  
actual size

25/-  
THE PAIR COMPLETE  
In leather pouch  
3 1/2 x 2"



A famous name for a famous Valve.

# NELSON MULTI

3  
FILAMENTS

15  
COMPLETE

The "NELSON MULTI" contains three separate filaments, each of which can instantly be brought into use by a switch device incorporated in the valve cap. Adapted to fit any Standard. Four-pin socket. No loose wires. Three times the life of any other valve. Filament Voltage 4 - 6 Telephone: Wimbledon 172.



NELSON MULTI.

THE  
RULER  
OF  
WIRELESS  
WAVES

BRITISH MADE.

The "NELSON MULTI" will function as a Detector, L.F. Amplifier, or H.F. Amplifier. Owing to its unique construction it is unequalled for pure clarity of tone. Packed in specially constructed boxes. Entirely British Made.

Anode Voltage  
Detector 60-80  
Amplifier 80-120  
Telegrams: "Nelson,  
Wimbledon 172"



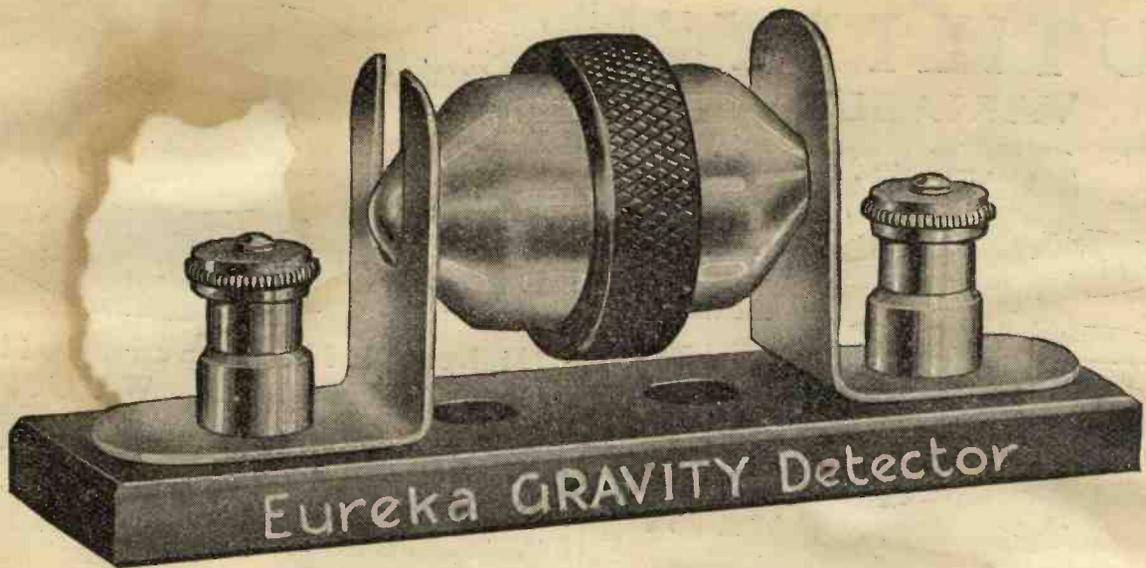
Trade Mark



Patent 21149

The NELSON VALVE CO.  
138, KINGSTON ROAD, MERTON PARK,  
LONDON, S.W.19

From all Wireless Dealers and Electricians.



—the *Crystal Detector*  
you'll eventually buy

**T**HE simplest Detector ever invented—and the most efficient, too. The Eureka Gravity Detector consists of three parts only: two cone-shaped plated brass caps insulated from each other by an ebonite ring. Around the inside of each of these two end pieces is situated a row of points so arranged that any crystal placed inside must rest upon both rows simultaneously.

Looking at the illustration above, the simplicity of the whole idea is at once apparent. The Gravity Detector is mounted between two stout plated clips.

The minute currents from your aerial pass first through one end-piece and then through the Crystal via the two rows of contact points to the second end-piece. Perfect rectification is ensured because the pressure of the crystal on the contact point *must* be just right. As a crystal user, you will appreciate the importance of correct contact pressure.

The whole idea underlying the Gravity Detector is so novel that experts can be well excused for doubting its efficiency. But the proof of the pudding is in the eating. They have soon found that it works easily.

Here are half-a-dozen exclusive Gravity features—many more will

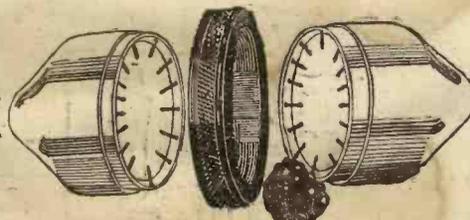
readily occur to you after a few days' use of this wonderful Detector.

1. When the Gravity Detector is in use the Crystal is fully protected against dust and light.
2. The Crystal can be changed in a moment and any crystal can be used. No screws or solder.
3. A slight turn of the Gravity Detector automatically discovers a new sensitive spot.
4. No moving parts and nothing to wear out. Will last a lifetime.
5. Extremely stable in use—will cure any S. T. 100 "howl" due to poor rectification.
6. A jolt or knock—instead of throwing the Receiving Set out of action—merely finds a new sensitive position for the Crystal.

