

DETAILS OF THE KING'S GIFT SET

Amateur Wireless

And Electrics

Vol. VI. No. 146.

SATURDAY, MARCH 21, 1925

Price 3d

PRINCIPAL CONTENTS

HOW TO TUNE

"STRAIGHT" TO
"SUPER"

DOUBLE-COIL
CRYSTAL SET

TRY THE SHORT
WAVES!

PRACTICAL ODDS
AND ENDS

A TALK WITH CAPT.
ECKERSLEY

2-VALVE REINARTZ
RECEIVER WITH
PLUG-IN COILS

SIDELIGHTS ON THE
SUPER CIRCUITS

FREE REPLIES TO
READERS' QUES-
TIONS

WELL ILLUSTRATED

Registered at G.P.O. as a Newspaper



TETRAZZINI

The photograph shows Madame Tetrazzini, who recently broadcast from 2 L O,
and Mr. Percy Pitt at the broadcasting studio.

Save Yourself Trouble

Exide

THE LONG-LIFE BATTERY



Type DFG



Type HZ

To meet the demand for batteries capable of being discharged at slow rates over long periods, the types illustrated have been designed.

These cells need re-charging only every SIX MONTHS

unless the full capacity has been taken out in a shorter period.

Type DTG

These cells are particularly suitable for sets using .06 Dull Emitter Valves. The cells are each 2 volts, so that two of these cells will replace 3 dry cells. Capacity when used for very slow intermittent work—20 ampere hours. They are supplied dry, but fully charged and need only the addition of acid to make them ready for service.

Price
(Excluding Acid)
Type DTG
5/-

Type DFG

This type is a development of the DTG, having more than double the capacity of the 5/- cell. Capacity on slow intermittent work, 45 ampere hours.

Type DFG
10/-

The above types are in strong moulded glass boxes.

Type HZ (in celluloid boxes)

The HZ series has been designed for use in circuits where the number of burning hours between charges is not less than 30. They need be re-charged only every six months unless the full capacity has been taken out.

VOLTAGE	TYPE	ACTUAL Ampere-Hour Capacity	PRICE	
			Cell only Uncharged	In Container Type "O"
2 Volts	1-HZ 2	40	£ s. d. 0 17 6	£ s. d. 1 3 6
	1-HZ 3	60	1 1 0	1 8 0
	1-HZ 4	80	1 4 6	1 12 6

Showrooms and Depots:

LONDON :
219/229, Shaftesbury
Avenue, W.C.2.

Phone: Regent 8070.

BIRMINGHAM :
58, Dale End.

Phone: Central 7629/30.

**THE Chloride ELECTRICAL STORAGE
COMPANY LIMITED.**

CLIFTON JUNCTION, NEAR MANCHESTER.

Showrooms and Depots:

BRISTOL :
22, Victoria Street.

Phone: 6460.

MANCHESTER :
1, Bridge Street.

Phone: City 9123.

**MADE AT THE LARGEST BATTERY
WORKS IN THE BRITISH EMPIRE.**



Showing Dubilier Grid Leak Attachment in position.

A NEW DUBILIER ACCESSORY.

To meet cases where the Grid Leak cannot be joined across the Grid Condenser, we have produced the accessory shown above. It consists of a plate of high insulation material carrying a single grid leak clip, and it is attached to the Type 600 condenser and to the panel by a single screw.

The Grid Leak is then inserted between the clip on the attachment and the right-hand clip on the condenser. This accessory obviates soldering of the leak, facilitates comparison of different leak values, and also ensures that a minimum of surface leakage occurs between the Grid Leak Terminal Strips.

In this, as in all cases, it is important to



Specify Dubilier.

The
Dubilier Grid
Leak Attach-
ment.
Price 6d.

<p>Ducon Works, Victoria Road, North Acton, London, W.3.</p>	<h1>DUBILIER</h1> <p>CONDENSER CO. LTD</p>	<p>Telephone: Chiswick, 2241-2-3. Telegrams: Hivoltcon, Phone, London.</p>
--	--	--

GIVE YOUR PANEL

THE TRUE INSTRUMENT
MAKERS' FINISH—
HAVE IT MACHINE
ENGRAVED!

Owing to the very great increase in the number of persons constructing their own Radio sets who require ebonite panels engraved, we have set aside a machine for this purpose and can turn out first-class work at the following prices; 24 letters or under, 1/4; over 24 letters and up to 36, 2/-. For every additional dozen letters add 6d. NOTE all lettering finished with durable white stopping or gold.

PROMPT EXECUTION OF ALL WORK

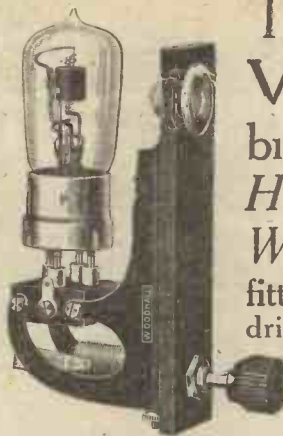
WRITE

**ECONOMIC
ELECTRIC
LTD.**

Head Office:
10, FITZROY SQUARE,
LONDON, W.1.

Showrooms:
303, EUSTON ROAD,
N.W.1.

Voucher
A.M.25, cut this
out and send to us
with your name and
address and receive
in exchange 44
page radio
List.



PRICE, complete
with 6ohms Rheostat, 6/6
" 10 " " 7/-
" 30 " " 7/6

The Woodhall Valve Unit combines *Rheostat, Valve Holder, Bracket and Window* in one compact fitting . . . And you need to drill *two holes only*.

This newest addition to the Woodhall Range of Components fills a definite need of many "Home Constructors." It gives the popular "back-of-panel" fitting for the valve, occupies a minimum of space, and is highly efficient in use. Consists of Woodhall Valve Holder, on rigid bracket with nickel-plated valve window and Woodhall Vernier Rheostat (see below).

The **WOODHALL** Vernier Rheostat



Patent No. 213,033

Combined plunger and rotary movement. Push-pull movement for coarse setting; rotary for vernier. Wonderfully smooth movement; best ebonite former; one-hole fixing. 6 ohms, 2/6; 10 or 12 ohms, 3/-; 30 ohms, 3/6.

WOODHALL

Guaranteed Components

Sold by all the best Radio Dealers. Sole Distributors:
Pressland Electric Supplies, Ltd., Hampton-on-Thames

Phone: Molesey 23



PERFECT RECEPTION

Absolutely GUARANTEED

BY USING

TUNGSTALITE

SYNTHETIC CRYSTAL

Regd. No. 447149

**BLUE
LABEL**



1/6

**GOLD
LABEL**



2/-

TUNGSTALITE will make all the difference to your set—see that you obtain one to-day.

OBTAINABLE FROM ALL DEALERS AND FROM

TUNGSTALITE, LTD.

47, Farringdon Road, London, E.C.

"THE PLEASURE OF A TREASURE"

'PHONE:
HOLBORN 2557.

YORKSHIRE:
41 Call Lane,
LEEDS

Amateur Wireless

and Electrics

Vol. VI. No. 146

March 21, 1925

HOW TO TUNE

THERE are two general methods of doing everything, the slipshod and the methodical, with, of course, infinite variations of each. Tuning-in the local station may be a very different matter to merely getting a good result on the local station. In fact it is far more difficult to tune-in a near-by station than a distant one owing to the effect of the local station on the receiver.

When to Practise

Let me start off by telling my readers that their receiving set may become a powerful transmitting set, causing the most awful catcalls in all receivers within a range of ten or twenty miles. Therefore do not practise tuning on broadcasting wavelengths during broadcasting hours until such time as you know thoroughly the signs of oscillation or, rather, incipient oscillation. The real art of tuning consists in the first place of knowing and understanding the various classes of sounds heard in the receiver even when no signals are being received, and for real understanding it is better to use a pair of the very best phones obtainable, and especially to use very light diaphragms.

For those who can afford them, a pair of Brown's A-type phones enable the sounds to be recognised and oscillation prevented more easily than less sensitive phones.

The Different Sounds

Until we count them up it is difficult to realise how many sounds there are. There is first the absence of sound when the receiver sounds absolutely dead, except that on touching the condenser spindle or grid connection of the detector valve we hear one click—one click only, and *no* click on taking the finger away.

Now we assume that our receiver contains more than one tuned circuit, and the above deadness means that the circuits are not tuned to each other, nor to any wavelength on which there are easily receivable signals. I say receivable signals, as the receiver is not under the condition of sensitivity yet, but a local station may and will probably be heard all over the scale.

Remember that a near-by station has always to be *tuned out* rather than be tuned in, and tuning out consists, in the first place, of having all the circuits tuned to the same wavelength as each



other, but not to the wavelength of the local station.

Now sound number two is also a dead sound, but there is a fullness of sound in the phones; it is as if nothing can be heard because of the immense number of sounds.

Signs of Oscillation

It is not always easy to distinguish between this sound and the first, but there is one certain test, which is to touch a certain point in the receiver; it may be the aerial, it may be the grid socket of the detector, but wherever it is we get one click on touching it and *another click on removing the finger*. It is this second click which is the important sign of oscillation.

Please do not oscillate, *especially* during broadcasting hours, whatever anyone says about the aerial not being affected by oscillations:

There are many stages of oscillation; in fact for ideal tuning efficiency and for tuning in distant stations it is absolutely essential that the receiver be capable of passing smoothly and gradually from oscillation to non-oscillation.

We shall return to this later, but here let us say that if the receiver is oscillating strongly, nothing whatever will be heard of incoming signals except perhaps a fearful scream from a near-by and powerful station.

I will repeat this in another form: that if the reaction is set very closely, not even the local carrier wave will be heard by the offender. But everyone else within a wide area will have their concert entirely spoiled by cat-calls. Offenders are usually quite unaware that if they use excessive reaction they will not even hear their own cat-calls. Therefore handle the receiver carefully, preferably without reaction to start, and work up the signal strength later. Beware of the *double click* when you touch the detector, grid or aerial terminal.

So long as you are receiving clear and undistorted telephony you are not causing interference. I am faking it for granted that you know that oscillation is caused in practically all cases by moving the reaction coil nearer to its partner coil.

But there are several circuits which will oscillate even without reaction, notably those in which a series condenser is used in the aerial and those in which primary and secondary circuits or a coupler are used before the first valve. In these cases increasing the aerial condenser or increasing the coupling between aerial and secondary, that is, moving the coils nearer to each other, tends to stop oscillations. With practically all sets when you hear oscillations, move the reaction coil away from its mated coil.

Carrier Waves

We have so far dealt with two sounds, or, rather, absences of sound: (1) The dead mistuned sound, (2) the dead but full oscillation sound.

If the set is gently oscillating and there is telephony about, the carrier waves of the different stations will be heard as musical notes as we ascend the wavelengths; the pitch of these notes will rise and fall as we move our condensers or variometers. I have already said that these notes will *not* be heard by us if our receiver is oscillating violently. As we diminish our oscillation the carrier waves become louder and louder and also alter in pitch. The telephony is always in the bottom note of the carrier wave.

(Concluded at bottom of next page)

"STRAIGHT" TO "SUPER"

A simple method of transforming your present set.

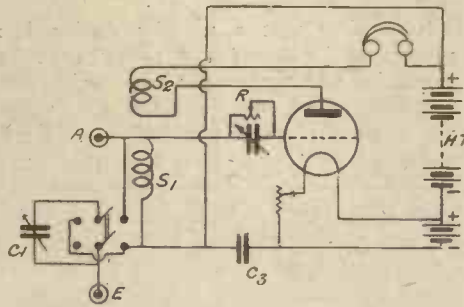
MANY amateurs possessing a small valve set, such as a single detector valve or detector and low-frequency valve set, have wished at one time or another to increase the range of their set either by adding a high-frequency valve or increasing the size of their aerial; others have wanted to make their set more portable by making it independent of aerial or earth. The circuit about to be described will appeal to those possessing only a single-valve straight-circuit regenerative set and especially to those who have to be content with a small and inefficient indoor aerial. The transformation can be made at a cost of a few shillings, the only additions being a fixed condenser (C_3) and a variable grid leak (R); a variable grid condenser might prove a valuable addition.

A Super-regenerative Set

As can be seen from the diagram, the circuit is a modified Flewelling super-regenerative, the tuning being reduced to the minimum; the main feature of it is that the grid, instead of being connected, as is usually the case in ordinary straight circuits, to the negative of the L.T. through the grid leak and tuning coil, is in this case in connection with the posi-

tive of the high-tension battery, a fixed condenser of fairly high capacity (0.006 microfarad) being placed between the tuning coils and the filament.

The set can be worked on a small indoor aerial or a frame aerial (3 ft. square).



Method of Modifying a "Straight" Circuit.

The tuning is very simple: the condenser C_1 is in parallel with the coil S_1 , the reaction coil S_2 being coupled with S_1 to get oscillation. The carrier wave is found by means of the condenser C_1 and the variable resistance R is adjusted until the hissing peculiar to super-circuits is heard; loosen the coupling of S_2 and adjust the tuning by means of the con-

denser C_1 . The tuning is very critical, and speech should come out clear and free from the distortion usually associated with super circuits. The best results are got without aerial or frame simply by connecting the aerial terminal A to a water-tap.

Results

With one detector followed by a low-frequency valve speech is received quite clearly from Bournemouth (120 miles), London and Chelmsford (140 miles).

The set can be used also on an outdoor aerial providing the reaction is used with great care and the variable resistance is off the oscillating point, as the set would react strongly in the aerial. It is then acting as an ordinary circuit, and results are equal to those obtained with a high-frequency valve and detector. On a 30-ft. twin-wire aerial 18 ft. high, speech and music are quite clear from Rome (I.R.O.) and Madrid (R.I.). Music from Radio-Paris and Chelmsford can be heard 10 ft. away from the phones.

Experimenters should test this circuit and find out whether any improvements can be made, such as trying different values for the condensers C_2 , C_3 , or adding a high-frequency valve. F. E. A.

"HOW TO TUNE" (continued from preceding page)

Therefore as we decrease reaction, which alters the tuning, we must retune on a condenser to keep on the lowest note of the carrier wave.

As we decrease the reaction the receiver begins to be controlled by the incoming signals, and telephony—probably distorted—or morse—probably mushy—begins to be heard, and finally we get clear and undistorted reception. But all the time we have been causing interference with someone else, and although this method of tuning is correct theoretically and practically, it is most unkind to everyone else. We must always work up towards oscillation and not down from oscillation.

The Valve Click

The bugbear—the *bête noire* of all experimenters—is the valve click. This has nothing to do with the finger-click test mentioned earlier. Everyone who has handled a set knows what I mean by the valve click. Its immediate cause is that a valve when oscillating takes less current than when not oscillating; the valve click is the noise due to an instantaneous change from oscillation to non-oscillation or vice versa. We hear the increase or decrease in current, but we do not know

by the phones how much steady current is passing.

Backlash

Even worse than the valve click is the valve backlash. Try it for yourself as you move your reaction coil (not during broadcasting hours, please). As you move the reaction coil up you will hear the valve click as oscillation starts.

As you move the reaction coil away you will hear the valve click as oscillations stop. If the click on and the click off do not take place at exactly the same spot you cannot possibly get the very best out of your receiver. The distance between the positions for click-on and click-off is the backlash, the most annoying of wireless troubles.

If you do get backlash try dimming the valve, reducing the H.T. or improving the earth; do not rest content until the passing from rest to oscillation is perfectly steady, without any trace of a click.

Searching

Once you have such control of your circuits that the valve click is replaced by a gradually increasing hissing noise in the phones leading to the fullness of oscillation, then and then only can you get really maximum efficiency. The hiss becomes

less marked as the receiver begins to oscillate. When the hiss is at its loudest it is a certain sign that the receiver is tuned throughout to one definite wavelength.

Having reached this point, do not work haphazard to find your telephony. Work gradually up and down the wavelengths, keeping the receiver gently hissing all the time, working on the non-oscillating side of the hiss. In this case you will hear the carrier waves as peculiar indescribable noises and you will not miss any stations, and, what is most important, you will cause no interference, while having your set at highest efficiency all the time.

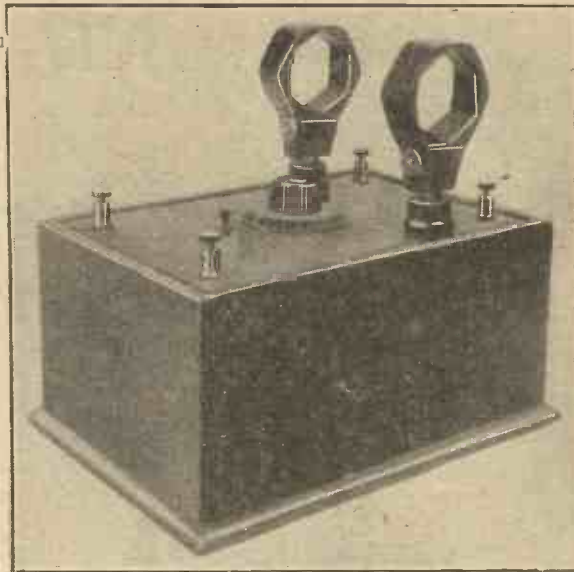
E. J. B.

A SOLDERING TIP

It usually happens when soldering that one drops solder and flux on to the panel on which one is soldering, with the result that the insulation of the ebonite is much impaired. This trouble can be almost entirely eliminated by cutting out discs of thin cardboard and placing these on the screwed part of the terminal shank like a nut before the soldering is commenced. In use all the solder and flux droppings fall on to the cardboard, which is afterwards removed. E. N. F.

A DOUBLE-COIL CRYSTAL SET

THE parallel-coil tuner is not very popular yet owing to its usually requiring two controls for tuning. The set about to be described, however, employs only one control, which simplifies matters considerably. The idea of putting two coils in parallel in a tuning circuit is not new; its object is to halve the resistance in the coil, and the arrangement results in a greater potential at the ends of the inductances. In a crystal set this greater potential is much more noticeable and desirable than in a valve set. The effect is also to halve the natural wavelength of one of the coils, necessitating the use of



and all holes marked (see Fig. 2). Drilling should be done carefully, taking care that the drill is upright. If the components used vary from those in the original, the drilling may have to be different. The wiring is carried out with square tinned-copper wire of No. 18 gauge. The wiring is very simple, and there should be no difficulty (Fig. 3).

Operation

Connect the aerial, earth and phones to their respective terminals, adjust the crystal and tune with the condenser. Plug in one coil only, say a No. 40, and tune in the local station, then take it out and put

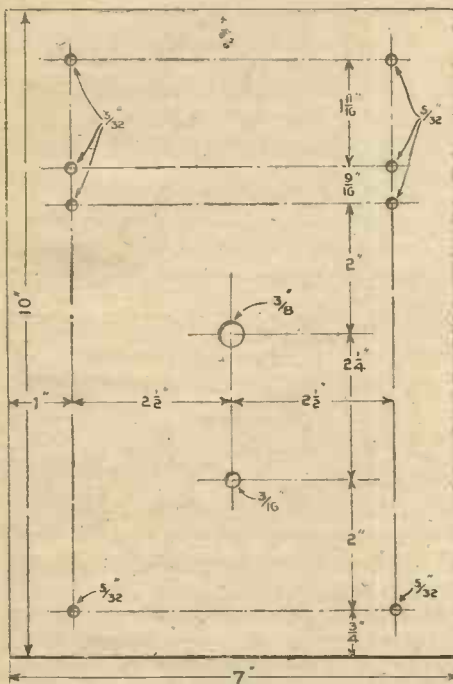


Fig. 2.—Drilling Diagram m.

larger coils than are ordinarily used.

The circuit diagram is given in Fig. 1, where it will be seen that a condenser of .0005 microfarad capacity is used to tune the coils.

Components

One mahogany (or ebonite) panel, 10 in. by 7 in. by $\frac{1}{8}$ in.; two coil holders (panel mounting); four terminals; one variable condenser (.0005 microfarad); one crystal detector (R.I., Ltd.); one .001-microfarad fixed condenser; tinned copper wire.

Drilling and Wiring

The panel should be cut to size

The Complete Set.

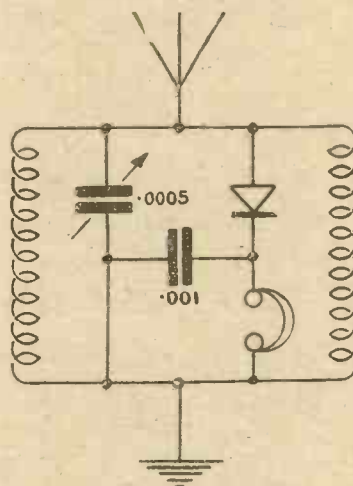


Fig. 1.—Circuit Diagram.

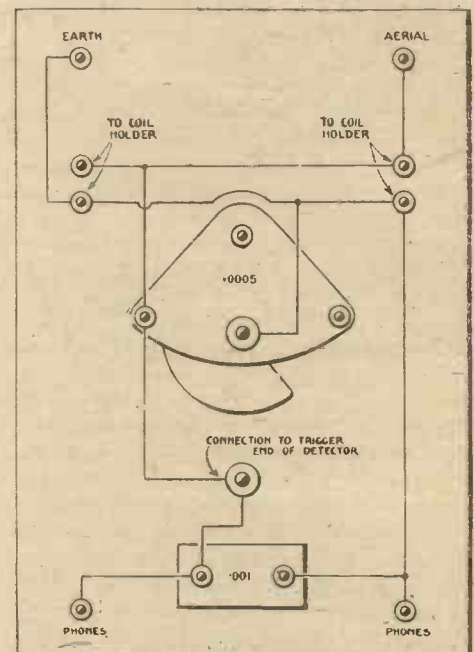
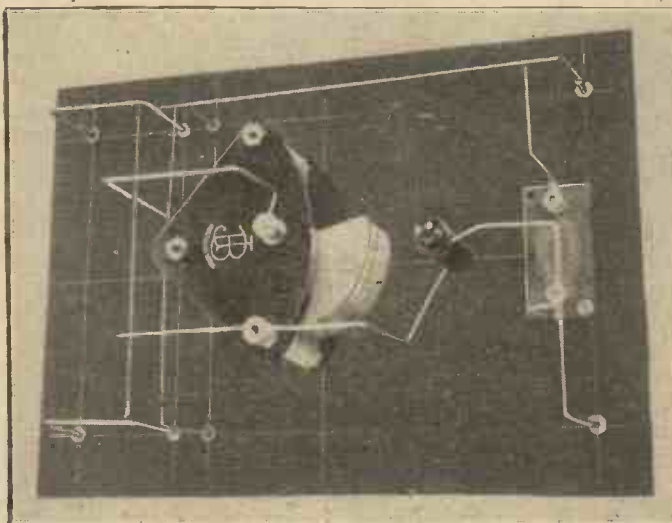


Fig. 3.—Wiring Diagram.

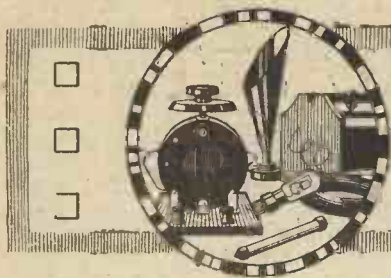


View of Under Side of Panel.

in two No. 50 coils (these *must* be matched), and listen again. After retuning the increase in strength will be very noticeable.

By taking out one coil the receiver may be used as an ordinary crystal set—a decided advantage when wishing to make experiments with this method of tuning.

The general construction and layout can be seen from the photographs. The range of this set will be found to be greater than that of the ordinary crystal receiver. Loud-speaker results were easily obtained on an indoor aerial at a distance of one mile from 2 L O. J. S.

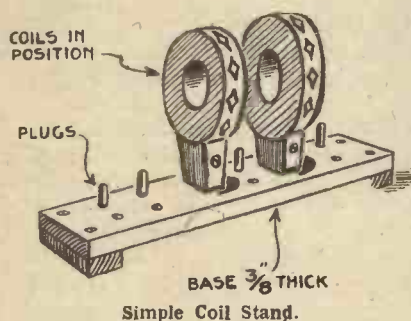


PRACTICAL ODDS AND ENDS

Coil Stand

A COIL stand which should be of interest to users of plug-in coils is shown in the sketch below.

It is a convenient method of standing coils which are not in use, much better than having them spread all over the

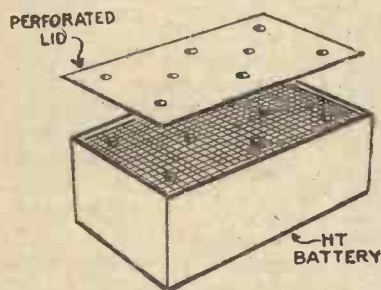


place where they are likely to be damaged. The hard-wood plugs should be glued into the holes to make them firm. L. C.

Tapping the H.T.

A MATEURS who have had the misfortune to burn out a valve by reason of the L.T. lead terminal tags accidentally brushing the top of the H.T. battery may find the following tip useful in preventing a repetition of such an accident and also in keeping the wax surface of the battery free from dust.

A piece of cardboard is carefully cut to make a good push fit into the top of the battery box, and holes are drilled to correspond with the voltage stages. The

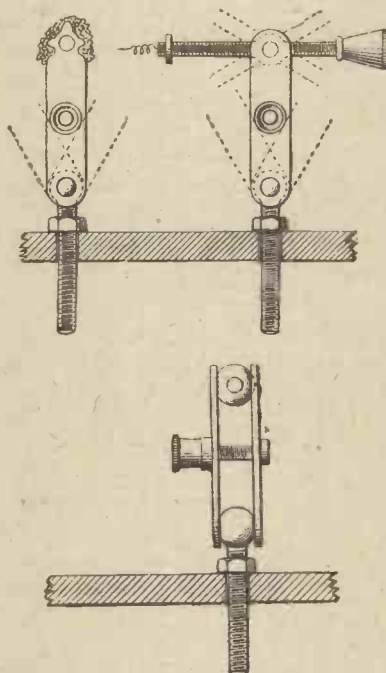


Protecting the H.T. Battery.

cardboard shield should then be varnished with shellac and pressed into the base about $\frac{1}{8}$ in. above the metal plugs. This will also prevent the battery being accidentally short-circuited should any metal object be laid upon it, a not uncommon occurrence. W. B.

A Handy Detector

CLOSED-IN crystal detectors usually allow only a limited movement of the catwhisker arm, and when it is desired to explore fresh faces of the crystal it is often necessary to dismantle the detector. The diagrams show a simply constructed type of detector, in which universal movement of the catwhisker and crystal is possible. The crystal may be turned in any direction, and it is possible to make contact to almost any point. Ball-and-socket mountings are employed for the catwhisker arm and the base of the crystal holder. Each of the two holders has a terminal through its centre, by means of which the tension of the supports may be



[Details of Detector.

adjusted and to which connection may be taken by means of short lengths of flex. A wide range of movement is possible, as can be seen by the dotted lines. R. P.

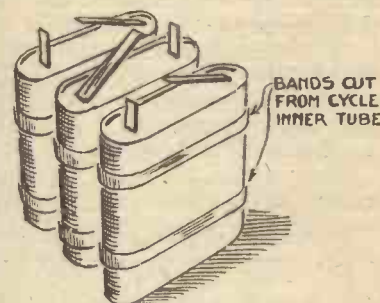
Burnt-out Valves

WHEN you burn out your valves, do not throw them away, for they can be put to several uses. In the first instance, the legs can be utilised in the place of "wander plugs."

When the bottom of the valve is taken out the insulating material can be used as an excellent valve template for drilling purposes. J. W.

Assembling the H.T. Battery

MANY amateurs make up their high-tension battery from flashlamp cells, but do not guard sufficiently against leakage, due to the cells touching each other, and the best results are therefore not always obtained. A piece of waxed



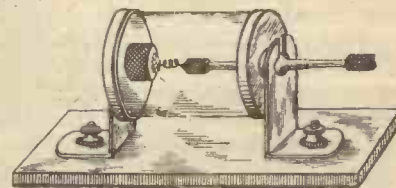
Insulating the H.T. Battery.

paper inserted between each battery overcomes the difficulty.

Another and more efficient method is to cut off a number of wide elastic bands from an old cycle inner tube and place two around each battery as shown in the accompanying sketch. This spacing of the cells will prevent any current leaking away, so that the life of the battery will be materially increased. C. L. R.

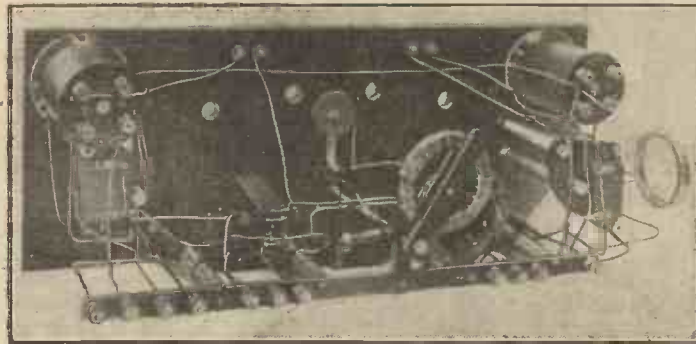
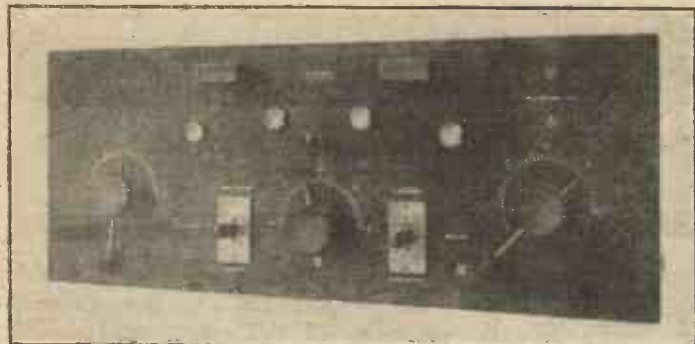
Improving the Detector

CRYSTAL detectors that are enclosed in glass covers are usually rather awkward to dismount when it is desired to change the crystal. If it is not desired to construct a detector having a larger range of movement the standard closed-in detector can be improved by cutting a slot in one of the end pieces as shown



Improving the Detector.

in the diagram. This will allow the shank of the ball socket to pass freely up and down, and it will be found quite a simple matter to dismantle the detector when required. The slot, of course, should not be made so large that it will allow of any undue movement of the catwhisker arm. E. W. P.



Two Photographs showing the Front and Rear of Panel Respectively.

THE KING'S GIFT SET

A Description of the Receiver Presented by H.M. the King to His Stable Lads.

MESSRS. HART COLLINS, LTD., of Bessborough Street, London, S.W., have had the honour of supplying a four-valve receiver to the order of H.M. the King for the use of His Majesty's stable lads. By the courtesy of the makers, we are enabled to give some details of its construction. The set is extremely efficient, and the firm are to be congratulated on its production. During a short test we made with a duplicate of the set we found that the manufacturers' claims are entirely fulfilled.