Sold by all Dealers, and manufactured only by  
**PORTABLE UTILITIES CO. LTD.**  
7 & 8, Fisher Street, LONDON, W.C.1  
Scottish Agents: FULLER, BLACKIE &  
RUSSELL, LTD., 30, Gordon St., Glasgow

Complete with one piece of guaranteed Crystal **6/6**

AN END TO ALL



DETECTOR TROUBLES

Gilbert Ad. 1777



## OPINIONS THAT COUNT

The Radio Press test reports are respected in all wireless circles for their accuracy and fearless impartiality. We publish below two *verbatim* extracts from reports recently made. Remember—U.S. Radio products are British made throughout. The letters have no connection whatever with the words "United States."

—improvement in reception.

**MAGNIFICATION WITHOUT DISTORTION**

**THE U.S. SUPER.**—British made throughout, the U.S. Super Transformer's success lies in the excellence of its design. The core, with no bolts through it, is packed with finest stalloy iron, allowing fullest amplification without hint of distortion; winding is done by experts; terminals are large and comfortable; soldering is also provided for more permanent connections. Ratio guaranteed 5:1. Remember—it's British. **PRICE 18/6**  
 Two other U.S. Transformers are also made: U.S. No. 1, suitable for first stage work. **PRICE 14/6**  
 U.S. No. 2, designed for following stages and power work. **PRICE 11/6**  
 All U.S. L.F. Transformers are tested and guaranteed.

### What the Press says of the "Super":—

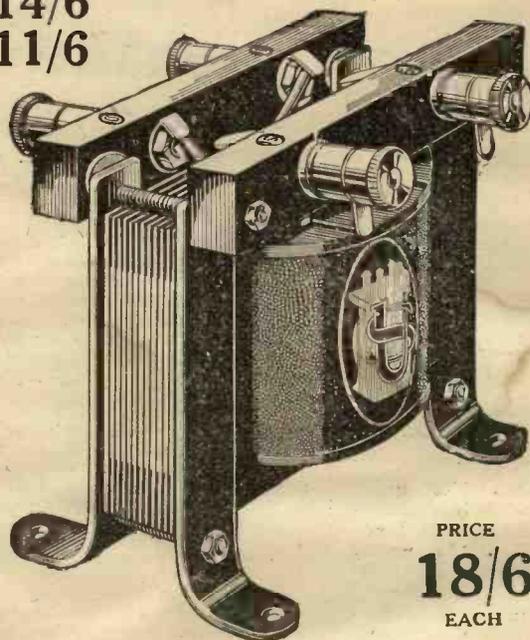
"Mechanical construction very strong. The iron circuit is of "Stalloy" and is tested up to 500 volts between windings. Ratio is 5:1

Under test the Transformer gave every satisfaction. It was tested in three positions before first and second stages of amplification and before power stage. Ample volume and good tone were secured and there was no trace of distortion. We found the transformer quite suitable in front of an L.S.3 power valve. Highly recommended."

*Broadcaster and Wireless Retailer.*  
 September, 1924.

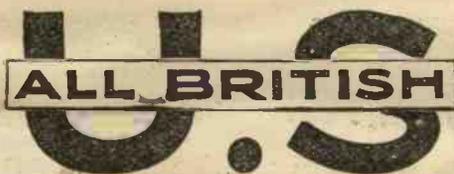
"The design has been carefully thought out, and really comfortably large and accessible terminals are fitted. The favourable impression given by a first inspection was borne out in actual test. The build-up recorded with this Transformer compared very favourably with that obtained with other standard patterns under identical conditions, whilst the tone was comparable to the best of the others. The present instrument can be heartily recommended, and indicates the vast strides that have been made recently in the design of L.F. Transformers."

*Modern Wireless.*  
 November, 1924.



**PRICE**  
**18/6**  
**EACH**

**STOCKED BY ALL LEADING WIRELESS STORES**



## SUPER TRANSFORMER

Wholesale only:  
**"U.S." RADIO Co., Ltd., 155, High St., Lewisham, London, S.E.13**

Phone: LEE GREEN 2404

Specially built for Dull Emitter Valves



Hold it  
upside down  
—shake it—  
and still the acid  
will not fall out

The Oldham "Non-spill" constructed of best seamless celluloid with large terminals and a screw vent. Absolutely non-spillable. Plates manufactured under the exclusive Oldham Special Activation Process 2 v. 10 amp. 12,6 hrs. continuous.

OLDHAM & SON, LTD.  
DENTON, MANCHESTER.  
LONDON: Gt. Chapel St., Oxford St., W.1  
NEWCASTLE: 1, St. Mary's Place.



Gilbert Ad. 1773.

HINTS ON PANEL LABELLING.

The making of labels and scales for wireless panels has become quite a fine art, it now being possible to give a panel a very finished appearance with a minimum of trouble.

A good idea has been evolved by a works specialising in these things in the form of terminal labels which can be actually recessed into the panel. This label is known as the No. 12, being made by Messrs. Money Hicks & Mills, Ltd., of Wimbledon, who claim to be the largest makers of wireless scales and labels in the world.



The label in question is so worded that it can be read from any point of view. It is fixed by simply passing the terminal through the label itself. The recessing is accomplished in a moment by means of a little tool that is sold with these labels when required, and it is recommended that amateurs and constructors should ask their dealers to show them these labels, together with the tool. They will be impressed with the beautiful way in which they are engraved, the simplicity of fixing, and the handsome appearance given to the finished panel, there being no waxed edges, as is the case with transfers: Also a few weeks of use cannot destroy the wording, which means great disappointment to those who have made a panel look so nice with transfers when it is new, only to be damaged and obliterated in a very short while. The No. 12 labels can be had in black, white and red.