The circuit diagram is given below, and it will be seen that, apart from the com-

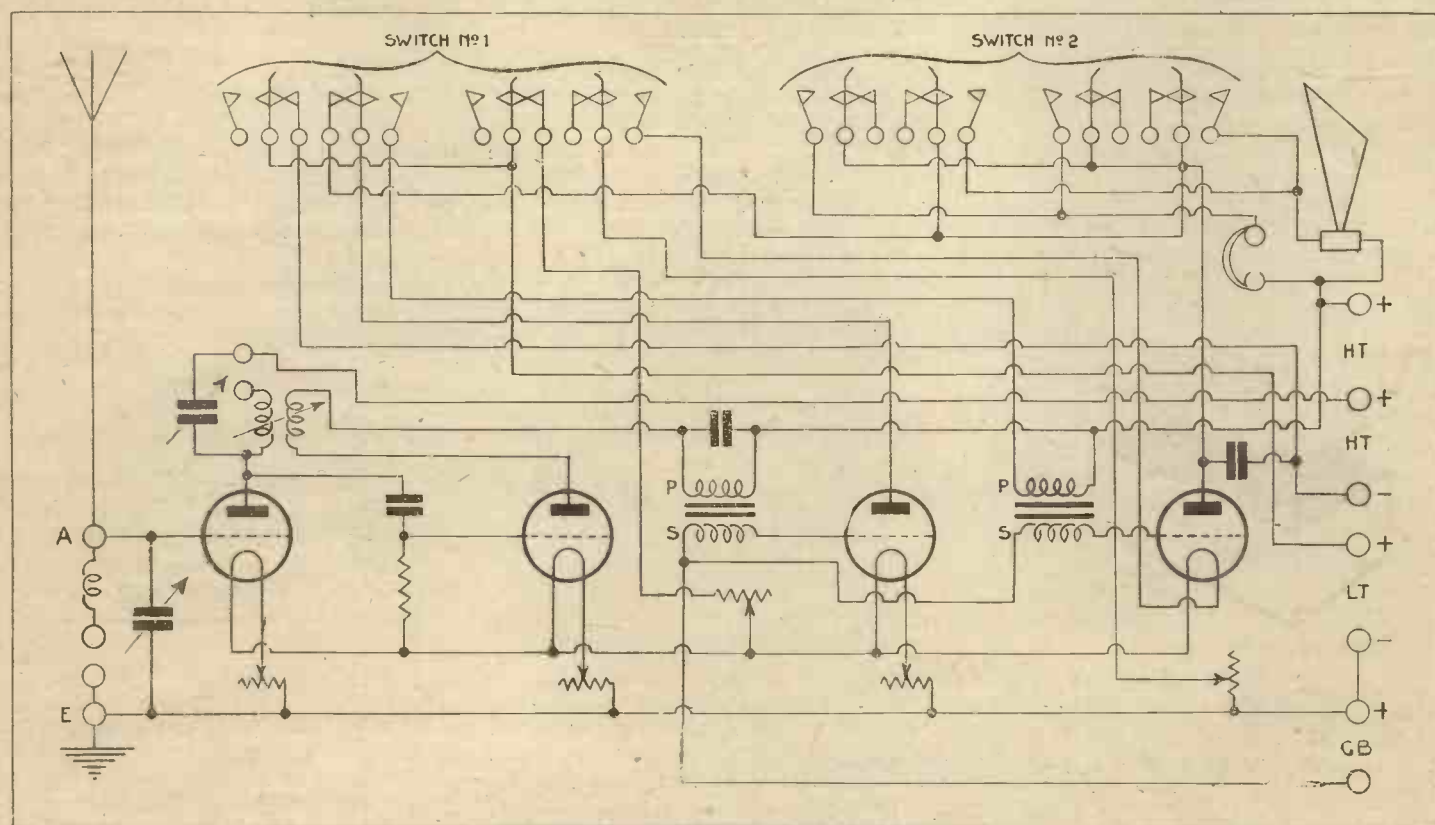
plications due to the two Dewar switches, the wiring of the receiver is quite straightforward. The circuit comprises a high-frequency stage of amplification, a detector and two low-frequency stages, one of which may be cut in or out of action by means of the left-hand switch on the panel front. This switch has three functions. In the middle position three valves are in use; in the bottom position four valves are brought into action, while in the top position the valves are switched off.

The right-hand switch (looking at the front of the panel) is used for switching the loud-speaker or phones into circuit.

The Design

The design of the set is on original lines. All the terminals are fixed on a long ebonite strip at the back of the panel. This strip is fastened to the panel by means of four ebonite rods about $\frac{1}{2}$ in. in thickness, round each of which is wound the resistance wire necessary for the control of the valve filament current supply. Adjustment of the filament resistances is made by sliding a metal slip along the resistance until the best results are obtained. Once this position is found the resistance need not be touched until such

(Concluded at bottom of next page)



The Circuit Diagram of the King's Gift Set.



Mr. Studley with his Receiver.

A TWO-VALVE straight circuit without any high-frequency amplification, using the simplest components, and working on an aerial but 27 ft. high—such is the receiver used by Mr. F. C. Studley, of Harrow, to obtain the excellent results which he mentions in the correspondence columns of AMATEUR WIRELESS No. 145.

A short description of the receiver may be of interest to readers who aspire to obtain good signals on the short waves.

Aerial System

The aerial is a twin wire, 50 ft. long and 27 ft. high, and yet wavelengths as low as 40 metres can be tuned in. The earth connection consists simply of a 4-ft. length of gas-piping driven into the ground. It may be mentioned that although the station is situated at the foot of Harrow Hill, no appreciable shielding effects are noticed.

The coils are wound with No. 14 d.c.c. wire and are not spaced as low-loss coils.

TWELVE HUNDRED STATIONS IN FIVE MONTHS!

No special precautions have been taken to ensure that there is a minimum of loss in the receiver and yet signals from all the five continents have been received.

The Circuit

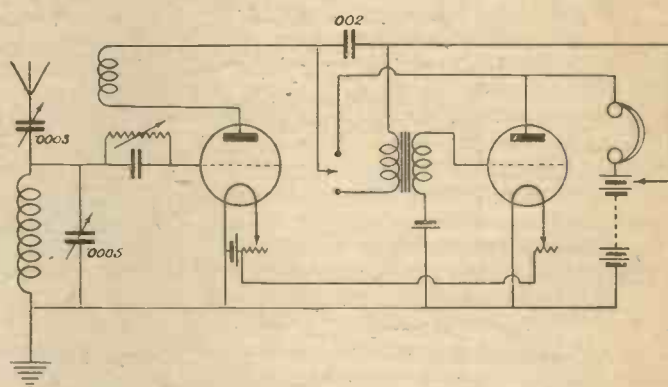
The circuit diagram of the set is shown in the diagram, and it will be seen that the controls are few in number. Two variable condensers, one .0003 microfarad and one of .0005 microfarad capacity, are used for tuning the aerial, and a variable grid leak is used to ensure that the valve is working on the correct part of its curve.

A separate H.T. tapping is taken to the plate of the detector valve, but this can only be used when the L.F. valve is switched on.

The valves are dull-emitters, a Mullard LFC Ora is the detector, and a M.O. DER is used in the L.F. stage. A grid bias cell of 1.5 volts is used with the DER valve.

World-wide Reception

Signals have been heard from stations in the following countries: Chili, Canada, Mexico, Australia, New Zealand, Porto Rica, Morocco, French Indo China, Algiers, Mesopotamia, U.S.A., Norway, Italy, Spain, Belgium, France, Luxemburg, Switzerland, Holland, Germany,



The Circuit Diagram of Mr. Studley's Receiver.

Finland, Sweden, Denmark, Austria, Portugal and Czecho-Slovakia.

In all 1,200 stations have been logged since last October, 400 of these being in the U.S.A.

"THE KING'S GIFT SET" (continued from preceding page)

time as a new valve is fitted. A main control vernier rheostat is mounted on the panel.

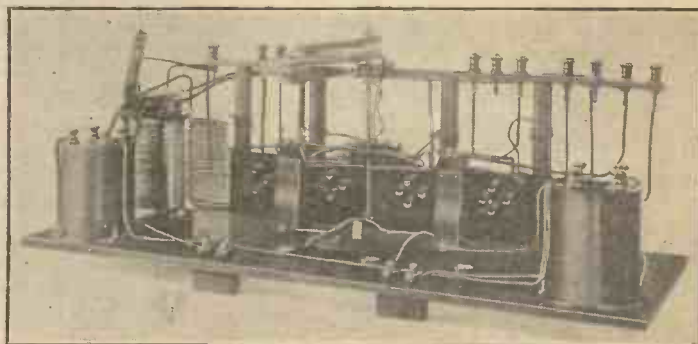
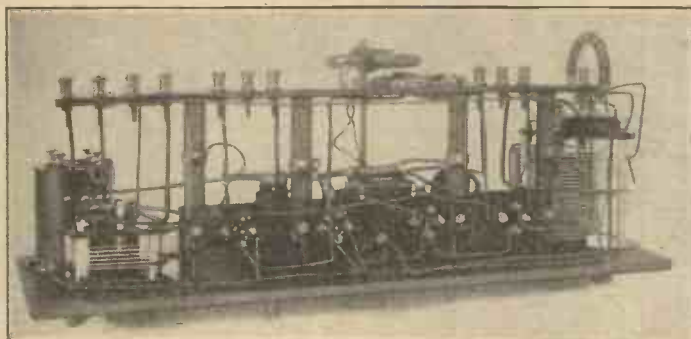
Looking at the photographs of the back of the panel, the aerial tuning coil is to

strip is the H.F. tuned-anode coil, tuned by the variable condenser seen on the left-hand side of the back of panel photographs. The two L.F. transformers are seen at the top corners.

Provision is made for loading coils to increase the wavelength range of the

loud-speaker +, loud-speaker -, H.T. -, H.T. + (40 to 72 volts), H.T. + (100 volts), earth.

The whole instrument is mounted in a beautiful cabinet, having hinged doors that close over the panel, thus preventing the invasion of dust. Compartments are made



Two Views of the Back of the Panel of the King's Gift Set.

be seen on the right. This is fixed in position inside the special cabinet supplied with the receiver. Reaction is obtained by altering the relative positions of the coils seen in the centre of the photograph. The coil fixed to the ebonite terminal

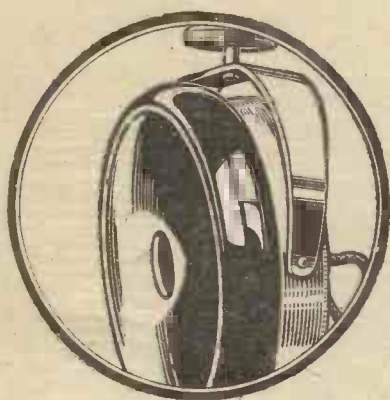
receiver. The sockets for this purpose are on the top of the panel at the front. Reading from right to left, the terminals mounted on the ebonite strip are as follows: Aerial, L.T. - and G.B. +, G.B. -, L.T. +, phones -, phones and

in the cabinet for the enclosure of H.T., L.T. and G.B. batteries and the telephones. A very pleasing appearance is presented by the complete receiver, which is compact and well finished in every way.

W. C. R.



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



The ebonite cap of the earpiece is screwed on by special apparatus to a marked degree of tightness. It is almost impossible to unscrew it without a wrench. This means more accurate clearance distance between the diaphragm and the faces of the pole pieces, and guards against distortion. But what is more important, it defeats any casual attempt to unscrew the caps, which, once done, destroys the *Matched Tone* adjustment.

British Manufacture
(B.B.C. stamped.)

When we assemble the *Matched Tone* Headphones we select, by means of special apparatus, two earpieces whose electrical properties closely agree. One by one the earpieces are tested by vibrating the diaphragm of a fixed telephone receiver with an oscillating current. The vibration is transmitted by a closed column of air to the diaphragm of the one on test, which is adjusted immediately beneath the permanently fixed example. It then vibrates in sympathy, thus causing a current to flow through the bobbins. The volume of the current is indicated on the dial of the testing apparatus, and any two 'phones which closely agree are matched and are assembled in one headphone—hence *Matched Tone*. This means greater purity, strength and sensitivity. Obviously, the joint energies of both earpieces in perfect unison means redoubled effectiveness in all these three qualities. Ask your Dealer for Brandes.

The *Table Talker* is another Brandes quality product at moderate price. Its full round tones are wonderfully clear and pleasing. The 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. Gracefully simple of line, 42/- it is finished a shade of neutral brown.



Brandes

The Name to know in Radio

Brandes Limited, 296, Regent Street, W.1.

WORKS: Slough, Bucks.

20/-



Superior "Matched Tone" Headphones

TRADE MARK

WIRELESS ON EASY TERMS

GAMAGES have now extended their easy payment system to Wireless, and you may now secure on payment of first deposit Wireless Sets and Apparatus from £5 upwards, balance being payable in monthly instalments. Write for details to Wireless Dept.

GAMAGES

First in 1908—Foremost To-day

Gamages were supplying ALL Enthusiasts and Experimenters long before Wireless attained its present popularity. We are, **WITHOUT QUESTION**, the Pioneers of Wireless Supply. A visit to our First Floor Salon is, in itself, an education in Wireless Values; but if you cannot call, order by post on our Moneyback Guarantee.

The Sensation of 1925 (vide Daily Papers)



The Amazing New Crystal Detector that saves so much time and temper!

IT IS PERMANENT!

THE NEW "R.I." CRYSTAL DETECTOR

No Adjustment or Cats Whisker Required
Amazing in its Simplicity! See it demonstrated daily during Broadcasting Hours at Gamages.
The Price of the "R.I." detector is ...
We hold Stocks and can post per return.

6/-

New Coil Socket

Pay as a visit of inspection

Order direct from this announcement on money-back guarantee.

New Type Coil Socket with support for Home-made Coils. Best ebonite and socket. Each

Post 2d.

Valve Holders

Latest type for Flush Mounting. Reduced height makes for compactness, reduced capacity and reduced solid dielectric for efficiency. Flush for protection of valve. Easy to mount. Brass finish. Price per set of 4.

Post free.

GAMAGES SUPER CRYSTAL DETECTOR

with the new **REVOLVING CRYSTAL**, which enables all spots to be used without removing Crystal. Supplied complete with a piece of our famous "PERMANITE" Crystal and Silver Cat's Whisker.

Price for Panel Mounting. **4/6**

The "Duo-Lateral" COIL HOLDER.

No Loose or Dangling Wires; Direct Connection on Underside of Panel; Reversible Pins; Anti-Capacity Handles

With the Gamage Duo-Lateral Coil Holder, there are no loose or dangling wires; it is electrically connected (through the stout metal brackets) to the underside of the panel by screws and nuts provided for the purpose. Insulated parts are made of best ebonite and metal parts of Nickel-plated Brass.

Price for Two Way **5/-**
Post 3d.

Price for Three Way **6/6**
Post 3d.

5/6

Post 4d.

For Table Panel Mounting.

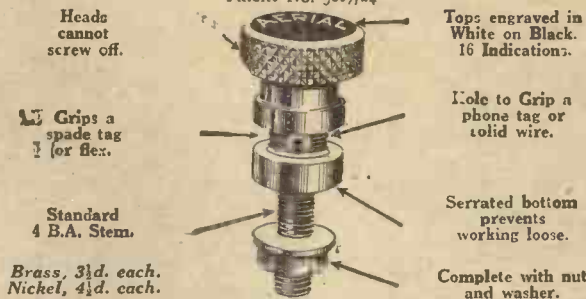
PRICE Two Way **5/-**
PRICE Three Way **6/6**

BRITISH MADE THROUGHOUT

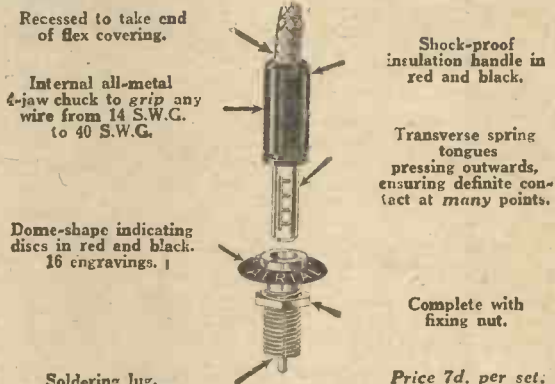
GAMAGES, HOLBORN, LONDON, E.C.1

"BELLING-LEE" Indicating Terminals

Patent No. 5807/24



"BELLING-LEE" Plug & Socket Terminals



BELLING and LEE, Ltd., Queensway Works, Ponders End.