Another excellent product of Messrs. Money Hicks & Mills, Ltd., is their No. 22 bevelled Variometer and Condenser Dial. This can be had in either Ivorex (white) or Ebonex (black), and it might be mentioned that it has passed the necessary tests, and has been adopted by many large makers in assembling their condensers, &c. The dial has a finish and appearance far above the average, and yet, owing to its method of structure, and the fact that it is produced on a mass production basis, the manufacturers are able to market it at such a price that it can be sold to the amateur through his retailer at as low a price as 7d. The bevel is just at the right angle for beauty of appearance, and the engraving is all that can be desired for clearness and accuracy.

Messrs. Money Hicks & Mills, Ltd., will be pleased to send a full price list of their labels and scales, together with samples, to any reader who cares to send 3d. in stamps and the name of his usual dealer to them at York Road, Wimbledon, S.W.19.

Advertisement of Money Hicks & Mills, Ltd.

# "ELLA"

## BATTERY CHARGERS

*They work from a Lampholder in your own Home*

There is an "ELLA" Battery Charger for every supply voltage. BATTERIES charged at home have much longer life and give better service than when charged outside.

"ELLA" Battery Chargers save their cost many times over. Send for Descriptive Leaflet. Trade Supplied.

**LIONEL ROBINSON & CO.,**  
3a, STAPLE INN, LONDON, W.C. 2.

Phone: HOLBORN 6323 (Two Lines).



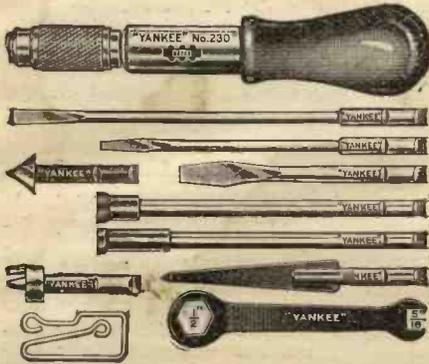
**A.C. Model.**  
Output 5/10 amps. 9 volts.  
Complete with Pole Indicating  
Ammeter and all connecting leads  
and adapter .. £6 6 0



**D.C. Model.**  
Output 5 amps. 9 volts. Machine  
only £5 12s. 6d. With Switchboard  
and Pole Indicating Ammeter  
and Regulating Resistance as  
illustrated .. £6 15 0

## "YANKEE" RADIO TOOL SET

No. 105



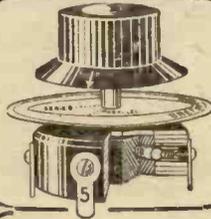
The handiest set of tools ever made for radio work.

Takes care of all screws; reams and countersinks holes; runs up nuts; bends and loops wire; and is provided with a wrench for jack and hex, or square nuts. A touch on the ratchet shifter gives a right and left ratchet and rigid adjustment.

OBTAINABLE OF ALL GOOD TOOL DEALERS AND IRONMONGERS

Wholesalers invited to enquire for terms to:  
MARKT & Co. (LONDON), Ltd.,  
98-100, Clerkenwell Rd., London, E.C.1.

## ANTI-CAPACITY SWITCH



We have pleasure in presenting another first-class speciality, which is the outcome of the famous BRETWOOD ANTI-CAPACITY VALVE HOLDER, which has gained such popularity among the wireless public on account of its scientific design and smart appearance. The Bretwood Switch is constructed on

similar lines, and we claim that it is, like the Valve Holder, absolutely free from capacity effects, and we feel confident that this component will meet with the most exacting requirements of the present-day experimenter. One of the principal features of the Bretwood switch is its beautifully smooth action, made possible by the spring loaded balls, and the wiping or rolling motion of the Phosphor-Bronze balls always ensures clean and perfect electrical contact.

Features.—1. Absolute freedom from capacity. 2. Perfect contact. 3. Sweet and smooth action. 4. Practically no wear-and-tear. 5. First-class finish and neat in appearance. 6. Easy to fix (one-hole fixing). 7. Very easy to make wire connections. 8. Like our other components, it is fully guaranteed. 9. For value offered the price is moderate.

Price  
**5/-**  
postage 3d.



Patent Pending

### BRETWOOD PATENT VALVE HOLDER

Eliminate poor reception by adopting this scientifically designed Valve Holder, and obtain 100 per cent. efficiency. Easy to fix. No capacity. No leakage. Always perfect contact. No soldering. Can be mounted on front or back of panel. Price 1/9. Postage 3d.

### It's THE LEAK that Counts

The Bretwood Grid Leak (Guaranteed) tunes a carrier wave from the silent point up. The Bretwood is recognised by highest experts and experimenters as the only variable and reliable Grid Leak.

Price  
**3/-**  
Postage 3d.

## RADIO IMPROVEMENTS, LTD.

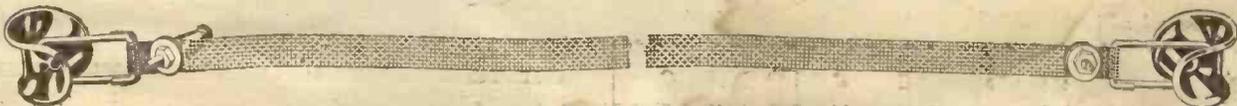
12-18, London Mews, Maple Street, London, W.  
ALL BRETWOOD SPECIALITIES ARE OBTAINABLE FROM MOST WIRELESS DEALERS.