ALL POST FREE at CALLERS' PRICES

EBONITE PANELS	COMPLETE	TRADE	SQUARE LAW VAR. CONDENSERS WITH KNOB AND DIAL
Matt 1" 3/16	P	E	Bank of 2 .. 1/6
12" x 6" 2 1/2 1/10	R	N	Standard Plugs 1/3
12" x 9" 4/8 3/8	I	Q	Potentiometer 300 ohms Ex-Govt. 5/6
12" x 12" 5/8 5/-	O	U	Hydrometers .. 3/6
15" x 9" 5/8 4/8	E	I	Microphones .. 2/-
15" x 12" 7/8 5/8	L	R	Tapping Keys 2/-
4" x 4" 8d. 6d.	I	E	R'dphone Cords 1/-
7" x 5" 1/6 1/2	S	S	Alum. H'dbands 2/6
6" x 6" x 1" 10d.	T		All "Igranic" "Lissen" "Burndept" "Edison-Bell" "Atlas" & "Sterling" Goods.
Any Size Cut			
8in. in 1" 1d. 1" 1d.			
TERMINALS	FREE	INVITED	JACKS-4-CONTACT
Mult-Pol. Brass 2d.	HEADPHONES	TRANSFORMERS	Bank of 2 .. 1/6
4 B.A. Standard. 1d.	4,000 ohms.	L.F. Silvertown 21/-	Standard Plugs 1/3
Spade type, doz. 3d.	Brown's "F" B.T.H.	Radio Inst. (new) 25/-	Potentiometer 300 ohms Ex-Govt. 5/6
Telephone type 11d.	Siemens, Brander, Sterling, Ericsson, all .. 20/-	Igranic 21/- and 30/-	Hydrometers .. 3/6
Multiphone 4-w. 9d.	General Radio 20/-	Burndept (new) 24/-	Microphones .. 2/-
"6-way 1/-	Fellows .. 18/6	Reliability 10/- 12/6	Tapping Keys 2/-
Refly spring 8d.	Alrweight 10/6	Ferranti .. 17/6	R'dphone Cords 1/-
2 B.A. Small type, 3d.	Adjustable 12/6	Xtraordinary .. 8/-	Alum. H'dbands 2/6
Contact Studs 4d.	H.T. BATTERIES	Tangent 12/6 & 14/6	All "Igranic" "Lissen" "Burndept" "Edison-Bell" "Atlas" & "Sterling" Goods.
Spring Washers 4d.	With Wander Plugs 60v. 8/-, 36v. 4/10	Royal .. 20/-	
AERIAL WIRE 7/2 1/2	30v. 4/- 15v. 2/-	R.A.F. Modulation 8/-	
Enam. Bright 4 strd. 100', 3/8, 2/6, 1/1	4v. F.L. Batry. 5d.	Telephone do. 8/-	
do. Electron 1/8	60v. Ever-ready 13/6	"Undyne" "10-1r 8/-	
Rubr. Id-in. 4d. yd.	36v., 3/- 15v., 3/6	II. F. McMichael's 10/-	
INSULATORS	Siemens same price	Tangent, each 5/6	
Shell, 2 1/2" x 2 1/2" 4d.	British Wires, etc.	Ooljah 900 m. 5/6	
Reel, 2" Id., Egg, 1d.	s.w.g. 100 s80 p.s.c.	Formers only .. 1/-	
Cryator type .. 5d.	18 1/11 2/11 1/5	SWITCHES, Ebonite	
Lead-in 4/-	20 2/2 3/4 4/2	"Tumbler 1 1/2 1/-	
4" & 6" do. .. 9d.	22 2/6 3/9 4/7	D.C.O. 1/8 S.C.O. 8d.	
9" 1/-, 12 & 15, 1/3	24 2/11 3/13 1/1	Dewar D.C.O. 3/3	
VALVE HOLDERS	26 3/4 4/2 5/6	"D.P.S.T. 2/8	
Type A 7d., Polar 1/2	28 3/9 4/9 5/6	Utility 2-way 4/-	
Revised 8 nuts 8d.	30 3/10 5/4 5/6	3w 5/-, 4w 6/-, 6w 8/-	
Ebonite .. 10d.	33 1/6 6/- 7/9	Lever Type Stocked	
Do. Open Type 6d.	36 5/- 8/6 12/-	Miniature Turn 6d.	
COIL PLUGS Ebonite	40 17/- 14/8 12/-	Lissen 2-way 2/6	
10d. Superior 1/2	VARIABLE LEAKS	Series parallel 3/6	
Narrow 7d. Basket 1/-	Filteron 0-7 meg. 2/-	Double-arm do. 2/-	
Moulded type 6d.	Watmel 0-5 .. 3/6	N.P. Panel 9d	
Coil Formers .. 24d.	Lissen Type .. 5/6	NEW LINES	
Basket type .. 11d.	"Resistances 2/6	Eureka Transformers, No. 2 .. 22/6	
Coil Mounts .. 4d.	micA, .002 DOZ.	Concert Grand .. 30/-	
Do. Porcelain 1/-	3" x 2" 1/-, 2" x 1 1/4" 4d.	R.I. Chokes .. 10/-	
Basket Coil Set 6-1 1/2, 4-1 1/2	CONDENSERS	Shaw's Hertzite 1/-	
CONDENSERS	Dublier (usual)	mic. Met. Detector, 6/-	
Mullard (prices)	Under 5/6 value. CARRIAGE PAID.	J. H. TAYLOR & CO.	
Mansbridge, 1 m.f. 16	Under 5/6 sd. per 1/- packing, etc.	3, Radio House, Telephone: 341	
2 m.f. 1/6-1/38 m.f. 9d.	IRON CORE CHOKES	Macaulay St., HUDDERSFIELD	
	1,000 & 750 ohms, 9d.	Telegrams: "Thorough" Huddersfield	



CLIX PROVIDES AN IDEAL POINT FOR SOLDERING

Retail Prices

CLIX with Locknut 3d.
CLIX Insulators
(6 colours) 1d. each
CLIX Bushes
(6 colours) 1d. pair

Obtainable from all Wireless
Dealers or direct from the
Patentees and Manufacturers:

AUTOVEYORS, LTD.

Radio Engineers and Contractors

84 VICTORIA STREET, LONDON, S.W.1

Perfect contact—instantaneously—everywhere.

The tapered design of CLIX plugsocket ensures full surface contact in every one of its countless applications.

That's why CLIX, the Electro-Link with 159 Uses, supersedes all forms of Plugs, Terminals and Switches, and has standardised the wiring of all radio circuits.



"Amateur Wireless" HANDBOOKS

Simple Crystal Receiving Sets and How to Make Them. Deals in a simple, straightforward manner with the making of a

number of crystal sets. With 114 illustrations.

Wireless Telegraphy and Telephony and How to Make the Apparatus.

Revised edition by Mr. E. Redpath, the well-known writer on wireless. The explanations of principles are up to date, and there are directions for making apparatus, including detectors, amplifiers, single circuit and complete short-wave receiving sets, a valve panel and a five-valve amplifier.

Simple Valve Receiving Sets and How to Make Them. Shows, in close detail, and with the aid of 112 illustrations, how to make and operate about ten different types of valve sets.

Wireless Component Parts and How to Make Them. Detailed instructions for making the various components. It does not describe the making of any one complete set, but just all the parts likely to be required. With over 200 illustrations.

:: Of all Newsagents and Booksellers, ::
1/6 net each, or post free, by return, 1/9 from
"Amateur Wireless," La Belle Sauvage, E.C.4.

HULLO!! C.Q., WILL DAY CALLING GO TO DAY TO-DAY

				Enamelled.	
Size				No.	
1. 2 in.	approximately	150 to	300 metres	5d. each.	1. 4d. each.
2. 2 1/2 in.	"	250 to	400 "	6d. "	2. 5d. "
3. 2 1/2 in.	"	350 to	550 "	7d. "	3. 6d. "
4. 3 in.	"	450 to	650 "	8d. "	4. 7d. "
5. 3 1/2 in.	"	600 to	750 "	10d. "	5. 8d. "
6. 4 in.	"	700 to	1,000 "	1/2 "	6. 9d. "
7. 4 1/2 in.	"	950 to	1,350 "	1/4 "	7. 10d. "
8. 5 in.	"	1,300 to	1,750 "	1/8 "	8. 1/1 "
9. 5 1/2 in.	"	1,700 to	2,600 "	2/- "	9. 1/2 "
					10. 1/4 "
					11. 1/6 "
					12. 1/8 "

EBONITE COIL HOLDERS 1/6 each

H.F. Transformer Formers, Turned Ebonite, 1/6 each.

The A.B.C. Wave Trap Ebonite Former, Cut Ready for Winding, 3/- each.

McMichael Valve Holders for Wood Panel Mounting, 2/- each.

Wood Base Mounting Coil Ends, 1/3 each.

IF YOU WOULD SECURE IMMUNITY FROM LEAKAGE IN YOUR SET HAVE YOUR PANELS CUT TO YOUR SIZE FROM OUR FAMOUS EBONITE. ORDINARY FINISH, 4/6 PER LB., MATT FINISH, 5/- PER LB. AMERICA EASY ON ONE VALVE.

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.

Sold only boxed with Silver Cat's-whisker, 2s. 6d. each, postage 3d. extra. Makes excellent contact with Zincite for a Perikon Detector.

We had a call from a delighted customer recently who stated he received 2 L O at Brussels quite distinctly on a DAYZITE crystal.

Write at once for our new catalogue, post free by mentioning "Amateur Wireless."

WILL DAY, LTD.,

19, LISLE STREET, Leicester Square, LONDON, W.C.2

'Phone: Regent 4577. Telegrams: "Titles, Westrand, London."

ON MAINTAINING A REPUTATION

A REPUTATION is infinitely easier to make than to maintain. Many years ago the "Daily Graphic" made a reputation for clean news, broad editorial outlook, good pictures and convenient make-up. To-day these qualities are just the same, and the reputation of the "Daily Graphic" is not only maintained but enhanced. For your home, for the boy and girl at school, for holiday time, for a railway journey, it is the best daily illustrated paper you can buy—and the price is only One Penny.

Your newsagent has many readers of the "Daily Graphic" among his customers. He will be pleased to add your name to his list. Send him an order to-day.

DAILY GRAPHIC

ONE PENNY

A Quarter Million Batteries!

Two years ago Engineers of the Research Department of the General Radio Company, Limited, announced what they considered the ideal radio H.T. Battery should be.

Simply stated it was this:—It must **LAST LONGER**—Deliver much **MORE ELECTRICITY**—Remain **MORE CONSTANT**—**STAND MUCH MORE ABUSE**—Be no larger and Sell at the **SAME PRICE AS ORDINARY H.T. BATTERIES**.

We made a battery according to their specification and after several months' test they ordered **250,000 BATTERIES**.

It's the one in
the striped
METAL box.

Ask to see this new battery—try it—then you will know why.



RADIOBATS Ltd.
18 Snowfields,
BERMONDSEY, S.E.1

*Registered.

Megger evidence



YOU can't tell how good—or how bad—a piece of ebonite is by looking at it. Even its surface appearance can belie its actual efficiency. But build into a Set—particularly if you are using a stage of High Frequency amplification—and you will soon find out whether its quality is good. Now, obviously, you don't want to go to the trouble and expense of building a good Set only to find that signals are weak, or that the Set howls—or even that not a sound is obtainable.

What is the remedy? Use a Red Triangle guaranteed Panel, and success is assured.

Every sheet of Red Triangle Ebonite before being cut into panels is tested on the Megger—a wonderfully sensitive electrical instrument which instantly detects leaks. Nothing can escape its eagle eye, and any ebonite that does not come up to Red Triangle standard of quality is ruthlessly cast out. Each panel is cut dead square and is supplied with a velvet matt surface carefully packed under our own label. If your local Dealer cannot supply, send direct to us. Delivery per return of post.

Special Sizes:

All Concert-de-Luxe, 16 x 8 x 1/4	8/-	Resistoflex, 12 x 8 x 1/4	6/-
Transatlantic V., 22 x 11 x 1/4	15/-	Anglo-American, 36 x 9 x 1/4	20/-
All Britain, 16 x 9 x 1/4	9/-	Neutrodyne Tuner, 12 x 10 x 1/4	7/6
S.T. 100, 12 1/2 x 9 1/2 x 1/4	7/-	Neutrodyne Receiver, 12 x 10 x 1/4	7/6
Puriflex, 14 x 10 1/2 x 1/4	9/2	3-Valve Dual, 24 x 10 x 1/4	15/-
Transatlantic IV., 16 x 8 x 1/4	8/-	Harris Crystal Set, 9 x 5 1/2 x 1/4	4/4

Special Note: Any Special Size Cut per return at 3d. per square inch.

PETO-SCOTT Co., Ltd.,

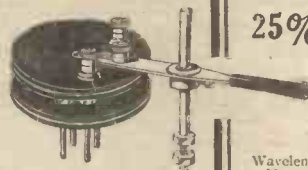
Registered Offices, Mail Order and Showroom,
77, CITY ROAD, LONDON, E.C.1.

BRANCHES:

LONDON:—62, High Holborn, W.C.1.
WALTHAMSTOW:—230, Wood Street.
PLYMOUTH:—4, Bank of England Place.
LIVERPOOL:—4, Manchester Street.
CARDIFF:—94, Queen Street.

Red Triangle Ebonite

P.S. 2496.



RADIAX Reactance Unit
(as illustrated), with Trans-
former, 300/500. Price 5/9.



25% POWER INCREASE

is secured with
RADIAX H.F. TRANSFORMERS
owing to their effective
step-up ratio.

(Each pin clearly marked for connections.)

Wavelength. Metres.	Prices.	Wavelength. Metres.	Prices.
170-330	3/6	900-1600	4/9
300-500	3/6	1500-2600	5/6
500-900	4/3		

FOUR PIN ANODE COILS at same prices.
Supplied also APERIODIC for T/A/T Coupling.

Send stamp for List of these and our other H.F.
Couplings. Complete Components Catalogue stamps 3d.

RADIAX, Ltd.

20 Radio House, Percy St.,
Tottenham Court Road,
London, W.1.
3 minutes from Tottenham Court Road and Gedge Street
Tube Stations. Mus um 496.

Barclays 700

VALVES REPAIRED

We guarantee to return them

AS GOOD AS NEW

Bright Valves, from. 6/6 } postage extra.
Dull Emitters, „ 10/6 }

Special terms for large quantities.

ALL VALVES THOROUGHLY TESTED BEFORE BEING SENT BACK.

H. SLOOC, 45, Ct. Marlborough St., London, W.1

On Your Wavelength!

Researches and Experiments

SOME time ago, if you remember, 2 L O's programmes sounded for a night or two as if a steam whistle had been installed in the studio. This was due to a heterodyne from one of the French stations, which had to be tracked down. As soon as this had been done a mutual agreement was arrived at and the nuisance ceased. You may notice sometimes that if you have left your set tuned overnight to the wavelength of the station which you habitually use, it may require a slight readjustment when next you switch on. Possibly you tear your hair and ask yourself why on earth the stations cannot stick to their proper wavelengths. The fact is that it has been found necessary to move very slightly up or down the scale in order to avoid either heterodyning or some other form of interference. If the research and experimental staff were not there to see to this your wrath would be far greater than it is when a slight readjustment of the wavelength is found necessary.

Varying Wavelengths

The trouble is that the fellows on the Continent do not always stick to their wavelengths. If they did the heterodyne question could be solved once and for all; but as it is they have a little way of being as much as five metres off their proper wave at times, which means that our own must make small alterations in order to avoid clashing with them. And the engineering staff has done very fine work on the problems of relaying and of simultaneous broadcasting.

Good though the transmissions are at present, they have by no means reached perfection. If you think of what wireless was like even a couple of years ago you will realise how enormous are the improvements that have been made in broadcasting in this short time. Improvements are still going on, thanks to the technical men. We who build receiving sets are always striving to turn out instruments capable of reproducing faithfully the speech and music that are sent out. Those who are responsible for broadcast transmissions must always see that their transmitting instruments are at least as good as our receivers. Actually they are always rather better, for it is now possible to send without distortion, though no receiving-set so far can reproduce perfectly the wave forms brought in by the aerial.