Earclays 384

# MAGNIPLIX AERIAL

We guarantee to improve your reception in strength, clearness and range

High tensile phosphor-bronze wire gauze. "Strong as Steel."



If your dealer does not stock them, send direct to us.

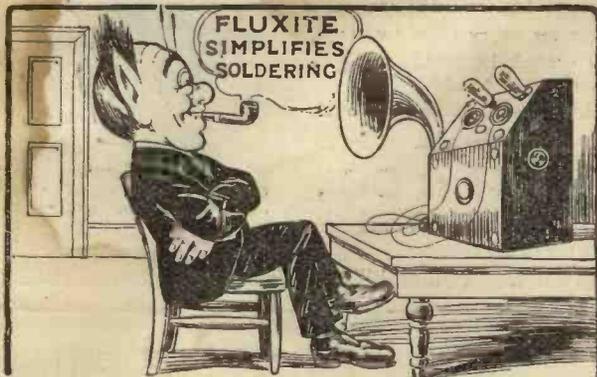
GUARANTEE:—If you are not satisfied that Magniplitx Aerial is worth the additional cost, return it in good condition and your money will be refunded.

Prices:—1 in. wide 3d. per ft.; 1/2 in. wide 2d. per ft. Supplied in lengths of 50, 75 and 100 feet, including fittings, viz.: End Terminal for Down Lead and Insulators; ready for erecting. For lengths under 50 ft. fittings charged 1s. 3d. extra. Postage and packing free.

**HELIXO LTD.**, Phone:  
Museum 6039.  
Henry Bldgs., Gresse St., Rathbone Place, London, W.1

Watch this space for additional "Magniplitx" results next month.

# SOLDERED AND SOUND



A Set that has all its connections soldered is a Set capable of giving its owner complete satisfaction—a great advantage over an ordinary loosely wired circuit that is nothing more than a thorny road for delicate currents. If you appreciate purity of tone and selectivity of reception, solder every join in your circuit and you will be handsomely rewarded for your pains. FLUXITE makes soldering really simple, and you will be delighted at how light it makes this one-time tedious job. Ask your Ironmonger or Hardware Dealer to show you the neat little

## FLUXITE SOLDERING SET

It is perfectly simple to use, and will last for years in constant use. It contains a special "small space" Soldering Iron with non-heating metal handle, a Pocket Blowlamp, FLUXITE, Solder, etc., and full instructions. Price 7/6.

Price *Write to us should you be unable to obtain it.*

**7/6**



Another use for FLUXITE—Hardening Tools and Case Hardening. ASK FOR LEAFLET ON IMPROVED METHODS.

## FLUXITE SIMPLIFIES SOLDERING

All Hardware and Ironmongery Stores sell FLUXITE in tins. Price 8d., 1/4 & 2/8  
**BUY A TIN TO-DAY**

FLUXITE Ltd., 330, Bevington St., LONDON, S.E.16

# Hullo!! C.Q., Will Day Calling

**1" ANDCO BASKET COILS.** (100 to 4,500 metres.) Duplex wound, 25 gauge D.C.C. wire, sewn supports unwaxed, very firm and strong, recognised as the finest type Coils yet made.

Size.	Each.	No.	Each.
1. 2 in. approximately 150 to 300 metres	5d.	1.	4d.
2. 2½ in. " 250 to 400 "	6d.	2.	5d.
3. 2¾ in. " 350 to 550 "	7d.	3.	6d.
4. 3 in. " 450 to 650 "	8½d.	4.	7d.
5. 3½ in. " 600 to 750 "	10d.	5.	8d.
6. 4 in. " 700 to 1,000 "	1/2	6.	9d.
7. 4½ in. " 950 to 1,350 "	1/4½	7.	10d.
8. 5 in. " 1,300 to 1,750 "	1/8	8.	1/1-
9. 5½ in. " 1,700 to 2,660 "	2/-	9.	1/2
		10.	1/4
		11.	1/6
		12.	1/8

The new DAYZITE Variable Condensers fitted with Aluminium End Plates, and both sets of Vanes adjustable. \*001, 7/9 each; \*0005, 5/8 each; \*0003, 5/1 each; \*0002, 4/7 each; Vernier, 3/11 each. Postage 6d. each extra.

## NO WATER PIPE HANDY? — WHY WORRY? GET A CLIMAX EARTH TUBE, 5/- each

Write for new Catalogue sent Post Free on mentioning this Paper. Postage and Carriage on all Goods extra.

MAKE NO MISTAKE IN YOUR SELECTION. Do not keep wasting money on crystals of unknown repute. Get a crystal that has stood the test of time.

## DAYZITE REGD.

As one delighted Customer writes: "Send another Dayzite Crystal for my friend. It is as good as a valve, and if the price was 5/- each it would be cheap." Secure a Registered DAYZITE Crystal, sold only boxed with Silver Cat's Whisker, 2/6 each, postage 3d. extra.

Makes excellent contact with Zincite for a Perikon Detector.

## WILL DAY, LTD.,

19, Lisle Street, Leicester Square, London, W.C.2.

\*Phone: Regent 4577. Telegrams: "Titles, Westrand, London."

# BRITEZITE CRYSTAL

USED NIGHTLY IN A MILLION HOMES

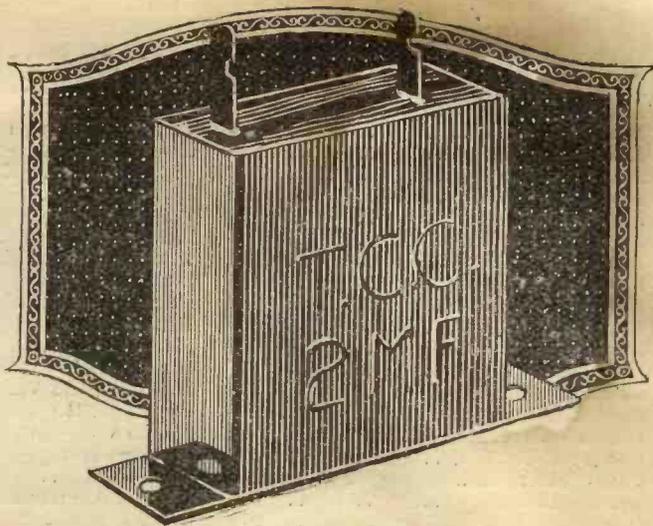
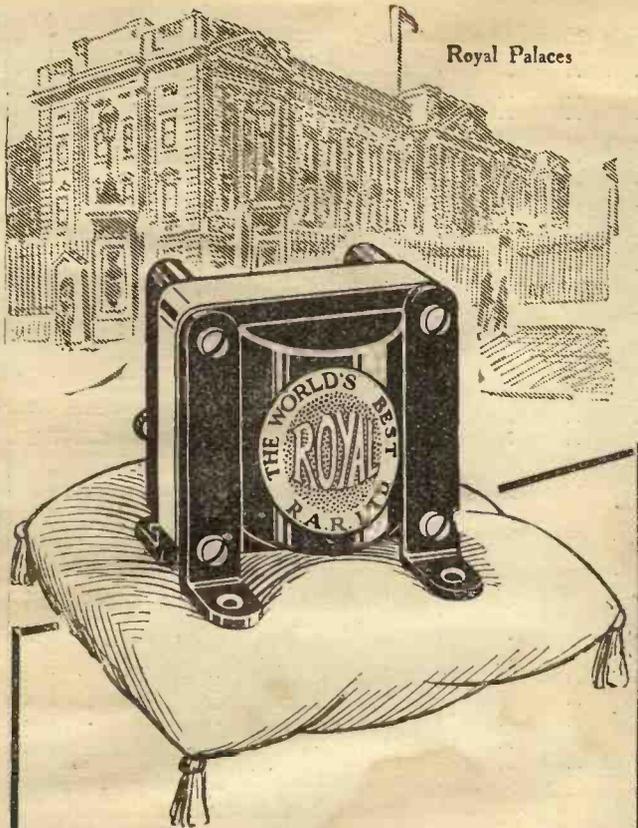


MR. EVERYBODY.—Always use "Britezite," the Crystal which "Popular Wireless" says is one of the most efficient brought to their notice. "Britezite" Crystal is standard in many leading makers' sets.

Send 1/- for sample and test "Britezite" yourself.

Satisfaction Guaranteed or money refunded.

**BRITISH CENTRAL ELECTRICAL CO., LTD.,**  
6-8, Rosebery Avenue, London, E.C. Telephone: Clerkenwell 5848/9.



**Do you know any Transformer that equals the following specification?**

1. The self capacity of the secondary winding of the "ROYAL" is 6 micro-micro farads—far and away lower than that of any other Transformer in general use.
2. It is tested to 1,000 volts between windings.
3. The inductive values of both windings are absolutely correct.
4. Hysteresis, leakage losses and capacity are practically nil.
5. It is completely METAL shrouded, thus eliminating any interaction between transformers.
6. Windings completely impregnated—terminal blocks of Cetec, the best dielectric known.
7. Complete absence of resonance peaks—which means that the lower harmonics are rendered in equal truth with the high notes.

The "Royal"  
**LOW FREQUENCY SUPER TRANSFORMER**

Price £1 0 0

**AN OFFER**

*We are so confident of the supreme quality of the "Royal" Low Frequency Super Transformer that we are willing for you to test it against ANY other on the strict understanding that we will refund the purchase cost on return to us within 14 days post paid.*

**R. A. ROTHERMEL, L<sup>td</sup>.**

MANUFACTURERS & SUPPLIERS OF ALL KINDS OF RADIO AND SCIENTIFIC INSTRUMENTS

24 & 26, MADDOX ST., LONDON, W. 1

Phones: MAYFAIR 578 & 579.

**Caution:**

**T.C.C. Condensers are being imitated**

WE were the first manufacturers of Condensers in green cases fitted with feet and designed specially for Wireless use. It has been brought to our notice that Condensers are being placed on the market with this distinctive colour and design but not of our manufacture.

**A test and what it revealed**

A test on two of these imitations gave the following results:

Condenser No. 1 marked '01 mfd. proved to be '017. An error of 70%.

Condenser No. 2 marked '01 mfd. proved to be '024. An error of 140%.

**Look for the Trade Mark before you buy**

In your own interests, therefore, we ask you to see that each Green Condenser carries our Trade Mark T.C.C. without which none is genuine.

The sign T.C.C. means: the best Condenser that can be produced embodying 20 years condenser-building experience. Capacity true within 10%. Highest insulation value.