Radio-Iberica

I have had a delightful letter from the Technical Directors of the Spanish station Radio-Iberica, which is now so well known to listeners-in in this country. They have

read some of my congratulatory notes on their transmissions, and they write to thank me for them. This is one of the most successful of all the Continental stations, for it is unsurpassed in the excellence of its programmes and in the quality of its transmissions. The official rating of the station is only 1,500 kilowatts, though it is often credited in the lists of Continental stations with double that power. Its signals come in—in the South of England, at any rate—with quite amazing strength. Twenty-five miles north-west of London one can receive them at good loud-speaker strength on four valves without making use of magnetic reaction. They are quite as loud as those of Birmingham, Cardiff or Newcastle, though the distance between Madrid and my aerial is a matter of 700 miles. The surprising part of it all is that they have to travel for a long distance over land on their way to this country, and Spain is renowned as being a country of dry soil with very few rivers and no lakes. This sort of land is generally supposed to be the worst of all for wireless waves to cross. And in addition to this there are several mountain barriers between Madrid and the waters of the Bay of Biscay. How Radio-Iberica's transmissions overcome these difficulties and arrive with such strength in this country is a mystery; but arrive they do, as you can discover for yourself, if you have not already done so, on any evening of the week. A single valve brings in Radio-Iberica quite well, and it has been heard more than once on a crystal.

Spring Conditions

The coming of spring brings no joy to the soul of the real wireless enthusiast, for he knows that it spells the beginning of the end of good reception until winter comes once more. Already the fell work of the longer hours of daylight is manifesting itself. The distant stations are not coming in so well as they were a week or two ago, and even the near-by ones no longer require to be throttled down a little to make them comfortable. In quite a few weeks America will be beyond the range of any but the big sets on most nights, and even if you do pick up a U.S.A. station you will usually hear more of atmospherics than of music.

If Shakespeare had been alive to-day he would probably have revised one of his lines and written, "Now is the summer of our discontent!" I feel sure that Shakespeare would have been a keen wireless enthusiast; in fact he more or less anticipated broadcasting, as you may see if you read about the doings of Prospero in *The Tempest*. It is curious that

Prospero should have sent out songs and the "voices" which appeared to come mysteriously from nowhere by means of his Ariel!

A Wonderful Evening

One was rather afraid when the *Evening Standard's* splendid programme was first announced for March 10 that something would go wrong. It seemed too much like tempting fate to bring together such a galaxy of talent upon one evening. Had things gone agley the whole thing might have been spoilt by vagaries of the atmosphere and the ether that are beyond human control. But as it turned out conditions for reception were about as good as they could be. It was one of those evenings when stations are picked up without any difficulty. Signal strength was excellent, and there was no interference at all, atmospheric or otherwise. The elements in fact appeared to be doing their very best to enable Tetrizzini to be heard by each one of the mighty host—the number has been put at ten millions—that was listening-in in order to hear that wonderful voice.

The great singer was in splendid form, her voice as clear and as sweet as it has ever been. What a joy it is to hear such a singer, who hits her notes clearly and stays upon them without the slightest trace of wobbliness. To me there are few more hateful things to listen to than the soprano or contralto who goes in for *vibrato* singing. We have far too many of these in the ordinary way, and wireless rather accentuates this horrible trick, a point that the Musical Director might note.

Tetrizzini

Madame Tetrizzini sang both in her native Italian and in English, choosing her songs in such a way that they would appeal to all. She gave us a real treat, and I am sure that she has earned the gratitude of scores of thousands of people who, but for the agency of the wireless receiving set, would never have been able to hear her sing. Hers is a glorious voice, fresh, true and perfectly controlled. Her singing of that old favourite, "The Last Rose of Summer," as her concluding item was a masterpiece, and her rendering of it must have brought tears to many eyes. And what a charming little speech she made when she had finished! One felt that she had thoroughly enjoyed herself in giving pleasure to the huge audience that listened to her, though she could see them only in imagination. One's only regret was that one could not join in the applause or say "Thank you" in some way.

On Your Wavelength! (continued)

A Splendid Programme

Yes, it was a programme to remember. It was certainly the finest that has yet been given in the history of wireless. We have had great singers and world-famous instrumentalists before, but never has there been a programme in which every performer was a star of the first magnitude. Miss Phyllis Lett, the finest British contralto, is, like Tetrassini, a perfect broadcaster; her voice comes through so clearly on the receiving set that she might almost be singing in the same room. Dinh Gilly is a prince amongst baritones, and what could have been jollier or more tuneful than John Goss's "Sea Shanties" The "Rio Grande" was my favourite amongst them. Isolde Menges let us hear what a wonderful violin played by a finished violinist can sound like. The Kerdoff Quartet consists of four Russian professors of music from the Conservatoire at Petrograd. Their rendering of the "Volga Boat Song" must have appealed to every listener.

This is the kind of programme that is really worthy of being simultaneously broadcast. Let us hope that we shall have many more up to the same splendid standard. Why should not the B.B.C. arrange, say, one each month? This fine programme gave a tremendous impetus to the wireless trade, and if the same kind of thing were done every few weeks the number of aërials installed would increase by leaps and bounds.

Sediment

I came across the other day a clear example of the iniquities of which some charging stations are capable. A friend purchased a brand new accumulator of first-rate make and sent it to the local garage to be charged. When it was returned it was seen that there was a very large deposit of sediment in the bottom of the case, so much in fact that there was a grave risk of its ruining the accumulator by causing an internal short-circuit. The only explanation that the charging station vouchsafed was that during the night the generator had raced, raising the charging current to something much higher than it ought to be. I do not know how many accumulators were being dealt with when this occurred, but I am certain that all of them have had their lives very much shortened.

Those Electrons

Probably all my readers are familiar with the fact that very often a small chip of glass left in the pinch of a valve makes a rattling sound when the valve is moved. I was in a shop recently and noticed a man, evidently "up from the country," very busy at the valve counter. The salesman, with an anxious expression on his face, was diligently laying out

valves of all sizes and descriptions; he finally signified that he had no other makes in stock. The countryman seized upon the last sample and held it to the light and examined it. With a puzzled face he placed it to his ear and shook it.

"A very good valve that, sir," volunteered the salesman.

The countryman gave it one more shake and, sighing heavily, put it down. "Naw ye doan't, young feller," he said, turning to leave. "Oi naw that ye think oi be soft 'cause oim oop from t' country, boot moi valve 'ad one o' them 'lectrons in't, and none o' your'n ain't." And shaking his head sorrowfully, he departed!

Strange Business Methods

For some long time past there has been a tendency on the part of the manufacturers to adopt a new component for manufacture, produce a few samples and advertise extensively in advance of bulk manufacture. The result is that the public approaches the dealer with a view to purchase, and is surprised to find that not only has the dealer no stock of the particular article, but, furthermore, he never has had any! The dealer, all in good faith, promises to obtain the requisite component, and forthwith places an order. Patiently he awaits delivery of his order, and in the meantime is inundated with inquiries from his clients. The weeks pass by and the inquiries begin to drop off until another new arrangement of a better design is advertised. About this time (generally two months after the order has been placed) the goods are delivered, but the public is now clamouring for the later design, and the dealer has his shelves laden with obsolete stock which nobody wants.

Atmospheric Conditions and Wireless

I am somewhat interested in the remarks of "B. H. R.," of Sale, in reply to mine concerning atmospheric conditions. Without a doubt his theory is perfectly sound. It is a pity really that so little work is carried out in the matter of atmospheric conditions as they affect wireless, since it is more than possible that a little research might be a means whereby many static phenomena might be avoided. Undoubtedly I have noticed that atmospheric effects on occasions do appear to be directional, and it is valuable to have corroboration of this. If more amateurs were to undertake an examination of this question very valuable data would no doubt be obtained. One or two experimenters working in conjunction, situated at a distance from each other, could compare results achieved by using different types of aerial, and if they worked systematically, in accordance with the published meteorological reports, might set down their experiences in the form of a table. I

have always been of the opinion that a considerable amount of so-called fading might be traced to a human source, such as the absorption which may be occasioned by the fringe of an interfering station. Research on this point would also be valuable.

To Pad or Not to Pad

There has been quite a lot of discussion lately on the subject of whether broadcasting studios should be draped and padded or not. Personally I would plump for the undraped studio every time, for the quality of music that is transmitted from a church or a big hall is always infinitely better than that which comes from the specially prepared studio.

Experts say that you must drape floor, walls and ceiling if you are to avoid distortion of speech. Personally I cannot say that I have noticed any distortion worth talking about in the speech that comes from theatres, concert halls or churches. Anyhow, I think that most of us would gladly put up with slightly inferior reproduction of speech if it would mean the transmission of music that sounds so much better than it does from the ordinary studio. "Unpadded music" has a ring, a depth and tone that you do not get when it comes from the studio.

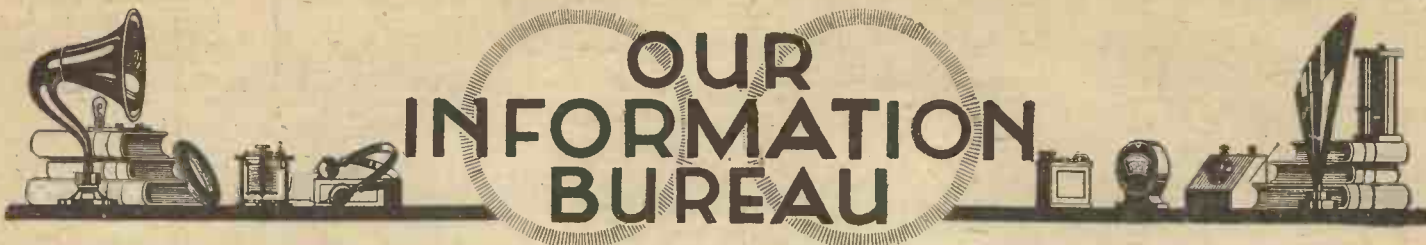
Musical Guesswork

This query programme, you know, threatens to become as much a disease as those cross-word puzzles. What with the office boy trying to find if a word in four letters beginning with s and ending in k stands for "situations vacant," and my typist trying to remember if "Because" is by Ronald Gourley or Meyerbeer, life becomes too complicated; but, anyhow, last night's mystery programme at Birmingham was certainly worth trying for the two guineas prize, for it gave us hen-pecked husbands a chance to get a word in edgeways.

"A Tale of Alsatia"

Between ourselves, I don't know what a "Picaresque" is. (Now there's a chance for our cross-word editors.) Anyhow, I do want to get Aberdeen to-morrow, for a London Picaresque of the time of James I will be broadcast. *A Tale of Alsatia* does not centre on that foreign country in your Cook's tour guide, so don't ear-mark it for your summer holidays; it was the name given to that part of Fleet Street district known as Whitefriars, where from the 13th to the 17th centuries stood a monastery. Here the whitehooded monks gave shelter from debt and penalties to half the foreign rascals in the city. Possibly the modern prototype is another part beginning with white. But there, you just see how catching that cross-word business is.

HERMON.

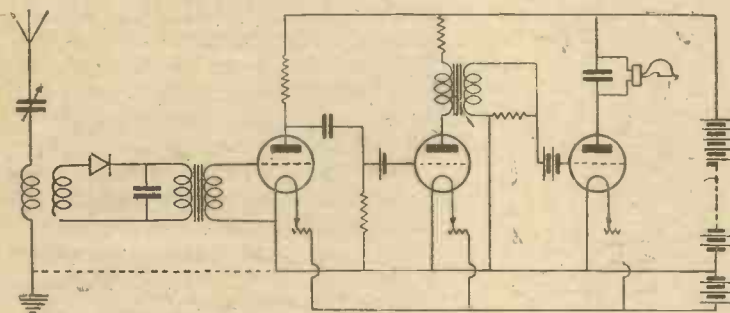


RULES.—Please write distinctly and keep to the point. We reply promptly by post. Please give all necessary details. Ask one question at a time to ensure a prompt reply, and please put sketches, lay-outs, diagrams, etc., on separate sheets containing your name and address. Always send stamped, addressed envelope and attach Coupon (p. 503).

Loud-speaker Set

Q.—Please give a circuit showing suitable connections for wiring up a powerful loud-speaker set. The receiver is to be used at a distance of about five miles from 2 L.O., and long-distance reception is therefore not necessary. Absolute purity of reception is essential, and a great volume of sound is needed for demonstration purposes in a large hall.—V. M. (E.10).

A.—A description of a high-power loud-speaker set was given in AMATEUR WIRELESS No. 136, page 48, but as this receiver employs



A Loud-speaker Circuit.

two stages of high-frequency magnification as well as two stages of low-frequency, the set described may not be entirely suitable. Some valuable hints with regard to the operation of loud-speaker sets are given and may prove very useful in connection with your receiver. A circuit more suitable for your requirements is shown above; it will be seen that a loose-coupled crystal detector is used together with three stages of low-frequency amplification. If purity of reception is desired, the following points should be noted: the first transformer should have a ratio of only 2 to 1; the values of the resistances of the second valve are critical for the best results; grid bias is used for the second and third valves; several loud-speakers should be used in parallel to prevent overloading and consequent distortion. An aperiodic secondary coil is used.—U.

Super-regenerative Circuits

Q.—Please advise in the use of super-regenerative circuits such as the Flewelling or Armstrong single-valve sets. I propose to build a receiver of this type, but am uncertain as to what the exact capabilities of super-circuits are. Is it desirable to use an out-door aerial? Could you also tell me what gauge of wire is suitable for winding a powerful loud-speaker of the standard moving-iron diaphragm type.—W. P. (Blackheath).

A.—Super-regenerative circuits were designed for long-distance work on short wavelengths. The strength of signals obtained varies inversely as the square of the wavelength, and therefore although astounding results may be expected on 100 metres, on 600 metres the strength will only equal that of a simple crystal set. All the time that signals are being received, a high-pitched whistle will be heard in the phones or loud-speaker. This may be eliminated, but super-

circuits are hardly suitable for broadcast reception as a certain amount of distortion is always present. A frame aerial should be used or serious re-radiation troubles will be caused.

If care is taken in choosing the components, remarkable results may be obtained, but super-circuits cannot be regarded as stable receivers for broadcast purposes. No. 46 s.s.c. wire is recommended for winding the magnets of the loud-speaker.—U.

Tuning Coils

Q.—I am constructing a tuner for my new two-valve set (detector and note mag.), and am undecided what type of coil to use. My old set employed tapped inductance, but I am told that these coils are now out of date. What kind of tuner do you recommend, and what size coils are suitable?—M. T. (Newbury, Berks).

A.—It is scarcely true to say that tapped coils are out of date, but it has been found advisable to use coils having a lower degree of loss on the short wavelengths. For wavelengths between 200 and 1,000 metres, therefore, the plug-in type of coil is to be recommended. Coils of this description should be wound honeycomb fashion on a 2½-in. former, 1 in. wide, and we suggest you wind coils having the following number of turns: 25, 35, 50, 75, 100, and 150.

For the lower wavelengths air-spaced coils (as described in No. 141) are recommended, since even the low self-capacity of ordinary plug-in coils will be detrimental to signal strength on wavelengths below 100 metres.

Tapped coils will probably be more useful than bulky plug-in coils on the long wavelengths.—U.

Inductance of Basket Coils

Q.—How can the inductance of a basket coil be calculated?—M. T. (Edgbaston).

A.—The following formula will be found fairly accurate: $L = \pi^2 n^2 d^2 l$. When L = inductance in cm., d = mean diameter of the coil in cm., n = number of turns, l = difference between radii of outermost and innermost turns.—U.

Filament Rheostats

Q.—What value of resistance is suitable for a rheostat for use with the Marcouli D.E.5?—C. M. (Croydon).

A.—30 ohms is a suitable value of resistance.—U.

Crystal Detectors

Q.—What is the best type of crystal detector for use in a simple crystal set? I wish to have a detector that is sensitive and yet which will not be affected by vibration.—J. P. (W.C.I.).

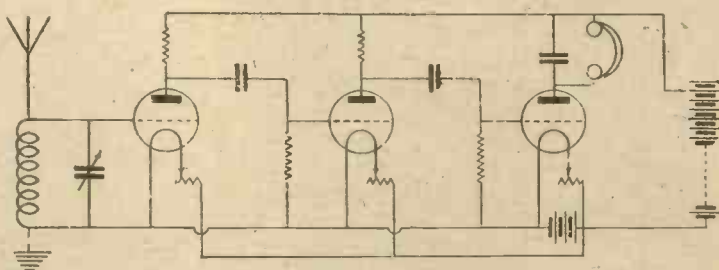
A.—It is very difficult to combine sensitivity and stability in a crystal detector. Carborundum and steel make a very stable detector, but an added potential is necessary. A silver, copper or brass contact with galena forms a sensitive combination.—U.