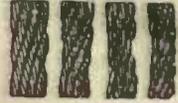
**TELEGRAPH CONDENSER Co., Ltd.**  
 Mortlake Road, Kew Gardens, Surrey.

Gilbert Ad. 1739

Index to Advertisers

	PAGE		PAGE		PAGE
Abbey Engineering Works ..	268	H.T.C. Electrical Co. ....	232	Sipton (E.) and Co., Ltd. ..	237
American Hard Rubber Co. ..	257	Igramic Electric Co. ....	206	Scientific Supply Stores ..	276
Andersons ..	276	Jackson Brothers ..	237	Smith and Ellis ..	276
Beard and Fitch, Ltd. ....	205	Lambert Robinson ..	263	Sterling Telephone and Elec. Co., Ltd.	182
Belling and See ..	246	Ledion, Ltd. ....	261	Taylor (J. H.) and Co. ....	251
Bobin (Maurice) ..	286	Lighting Supplies Co. ....	246	Telegraph Condenser Co., Ltd. ....	275
Bowyer-Lowe Co. ....	220	Lissen, Ltd. ....	201	Telephone Mfg. Co. ....	263
Brandes, Ltd. ....	202	London Elec. Stores ..	244	Temple (M.) ..	263
Britain's Best Crystal ..	241	McMichael (L.), Ltd. ....	241	Tungstallite, Ltd. ....	210
British Central Elec. Co. ....	274	Marbaix (Gaston E.) ..	243	"U.S." Radio Co. ....	271
British Engineering Products ..	266	Markt and Co. ....	273	Verstraeten (M.) ..	264
Brown (S. G.), Ltd. ....	267	Marshall (H. Lloyd) ..	253	Ward and Goldstone, Ltd. ....	254
Burndept, Ltd. ....	250	Merton Davis ..	260	Watmel Wireless Co. ....	236
Burne-Jones and Co. ....	252	Molback ..	263, 264	Wholesale Fittings Co. ....	251
Buss (T. O.) ..	242	Money, Hicks and Mills ..	272	Wilkins and Wright, Ltd. ....	223, 269
Cattermole Bros. ....	263	Mullard Radio Valve Co., Ltd. ....	214, 215	Zeitlin (V.) and Sons ..	269
Chase Elec. and Radio Co. ....	236	Naylor (J. H.) ..	266		
Collinson's Precision Screw Co., Ltd. ....	181	Nelson Valve Co. ....	269		
Cossor (A. C.), Ltd. ....	208, 209	Neutron, Ltd. ....	235		
Curtis (Peter), Ltd. ....	227, 239, 264	Noel (S. A.) ..	264		
Darex Radio Co. ....	263	Oldham Accumulators ..	272		
Day (Will), Ltd. ....	274	Ormond Engineering Co. ....	228		
Dixon and Co. (Leslie) ..	244	Peto-Scott Co. ....	258, 259		
Dubilier Condenser Co., Ltd. ....	219, 245	Pleasance ..	266		
Earlux Phones ..	269	Portable Utilities Co., Ltd. ....	265, 270		
Elliott and Morrison ..	268	Radiax, Ltd. ....	243		
Energoproducts ..	223	Radio Communication Co., Ltd. ....	224, 225		
Engineering Tools ..	244	Radio Improvements ..	273		
Falk, Stadelmann and Co., Ltd. ....	232	Radio Panel Co. ....	244		
Fluxite ..	274	Radio Stocks ..	247		
Formo Co. ....	236	Raymond (K.) ..	230, 231		
Gent & Co. ....	264	Robinson (Lionel) and Co. ....	273		
Goswell Engineering Co. ....	249	Rose Bros. Elec. Co. ....	238		
Gran-Goldman Service ..	223	Rosen (Ed.) and Co. ....	248		
Helixo, Ltd. ....	273	Rothermel (R. A.) ..	275		
Holrose Mfg. Co. ....	276	"S. A. Cutters" ..	238		

**FOR SECURING YOUR AERIALS**



and a thousand purposes where great strength and strain is needed. FLEXIBLE STEEL WIRE ROPE, Aeroplane Cable made to Government specification to specified breaking strains. PRICES BELOW COST. Orders of 10/- and over carriage paid, otherwise please add 1/- for postage.

No.	Dia.	Strain.	100 ft.
0	1/16	5 cwt.	4/6
51	5/32	25 cwt.	10/-
52	3/16	35 cwt.	11/-
53	7/32	45 cwt.	12/-
5	1/4	70 cwt.	14/-
7	11/32	100 cwt.	20/-

Strainers for use with above, right and left-hand threads, 9d. each, or 3/6 per dozen. SMITH & ELLIS, Ltd. (Dept. 85), 11, Little Britain, E.C.1. Tel.: City 8994

**The "HOLROSE" CARTRIDGE RHEOSTAT & POTENTIOMETER.**

There are many advantages in fitting a Holrose Rheostat or Potentiometer. They give absolute control, smooth and silent, and when fitted to panel the changing of a cartridge from bright emitter to dull emitter can be done by just loosening two nuts. One hole fixing. Nickel plated.



**"HOLROSE" CARTRIDGE RHEOSTAT COMPLETE** with 3, 6, 10, or 30 ohm cartridge 3/6 each, postage 3d.

**Spare Rheostat Cartridges,** 1/2 each.

**"HOLROSE" POTENTIOMETER** 300 ohms. 4 3 each Postage 3d.

**Spare Potentiometer Cartridges** 1/10 each.

Reg Design No. 704707

If your dealer has not got them, we send post free if you mention his name & address

**THE HOLROSE MANUFACTURING CO.** (Dept. W.1.) 43, LONSDALE ROAD, KILBURN, LONDON, N.W. 6 Phone: Willowden 8113.

**"SCIENTIFIC" COMPONENTS—THE CONSTRUCTORS' SAFEGUARD**

**"SCIENTIFIC" Square-Law Condensers.** (As shown)

Guaranteed full capacity as listed; each condenser gives a true straight line Wave-length Calibration Curve.

**ONE-HOLE FIXING.**

.001 mfd. .. 7/9	.0005 mfd. .. 5/-
.0003 mfd. .. 4/-	.0002 mfd. .. 3/-

Vernier Condenser, 2/9 Dial and Knob, 1/- ex. Postage, etc., 9d.

**"SCIENTIFIC" Experimental Panels.** (As shown)

Ideal for Experimenters. May be incorporated in any circuit. Eliminate confusion in experimenting. Each Panel comprises one or more Valve Holders, one Rheostat per Valve, and Terminals for Grids, Plates and Filaments.

1-Valve Panel (without Valve) ..	7/9
2-Valve Panel ..	15/-
3-Valve Panel ..	22/6

Fitted with "Millistats" for Dull Emitter Valves, 5d. extra per Rheostat.

**VALVE HOLDER, with Terminals, on Ebonite Panel** .. 1/6

**FILAMENT RHEOSTAT (5 ohms) One-Hole Fixing, with Dial and Knob** .. 2/6

**"MILLISTAT" (50 ohms), for Dull Emitters, One-Hole Fixing, 2/6. Dial, 5d. extra.**

**Low Frequency TRANSFORMER, efficient maximum amplification** .. 12/6

**SHIELDED L.F. TRANSFORMER, a first-class instrument** .. 20/-

**"SCIENTIFIC" APERIODIC H.F. TRANSFORMERS.** The Transformer that has revolutionised H.F. Amplification. Requires no condensers, no tuning, and covers a wide range.

"B" Size, 350-500 m. ....	7/6
For BBC Stations, ..	
"D" Size, 1000-1800 m. ....	9/6
For Chelmsford, Radola, etc. ....	
"E" Size, 1800-2700 m. ....	9/6
For Paris (P.L), etc. ....	

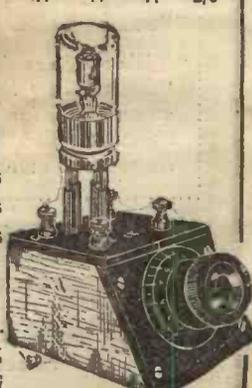
All components, post extra.

**SCIENTIFIC SUPPLY STORES,**

Head Depot: 80, Newington Causeway, S.E.1.

Branches: 128, Newington Causeway, S.E.1; 7, St. George's Circus, S.E.1; 16, Manette St., Charing Cross Rd., W.1; 207, Edgware Rd., W.2; 84, Church Rd., Upper Norwood, S.E. 23.

Tel.: HOP 4177

**A Combined Soldering Iron and Blowpipe.**

**3/11 POST FREE**

Specially designed for the Wireless Mechanic.



The "Mvstic" Combined Soldering Iron and Blowpipe is attached to an ordinary flexible gas tube and works for you at **75% LESS COST THAN ELECTRICITY**

Only 7 1/2" long, it is fitted with a neat, solid copper hammer bit, which heats to soldering point in less than one minute and retains a constant and uniform temperature. By unscrewing the bit, you have a powerful Blowpipe. Money returned if not absolutely satisfactory.

Of all retailers or direct from

**F. ANDERSON & CO., Sole Selling Agents,** REGENT HOUSE, KINGSWAY, LONDON, W.C. 2. Trade Enquiries Invited

# Buy Confidence!

## A Word to Every Reader

**THIS** magazine has brought thousands of new readers into contact with Radio Press, Ltd. From now on you will be our friends, and we do not want you to think that the Radio Press is a cold-blooded publishing company. It is not. It is a collection of the keenest wireless enthusiasts—names known throughout the world—the authors of articles translated, because of their merit, into a dozen different languages.

If you knew us you would realise the feeling of responsibility we have. What we say goes out to 450,000 readers every month in our three papers. We realise our influence, and we never intend to let you down.