H.F. Amplifier

Q.—I am enclosing the diagram of my receiver (reproduced below), which is intended for the reception of long-distance broadcasting. I have not been able to get any satisfactory results as the addition of the high-frequency valves seems to make no appreciable difference. It is difficult to obtain reception from more than two of the B.B.C. stations, and even London is not strong in the phones.—C. T. (Lower Edmonton).

A.—It should be remembered that the use of two high-frequency valves will not greatly increase the strength of signals from local stations. Low-frequency amplification is needed to increase signal strength, whereas the two H.F. valves will only increase the range of the set. The chief fault in your receiver seems to be that you are using resistance-capacity coupling for H.F. valves on comparatively short wavelengths.

Unless the receiver is specially designed and constructed it is almost an impossibility to obtain any H.F. amplification from resist-



Resistance-coupled H.F. Amplifier.

ance-coupled valves on wavelengths below 1,000 metres. It is therefore not surprising that all the B.B.C. stations are not received at good strength. If the resistances be taken out of circuit and tuned inductances connected in their place, thus forming the tuned-anode method of coupling, this difficulty should be overcome. If the resistance-capacity coupling is still retained it would be advisable to take separate tapplings from the H.F. valves to the high-tension battery, since the detector valve requires less anode voltage than the two valves having resistances in their anode circuits. For short-wave work it would be advisable to place the aerial condenser in series instead of in parallel.—U.

TRY THE SHORT WAVES!

(CONCLUSION)

The instructions in this and the preceding article will enable you

to receive on the short wavelengths now coming into great favour.

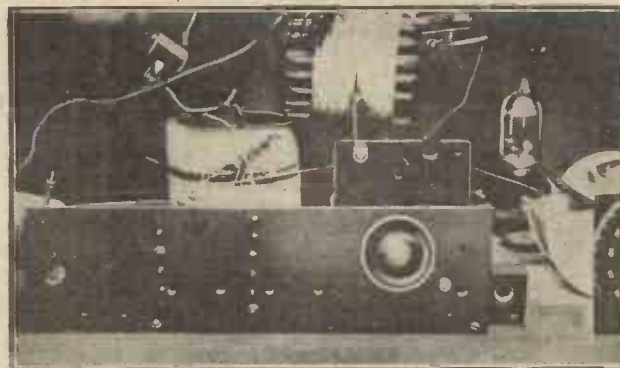
Other Capacity Losses

TURNING to the set itself, let us examine losses here; for example, the grid leak and condenser. Figs. 4 and 5 show the correct and incorrect way of mounting these articles in position. For short-wave reception always put the leak across the condenser, never from the leg of the valve filament to the grid.

Now the valve holder. Referring to the photograph (p. 429), there will be seen two valves from which the caps have been removed. This is the best way of employing a valve on the short wavelengths, as capacity losses arise at the "pinch" where the leads are fixed in the glass, and in the holder of course. Marconi V24 valves are better for short-wave work, as their capacity is much lower. However, not everyone wishes to remove the base from this valve, and therefore care must be taken to reduce the losses which are bound to occur in the valve holder.

Valve-holder Losses

Fig. 6 shows the losses which occur when an ordinary moulded composition holder is used. The circuit shown (Fig. 7), shows the application of such losses or how they would appear in an ordinary one-valve set.



The Type of Set.

Fig. 8 shows a method of reducing capacity and leakage losses where ordinary pins are employed by cutting away small strips of the ebonite panel between the legs. It is always advisable to employ these pins or legs, and to adopt the above suggestion.

Valves

Fig. 9 shows two types of valves—an ordinary 4-pin type and the V24 mentioned above. It is easy to see which is the better valve from the lower self-capacity point of view.

The Secret of Success

The photograph shows a view of a receiver, using the low-loss coil mentioned above and the method of mounting. (This coil is used in a Reinartz receiver; hence it is centre tapped and is supported by the centre tap—a stiff piece of heavy gauge aerial wire.) If any high-frequency chokes

The Type of Set

Now we have reviewed the situation as far as it is necessary, and a few words on the type of set will conclude this article.

High-frequency amplification is useless. Any ordinary or extraordinary type of rectifier will do (excluding the obviously doubtful reflex circuit and the like), and note magnification may be added. The writer advises the use of only one stage, however, which may be cut in or out at will. He himself uses a modified Reinartz circuit with an optional note magnifier.

As regards transmitting, the above remarks hold true for this also. Watch stray capacity and the rest will look after itself. Of course care should be taken to increase the gauge of wiring to withstand the heavier currents which they will be required to take, and insulation should be looked to even more carefully than ever.

A. G. W.

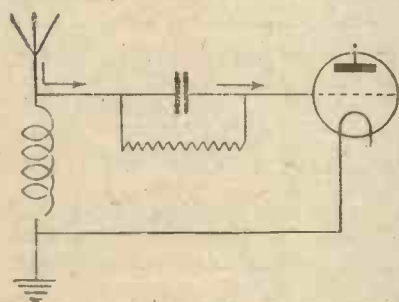


Fig. 4

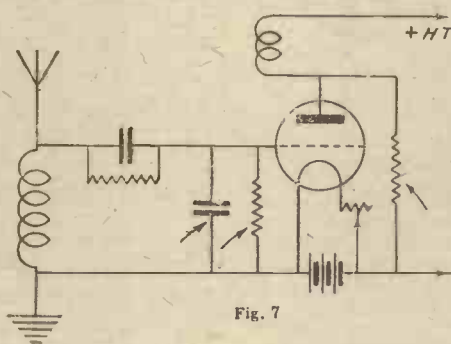


Fig. 7

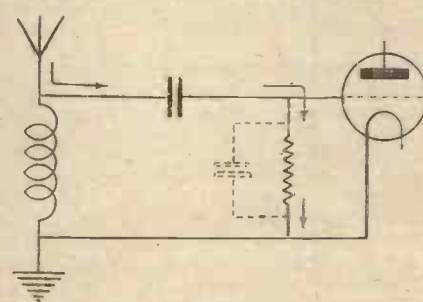


Fig. 5



Fig. 6

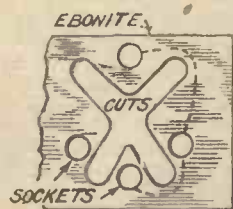


Fig. 8

Fig. 4.—Correct Position of Grid Leak.

Fig. 5.—Incorrect Position of Grid Leak.

Fig. 6.—Losses in Valve Holder.

Fig. 7.—Points where Losses Occur.

Fig. 8.—Method of Reducing Losses in Valve Holder.

Fig. 9.—Comparison of Capacity Losses in Valves

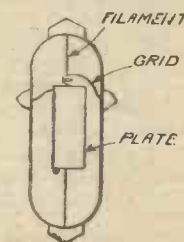
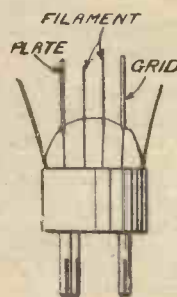


Fig. 9

AROUND THE SHOWROOMS

Electron Wire

TO test a sample of Electron aerial wire I adopted a rather unique method.

I erected a number of indoor aerials (of different wires) of exactly the same length, including a length of Electron wire.

Then I tuned-in a crystal set to London on what I thought would be one of the best aerials, and then detuned until signals were only just audible.

Next I "borrowed" an independent observer, who sat with his back to the set. I then changed the aerials about, while the observer noted the difference in signal strength. Every time he voted for the Electron aerial. This was quite a conclusive test, and I can recommend this wire to anyone who wants to fix up an aerial with the minimum of trouble.

This wire is supplied by the New London Electron Works, Ltd., of Boleyn Road, East Ham, London, E.

Grid-leak Attachment

A LONG-FELT need in the form of an attachment for use in conjunction with the Dubilier-type 600 grid condenser when a series grid-leak connection is required, has just been placed on the market by the Dubilier Condenser Co., Ltd., of Victoria Road, North Acton, W.3.

This attachment is easily added to the existing condenser and dispenses with the necessity for separate grid-leak clips when H.F. amplification by the tuned-anode method is embodied in a receiving set.

I understand that large supplies are available for immediate distribution, the clip and moulded insulating-base complete retailing at 6d.

The same firm has produced a new form of variable condenser, called the Duwatcon, which, by reason of its special construction, enables the value given when the condenser is in its maximum series position to overlap that given when in its minimum parallel position.

In this way there is no risk that any wavelengths will be passed over when the condenser is changed from the series to parallel position.

The condenser is provided with three terminals, which are joined up to the tuning coil and to a "series-parallel" switch. A diagram of connections is included with each condenser to facilitate wiring up.

"Pliotron" Dull-emitter Valves

I HAVE tested a new dull-emitter valve of the .06-ampere type (Model SS4) made by Aneloy Products, of Eton Works, Upland Road, S.E.22.

The results obtained were excellent, and for a valve of extremely low filament-current consumption is noticeably devoid of any microphonic tendency.

On actual test I found that the valve is most suitable as a detector, although fair results were obtained using it as a low-frequency amplifier.

When used as a detector, 40 volts H.T. on the plate is found to give the best results, and when used as an amplifier 80 to 100 volts are necessary, with a negative grid potential of $1\frac{1}{2}$ volts.

Televox Loud-speaker

FINISHED in dull gold and black, the Televox loud-speaker, made by the Edison Swan Electric Co., Ltd., is pleasing in appearance and no less pleasing in performance.

In order to make a fair test, I connected the loud-speaker to a three-valve receiver known to give excellent results. London, at a distance of ten miles, came through with remarkable purity and volume, while other stations were received with the same purity and with enough volume to fill a large-sized room.

The proximity of the diaphragm to the magnets is adjusted by loosening a locking ring round the base of the instrument and unscrewing the top of the receiver (to which the diaphragm is attached) until the diaphragm is in the best position, which may be judged by the quality of the sound.

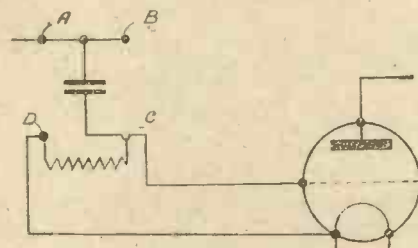
VANGUARD.

PROGRESS AND INVENTION

Grid-condenser Unit

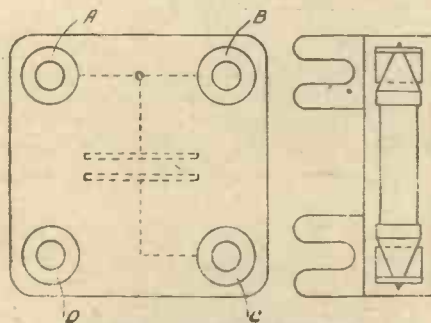
A CONDENSER unit for use in the grid circuit of a valve is described in Patent No. 228,693/24 (Wadia Halim Murad, Manchester).

It will be seen from the diagram that



The Grid Leak in Series.

the unit consists of a base having four terminals A, B, C and D, and a grid condenser connected as shown to the three terminals A, B and C. A grid leak is



Condenser Unit (No. 228,693/24).

mounted on separate clips so that it can be connected across any pair of terminals.

According to the specification, the plates of the condenser, interleaved with thin sheets of mica, are fitted into a moulded case of ebonite or other insulat-

ing material, having the four terminals for connection at each corner.

In order to make the change from the parallel to the series arrangement of connections or vice versa it is only necessary to remove the grid leak from the terminals on one side of the condenser case and to connect it to those on the other side, and to add or remove the low-tension wire.

The circuit diagram shows how the connections are made in order to place the leak in the series position.

Frame Aerials

PORTABLE sets are now a practical proposition, and frame aerials are generally sufficient to provide the energy for a modern sensitive set.

Portable frame aerials, however, are not easily constructed, as considerable difficulty is usually experienced in arranging the wires in the correct position. It is, of course, essential that the wires should be symmetrically placed, as serious high-frequency losses will be introduced into the coil if the turns are wound unevenly. It is essential, too, that once the wires have been arranged this arrangement should always be adhered to or tuning adjustments will need to be constantly varied. Patent No. 225,148/23 (F. Sloop, Gray's Inn Road, W.C.) describes a simple method of overcoming this difficulty of the arrangement of the conductor.

The aerial is formed by interposing the wire between two sheets of textile fabric which are stitched together between the convolutions of wire so as to enclose the wire at all points between the extremities.

The frame of the aerial has hooks placed at the four extremities of the arms, and the two stitched fabric sheets are supported on these.

A TALK WITH CAPTAIN ECKERSLEY

(FROM OUR OWN CORRESPONDENT)

"THERE is," I said sternly, "not the slightest possibility of escape down that corridor."

Captain Eckersley withdrew his pipe from his mouth, gazed at me intently for a few seconds, then in a resigned tone:

"Very well. Come down to my office now. I have a few things to look over. Might as well kill two birds with one stone."

"My hope," I observed, "in the one case, is that your aim may not be accurate." I followed him.

By means of a desk and three chairs I fortified my position, and also made sure that the wall at his back contained no secret door, by which he could beat a hasty retreat and avoid the interview.

"Now," said the chief engineer, "what is it you wish to know?"

The Day's Work

"Listeners," I began in my most persuasive manner, "judge of your work by the results they hear, but have no idea of what you actually do throughout the day. To quote the wording of a detective agency's advertisement, 'Does shopping account for all the time?'"

"It is difficult to say how I subdivide my day's work, but I will give you some idea of the organisation under my control. The engineering side of the B.B.C. is composed of three departments dealing with, respectively, maintenance, development and correspondence. Subdivisions include stores and training. Personally, I supervise both the administrative and executive sections of the work, and I possess very able lieutenants, who take most of the routine and straightforward duties off my hands.

My principal time is naturally mainly occupied with questions of policy. The maintenance department is, of course, responsible for the running and upkeep of the existing stations; the development section for the examination and study of all new inventions, improvements, experiments and for the construction of new plant and stations. This is quite an important part of the day's work. The correspondence department deals with, amongst other matters, the large mail received from listeners in all parts of the United Kingdom; at least that portion of the mail which deals with transmissions—'blind spots,' technical matters, peculiar effects experienced, howling, and the sundry complaints or criticisms made by the public and which refer to the engineering side of the work. For my share, I receive about two hundred letters a day, most of which can be dealt with by my correspondence staff. Any cases which present peculiari-

ties or involve special investigation are brought direct to me, and such complaints are very carefully examined and dealt with in detail. As an example, I can give you the statement made by some owners of crystal sets that their neighbours possessing valve receivers were able completely to cut off their reception of the local station. We need not discuss this particular matter, as I have dealt with it in one or two of my 'Fortnightly Talks.' Such a complaint, however, demanded a thorough investigation, and very many tests were made to confirm or refute the accusation. In the public interest it was my duty to go very carefully into this matter, and I have since broadcast the results of my personal experiments and observations. So far as possible, I see that every letter received is duly answered, but listeners must excuse me if I do not reply to all those of purely a complimentary nature."

"Quite so," I interrupted, "but give me some idea as to the way in which you start your day's work."

"I look through the mail. I supervise the purchases of all material required for the upkeep and maintenance or construction of stations. One of my first duties is to receive and examine reports regarding the previous day's transmissions of all our broadcasting centres, both main and relay. These are carefully checked, and this chart shows at a glance how these stations are working. Notwithstanding occasional breakdowns, which are inevitable—Bournemouth, for instance, had its aerial brought down by a gale—I am pleased to say that the actual breakdowns or interruptions, in the aggregate, only amount to, roughly, one quarter per cent. of the entire transmitting time.