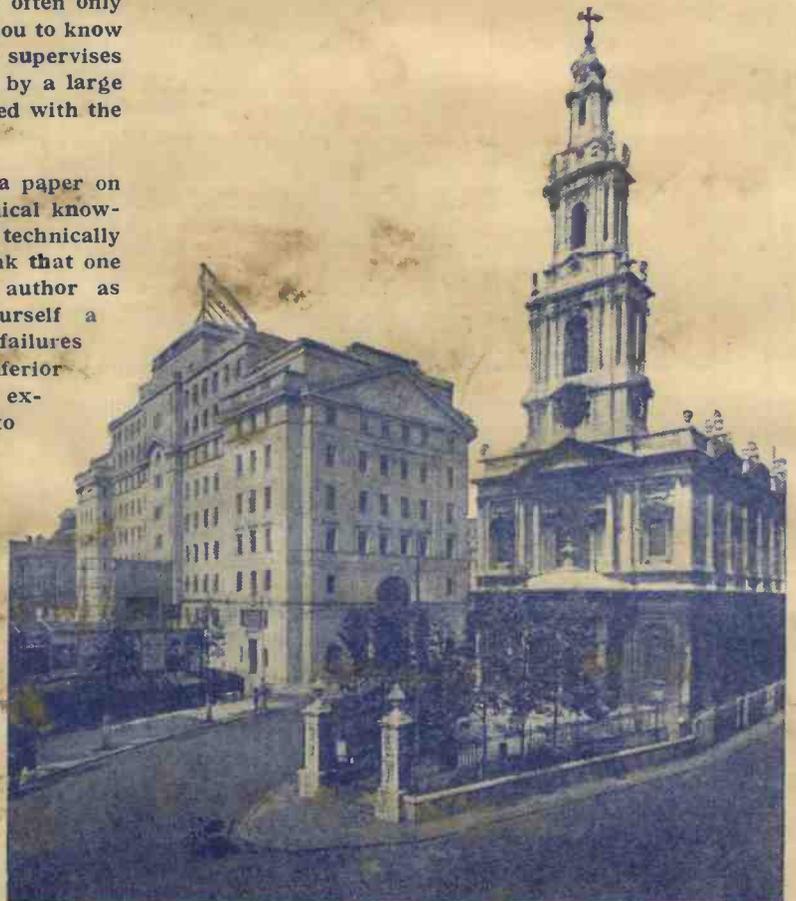
We are wireless people from the Managing Director to the junior office boy. The policy and every detail of the Company is personally directed and supervised by John Scott-Taggart, F.Inst.P., A.M.I.E.E.—the business and editorial control being in the hands of one man. When editors of "technical" journals are so often only journalists, it means an immense amount to you to know that a fully competent technical radio engineer supervises the publications you read, very ably assisted by a large technical staff trained for the work and imbued with the same ideals and the same vital keenness.

Many of you are beginners. You buy a paper on trust. You have not the experience or technical knowledge to know whether what you read is sound technically and practically or not. You may at first think that one wireless article is as good as another, one author as able as another. You will soon find yourself a sadder and wiser man if you do; a few failures due to making untested sets which give inferior results, a few words with an experienced experimenter, and you will find that it pays to stick to people you know—to a firm which has built up a huge business simply by selling confidence.

You see the photograph here of Bush House and the aerial on the roof? This is where the head office of the Radio Press is installed—magnificent offices in which every detail is organised to give YOU sound designs for sets you want to build, sound theoretical articles, sound advice on every aspect of wireless. The brilliant success of the Radio Press, financially and in reputation, is due to the ideal of never letting a wireless reader down. Every single article is sifted to ensure its accuracy and reliability, and every set is scrupulously tested.

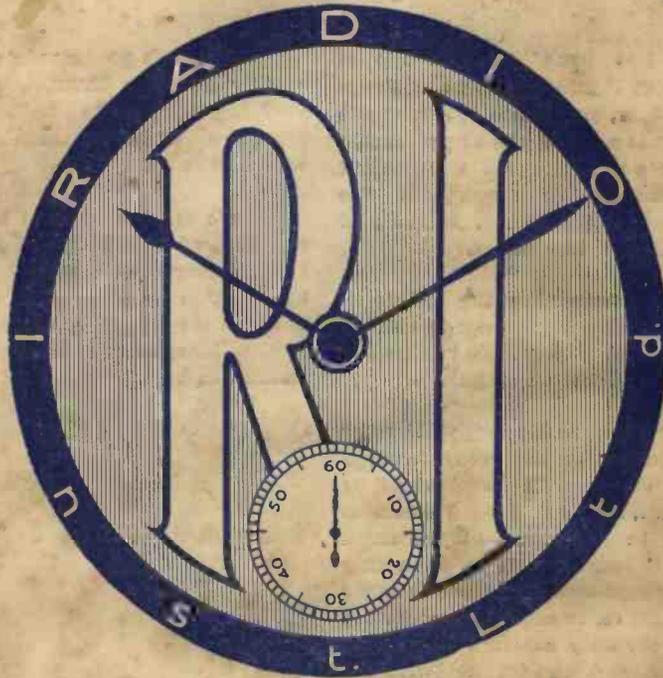
Only the magnitude of our business—we have one weekly and two monthly wireless journals, and do a very big business in handbooks—enables us to give that service which has commanded the respect of every reader who knows us.

We ask you, if you need confirmation, to ask an experienced friend what he thinks of the Radio Press, their writers and their publications. We will abide by the opinion he gives you. We know what he will say because we know he himself has bought Radio Press publications, and in buying them has bought confidence which has been justified by his subsequent experience.



OFFICES OF RADIO PRESS, LTD., STRAND, W.C.2.

# One a Minute



For 24 hours a day during one working week, the public are demanding the famous R.I. transformer at the rate of one per minute.

Thousands of experimenters and amateurs appreciate the unique design now so well known as that of the New R.I. transformer, and faultless reception will convince you or any other interested person the instant you substitute an R.I. for your present transformer.

Remember the R.I. is an individual job, each one tested on its merits, each one guaranteed to the public for a period of one year.

Given away with each instrument, one book of Distortionless Circuit Diagrams.

*Write for the New R.I. brochure, free on application. The information provided will prove invaluable.*



**Radio Instruments Ltd.**  
12 Hyde Street, Oxford Street

Telephone: REGENT 6214 (3 lines) W.C.1. Telegrams: Instradio London.