Engineers' Duties

"Now let us see. Oh, well, there are six or seven engineers on duty every day. One man comes in early and places all the batteries on charge, tests all the plant, and generally cleans up preparatory to the first transmission. Tests are continually being made, not only because they are necessary, but also for the benefit of the engineers we train for our new stations. Engineers are on duty eight hours per day. In the morning the programmes are examined, and the various men allotted to their respective jobs. There is always one man on duty in the control-room, and as the work demands exceptional care and concentration he is only given a two-hours' spell of it, after which another acts as relief. Don't forget that, apart from the actual studio transmissions, we have the outside relays, and much of our day's work is taken up by coping, or endeavour-

ing to cope, with emergencies, such as sudden outside transmissions, and of which, as frequently happens, we get but very short notice."

Checking the Transmissions

"I notice you have headphones in almost all the rooms here."

"Yes. Whenever there is a 'show' on we listen from any room in which we happen to be at the time. We are all severe critics. It is essential I should hear the transmission in the same manner as the outside listener. I always judge of the quality from his point of view. I have a set at my private house, and when off duty in the evening I always listen to the programmes."

"What! all of them?" I queried.

"Well, not right through, but 'rom time to time, in order to form my own opinion of the transmission. I aim at the best quality possible."

"By the way, has howling decreased or increased of late?"

"Oscillation is spasmodic. It is like influenza. We get an epidemic at times, after which it dies down for quite an appreciable period."

"Do violent outbursts of howling coincide with school holidays?"

"Better not talk about oscillation. The public hears so much of it from me; but 'howling' does, as you know, spoil people's enjoyment. One person alone, either wilfully or through sheer ignorance, can mar several hours' enjoyment."

The New 2 L O

"What are your plans for the new transmitting station in West London?"

"We have erected a three-kilowatt transmitter on a new site. We hope that the energy and range may be greater than our present 2 L O station. Tests will prove whether our expectations are realised. It is possible to build something which may be theoretically perfect, but practical results depend on so very many factors. If I get the same results as I am getting now I shall be pleased; if they are better I shall be delighted. We shall know when we have made some tests."

"Will not the extra energy render the task more difficult of cutting out 2 L O to receive other stations?"

"It may, but in my opinion the listener should render his receiver more selective. It is quite possible to do so. Although complaints are received regarding the difficulty of tuning-in some of the provincial and foreign stations, I could take you upstairs to our testing-room, and there, whilst 2 L O is working, you could get re-

(Concluded on page 492)

EXPERIMENTAL TRANSMISSION.—XI

MORE ABOUT MODULATION

Aerial-absorption Principle

A WELL-KNOWN American company provides a modulator acting on the aerial-absorption principle, which, it is claimed, has none of the disadvantages of direct connection and yet retains the good

transformer, thus altering the internal impedance of the valve and directly controlling the aerial.

The modulator may be an ordinary receiving valve if only small powers (not much over 10 watts) are employed, and

a certain amount of glow is also caused by the radio-frequency potential derived from the aerial inductance.

When the microphone is spoken into, the potentials set up across the secondary of the transformer vary the conductivity of

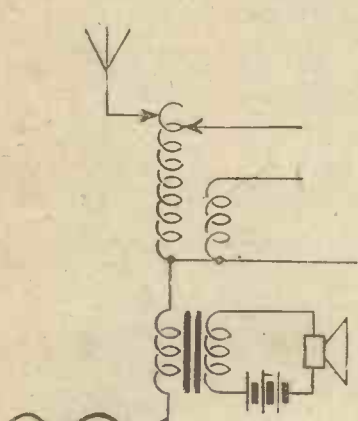


Fig. 43.—The Magnetic Modulation.

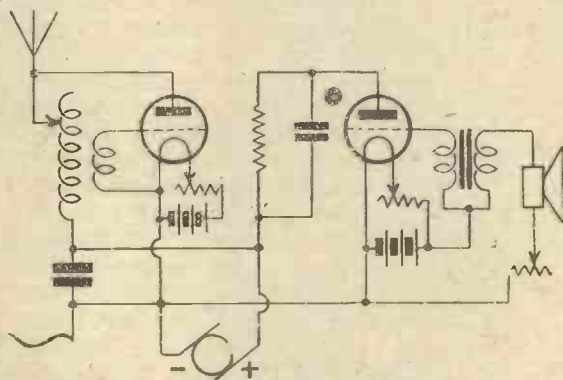


Fig. 44.—Valve Control of the Aerial.

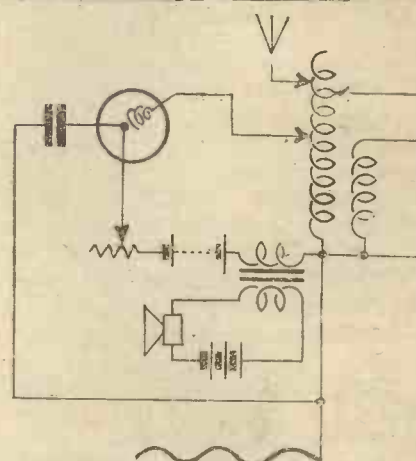


Fig. 46.—The Neon tube Modulator.

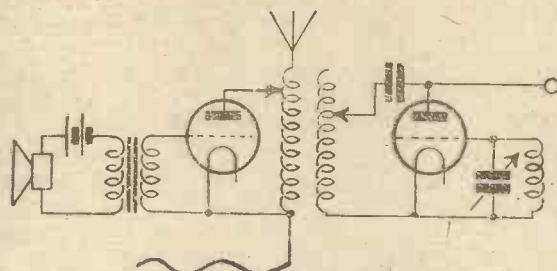


Fig. 45.—Another Method of Aerial Absorption.

quality of modulation obtained by normal methods of aerial absorption.

The microphone acts through a magnetic modulator, a device which utilises the magnetic properties of iron at radio-frequencies in the same way as the Alexander-son magnetic amplifier employed in large transmitting stations, which is operated by a variable impedance connected across the high-frequency generator. The magnetic modulator is connected directly into the aerial circuit near the ground connection, and acts simply as a variable resistance modulated by the microphone.

Another advantage of such a system is that in Fig. 42 (p. 392, No. 144) the microphone leads must be as short as possible, as any capacity effects will reduce the variation of resistance, whereas in Fig. 43 the leads may be as long as is desired, since no radio-frequency currents are passing through the microphone.

Another Method

A second method of employing aerial-absorption control on powers of the order of 10 watts is to use a three-electrode valve as the absorbing medium, and to control the grid of this by means of the microphone in the usual way.

The connections of such a scheme are shown in Fig. 44. Here the grid of the modulating valve is controlled by the microphone through a step-up microphone

for this reason a resistance is shown in the anode lead to this valve to cut down the plate supply. Common filament batteries may be used if desired.

Such an absorbing element may be coupled inductively to the aerial circuit, or tapped off across the inductance as shown in Fig. 45; in either case it is desirable to employ a loose-coupled oscillator to minimise capacity effects and to abolish battery trouble.

Neon-lamp Modulator

It would perhaps be as well to explain here how it is possible to use a neon-lamp as a modulating unit. The simplest modulation scheme using a neon tube is shown in Fig. 46. Shunted across the aerial circuit is the lamp in series with the secondary of a step-up modulation transformer and a source of plate voltage, if it may be so termed. About 150 volts is suitable. By means of the resistance R the lamp is adjusted till it just glows feebly;

the lamp, causing a varying damping on the aerial circuit.

This method certainly gives very satisfactory results, especially on low powers, and as it is inexpensive in initial outlay and upkeep it is to be strongly recommended.

KENNETH ULLYETT.

(To be continued)

NOISY RECEPTION

INTERMITTENT crackling and sizzling noises which are often put down to atmospherics are frequently due to bad contact between the valve legs and the sockets in the filament circuit.

This trouble is more often experienced when using bright-emitter valves rather than with those of the .06 class, and is due to the fact that the effect of a slight increase in the resistance of a circuit is more pronounced when a comparatively large current is flowing.

A remedy for this is to clean the pins of the valve with fine emery-cloth and afterwards increase slightly the diameter of the pins by inserting a pocket-knife in the centre slit. The valve should then be a good fit in its socket and the troublesome noises cease.

S. J. M.

A popular orchestral programme will be broadcast on March 20.

TWO-VALVE REINARTZ RECEPTION

IT is a source of wonder to the writer why the Reinartz tuning system has not "caught on" in England as it has done in America. The originator of the circuit is John L. Reinartz, a young American who has produced an astounding number of tuner designs. In all probability the reason for its lack of popularity in this country is that hitherto a special coil has been necessary for the tuner, thus limiting the range of wavelengths on which it will receive. By using plug-in coils, however, all these disadvantages are overcome.

The Reinartz tuner is simplicity itself to handle. Once the correct position of the coils has been found there is no need to alter the setting. Tuning is then accomplished by the rotation of the two condenser dials seen on the right of the panel in the photographs.

Another great advantage of this system is the great selectivity that can be obtained. Although perhaps not quite as sensitive as some circuits possessing one or more stages of high-frequency amplification, it is quite sensitive enough to receive all the broadcasting stations on the headphones provided that a good outdoor aerial and a good earth system is employed.

The Theory of the Circuit

Referring to the circuit diagram Fig. 1, it will be seen that a semi-aperiodic aerial coil is conductively and magnetically coupled in a fixed manner to a tuned grid

coil. The semi-aperiodic aerial and the grid coils take the form of ordinary plug-in coils in a three-coil holder, the third socket being used for the plate or reaction coil.

In practice the aerial and grid coils are kept permanently coupled tightly together, while the plate coil is adjusted until a suitable coupling is obtained. Once adjusted, it is left so, and reaction control is carried out by the reaction condenser alone.

In order that the reaction coil and condenser should function properly it is necessary that the H.F. oscillations should pass through the coil and condenser and not be able to pass through the L.F. transformer by means of the capacity of this instrument. This necessitates the use of a transformer having a very small self-capacity. Using a transformer having a fair amount of self-capacity, it is essential to incorporate a high-frequency choke coil between the plate of the valve and the transformer, as shown in the circuit Fig. 2. Using a McMichael transformer the choke coil was found to be superfluous and was omitted.

Component Parts Required

Any good make of components may be used, provided, of course, that they possess identical electrical values to those given in the following list. For the benefit of those who prefer to make a set similar

in every respect to the original, the manufacturer's name is given, in parenthesis, after each component.

One Radion ebonite panel, 14 in. by 8 in. by $\frac{3}{8}$ in. thick (American Hard Rubber Co.); one three-coil holder



The Complete R

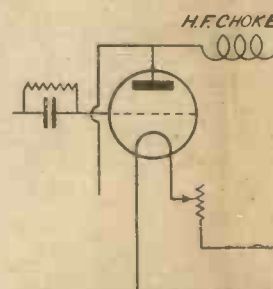
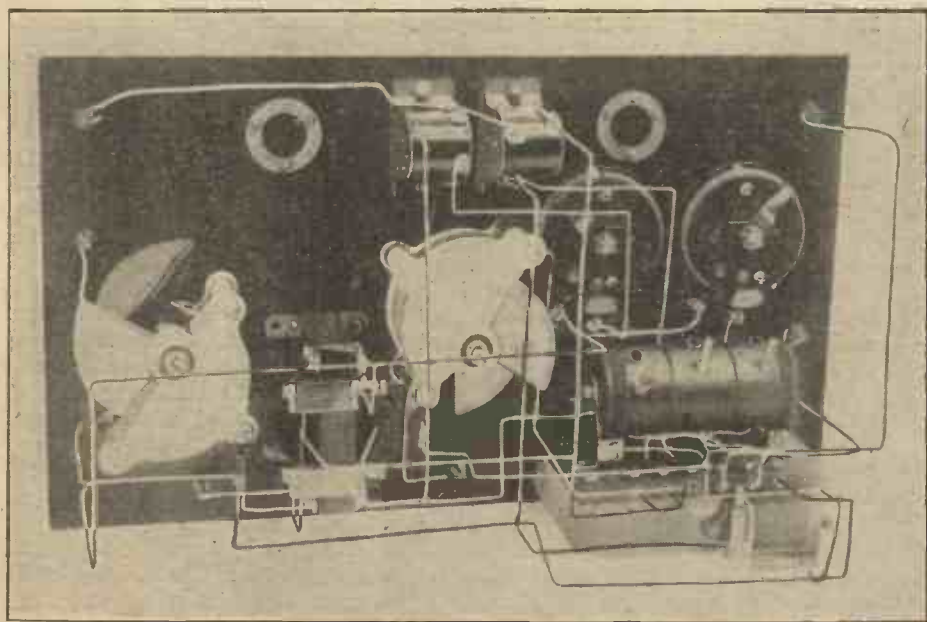


Fig. 2.—Diagram Showing



Plan View of Back of Panel.

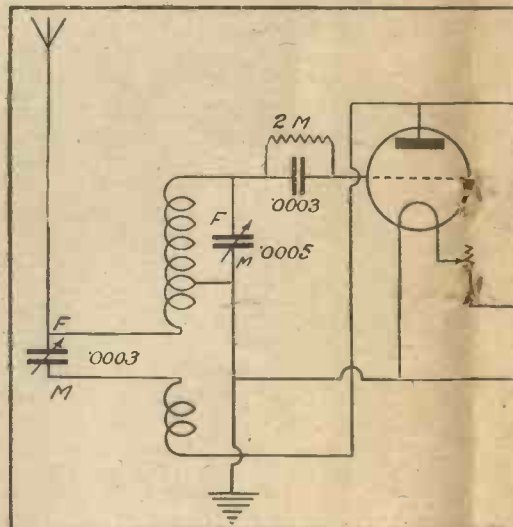
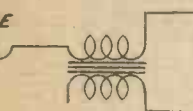


Fig. 1.—The Circuit

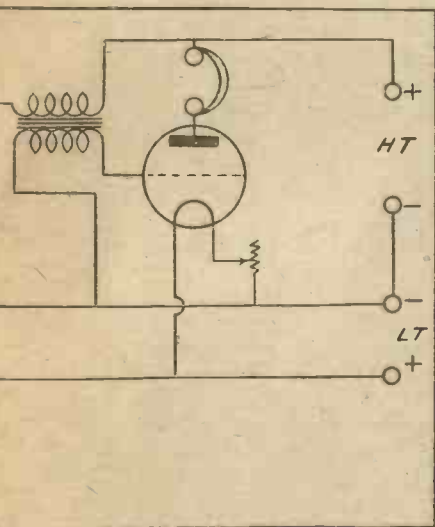
RECEIVER WITH PLUG-IN COILS



Receiver.



Position of Choke.



Circuit Diagram.

fixed condenser (Dubilier); one low-frequency transformer (McMichael); two filament rheostats (Burndept dual type); ten terminals; two valve windows; two valve holders (Aermonic); one oak cabinet to suit panel (Henry Joseph and Co.)

The Cabinet

Messrs. Henry Joseph, of Victoria Street, London, S.W.1, have supplied us with a very suitable cabinet for this set. It has the great advantage that the panel fits into place and is held rigidly without the use of wood screws. This is done by means of four turn-buttons clamping the panel tight against the beading round the front of the cabinet.

Drilling the Panel

Too much emphasis cannot be laid on the necessity of using good ebonite. For this reason it is advisable to buy branded ebonite in preference to the cheaper unbranded material. If, however, the latter is used, remove the polish with fine emery-paper, afterwards rubbing the surface with a rag moistened with a little oil. In this way the black surface of the ebonite is restored.

On a piece of paper measuring 8 in. by 14 in. mark out the centres of the holes shown in the panel-drilling diagram (Fig. 3). Lay this piece of paper flat on the panel and mark through at the centres with a sharp steel point. Holes of the

sizes indicated in Fig. 3 should then be drilled at these points.

Mounting the Components

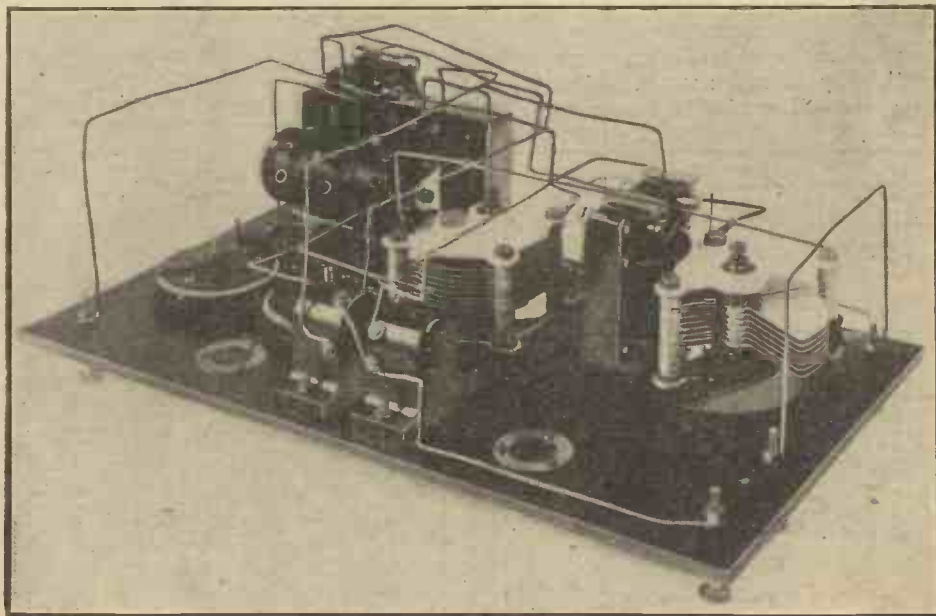
The next step is to mount the various components on the panel, and this should be done in the following manner. Mount the two valve holders, the two rheostats and the terminals on the panel first, and wire up the filament lighting circuit before anything else is done. When wiring allow plenty of room for the mounting of the other components. Next the variable condensers, the coil holder and the L.F. transformer are mounted and wired.

The three-coil holder is screwed down on to a piece of wood 1 in. thick, 4 in. long and 2½ in. wide. This piece of wood, when screwed to the panel by means of three 1½-in. brass wood screws, forms a rigid support for the coil holder. The fixed grid leak and condenser are seen screwed down on the side of this wooden bracket.

No difficulty should be experienced in making the various connections if reference is made to the wiring diagram Fig. 4 and the photographs of the under side of the panel.

Valves

The Burndept "dual" type of filament resistance is suitable for either dull- or bright-emitters. In the original receiver a Cossor plain-top bright-emitter valve was used for the detector and a Mullard type



Another View of Back of Panel.

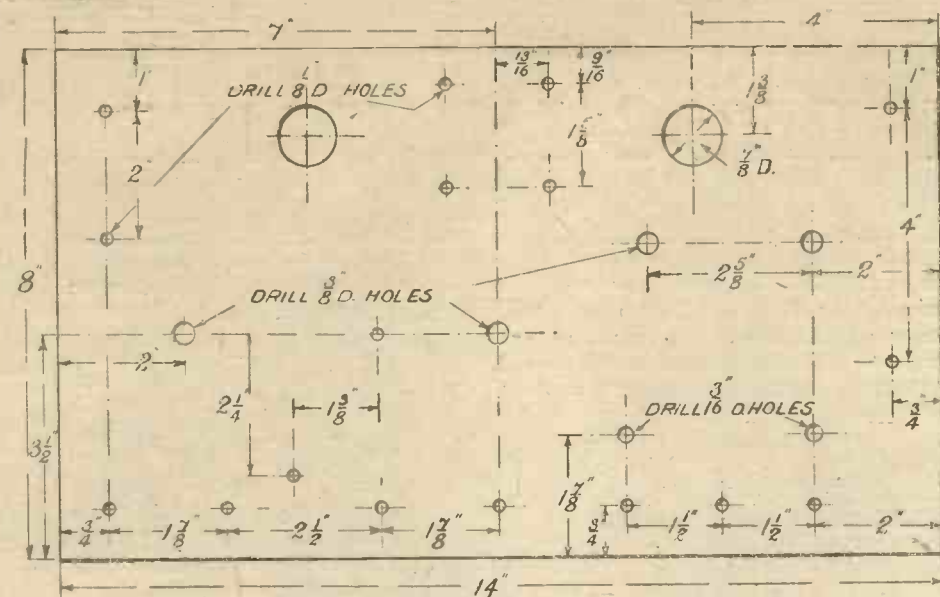


Fig. 3.—Lay-out of Panel.

DFA₁ for the amplifier. With this combination signals were exceptionally loud and free from distortion. Approximately 80 volts seems to be a suitable H.T. value, and for the filament lighting a 6-volt accumulator is necessary.

Operating the Set

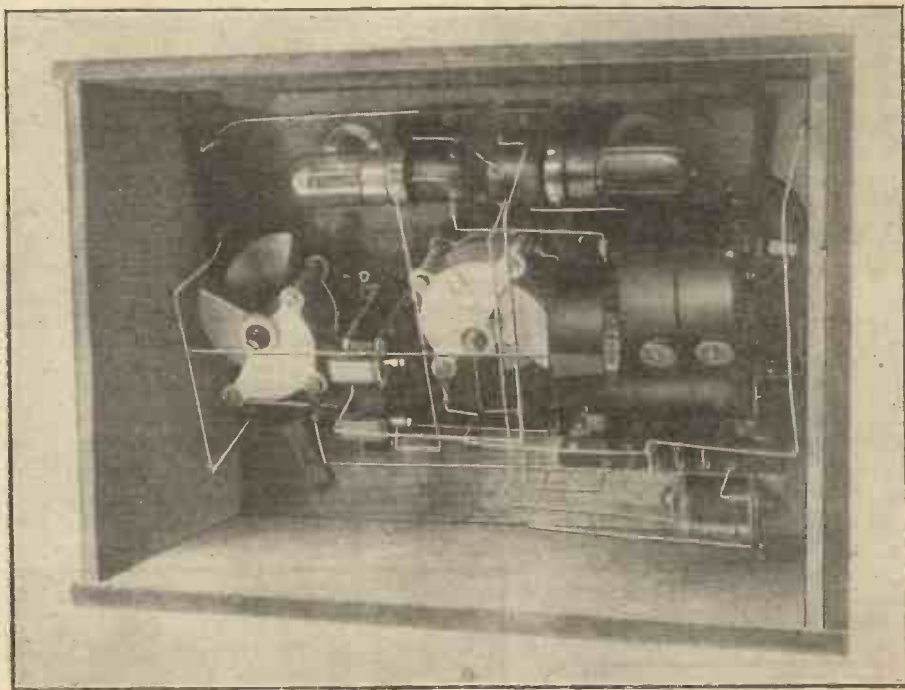
As soon as the wiring is completed the aerial, earth, batteries and phones may be connected up and the valve inserted for a preliminary test. Suggestions for suitable coils are: aerial coil, a No. 25 or No. 35 (or their equivalent); grid coil, No. 50; plate coil, No. 50 or No. 75.

Couple the aerial and grid coils close together and set the plate coil at right angles to the other two coils. Set the reaction condenser at zero. Turn on the filament current and search for signals by very slowly turning the grid-coil tuning condenser dial. Having picked up the local station, turn the reaction condenser dial to see whether the set oscillates, which in all probability it will not do. Now bring the plate coil gradually nearer to

the other coils until the set just starts to oscillate. This will be indicated by a slight hissing sound in the phones. The plate coil should next be separated from the other coils by a slight amount and it will now be found that, by turning the reaction condenser the set will once more start to oscillate. The three coils should be left in this position. Tuning is now very simple. Signals are picked up by the tuning dial and strengthened by merely turning the reaction dial.

ANOTHER MAGIC BOX

THE newspapers have recently been greatly interested in the so-called Abrams box, which is alleged to cure practically any variety of sickness by tuning-in to the electronic frequency of the diseased cells and administering high-frequency current of the appropriate wavelength.



Back View showing Receiver in Case.

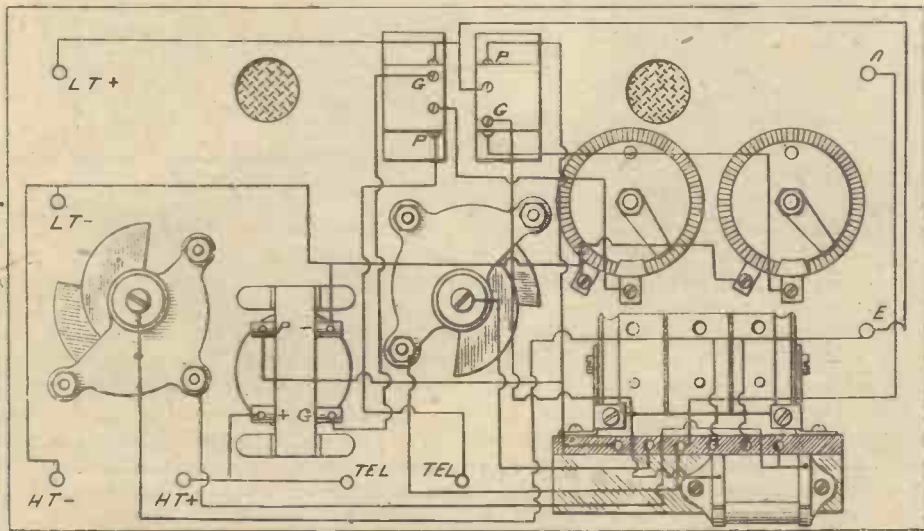


Fig. 4.—Wiring Diagram.

A rival to Abrams has now appeared in the person of Dr. G. R. Rogers, formerly of Texas. He has designed a mystic contrivance called the Neurophonometer, by which he claims to be able to deduce the "variance from the normal capacity and inductance of the brain, which generates the life-force of the body." He is also prepared to determine the patient's electronic frequency (each person having a specific and characteristic frequency of his own) and thence to deduce the "exact point of interference with the transmission of the vital vibratory fluid."

It is fairly clear that if the electronic type of medical treatment develops much further, every doctor will have to become sufficiently expert in wireless methods to look down upon mere super-hets, neutrodynes, and the like. M. A. L.

SIDELIGHTS ON THE SUPER CIRCUITS

The second and concluding article dealing with the principles of super circuits.

LITTLE further progress in the design of receivers with super circuits was made during the war period, apart from the design by Marius Latour of various types of multi-valve reflex circuits in which a valve detector was used in place of the crystal. The advent of broadcasting, however, caused a keen revival of interest in dual amplification. At a time when valves were an expensive luxury, the use of reflex meant a considerable saving in the number of amplifying stages required to cover a given range, or to operate a loud-speaker. As a result many detail improvements were effected, chiefly with the object of improving stability and making the circuit less difficult to handle.

The Voigt Circuit

Fig. 3 shows one arrangement, due to Mr. Voigt, in which no low-frequency transformer is required, thus eliminating one of the most expensive of the circuit components. The amplified radio-frequency currents are transferred to the crystal K across an air-cored H.F. transformer T. The rectified currents from the crystal are fed back across a condenser M, which is inserted directly in the grid circuit so as to apply corresponding L.F. variations between the grid and filament of the valve as before.

The Armstrong Reflex

Fig. 4 represents a one-valve reflex circuit due to Professor Armstrong. In this case advantage is taken of the fact that H.F. currents (as well as rectified cur-

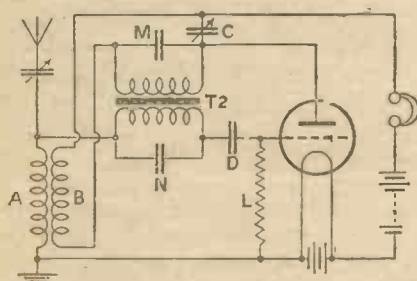


Fig. 4.—The Armstrong Reflex Circuit.

rents) are always present in the output circuit of a detector valve. By using the H.F. currents as a means of introducing ordinary retroaction, and at the same time feeding back the low-frequency components to the grid circuit for reamplification, the efficiency of a single detector valve can be greatly increased.

The valve acts normally as a detector by virtue of the grid condenser D and high-resistance leak L. The tuned-plate

circuit comprises an inductance coil B and variable condenser C, and also the primary of an L.F. transformer T₂, the secondary of which is inserted directly in

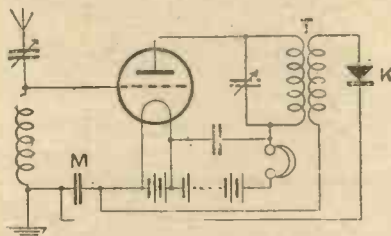


Fig. 3.—The Voigt Circuit.

the grid circuit. By-passing condensers M, N shunt the windings of the L.F. transformer in order to give free passage to the radio-frequency currents.

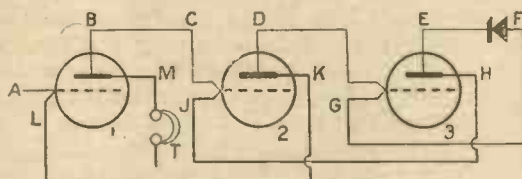


Fig. 6.—The Grimes Inverse Feed-back Circuit.

Ordinary reaction takes place between the H.F. currents in the coil B and those in the aerial or grid coil A, whilst there is a simultaneous feed-back of the rectified currents across the transformer T₂ for further amplification.

The Round Feed-back

Fig. 5 shows an interesting variation in the standard method of feed-back, attributed to Captain Round. Instead of feeding both the high- and low-frequency currents to the grid in series, the different currents are applied in parallel through separate paths.

Incoming energy from the aerial reaches the grid via the condenser C, a choke coil S being inserted as shown across the grid and filament. This prevents the passage of radio-frequency currents, so that the coil A is not short-circuited. The rectified currents from the crystal K are fed across the transformer T₂ as usual, but cannot reach the grid via the coil A, as before, because that passage is now blocked by the condenser C. Instead they flow through the choke coil S, which offers very little resistance to their passage, and so reach the grid by a separate path from that traversed by the high-frequency input. The parallel-feed method has proved very useful as a means of stabilising the circuit by preventing leakage interaction, and consequently low-frequency "noises."

The Grimes Inverse Feed-back

One of the latest improvements in reflex circuits is that known as the Grimes "inverse feed-back" illustrated diagrammatically in Fig. 6. When several valves are used in series, each carrying a simultaneous load of high- and low-frequency currents, it is obvious that where the direction of travel through the set is the same for both frequencies (from left to right) the valves at the right-hand end of the receiver will be overloaded relatively to those at the left-hand end.

In order to avoid this defect the low-frequency sequence is reversed relatively to that of the high-frequency currents. For instance, the radio-frequency currents follow the path ABCDE, passing through the valves in the order 1, 2, 3, as usual. The rectified currents from the detector K, on the other hand, are led back through the valves in the order 3, 2, 1, following the path FGHIJKLM, the telephones T being located in the plate circuit of the valve 1, as shown.

B. A. R.

THE AERIAL WIRE

IF your aerial has been up for a year or more the surface of the wire has in all probability corroded, due to the action of the weather, and as radio-frequency currents travel on the surface of the wire, loss of signal strength may often be due to this corrosion.

This trouble is particularly prevalent in

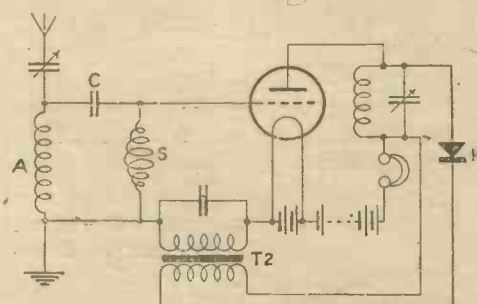


Fig. 5.—The Round Feed-back Circuit.

large cities where the air is contaminated by soot and fumes from manufacturing plant. It is, of course, desirable to keep the wire in quite a clean condition always, but this would necessitate a clean-up at least weekly.

The use of enamelled wire for the aerial is therefore highly desirable, as the enamel protects the surface of the copper from gases and other corrosive elements in the atmosphere.

S. J. M.



THE Copenhagen broadcasting station has installed a relay plant on board the ss. *Aalborghus*, which retransmits the main station's 775-metre transmissions on 445 metres. This novel relay station operates on Tuesdays, Thursdays and Saturdays, when the vessel is lying in Aalborg harbour.

5 XX is being received on the other side of the Atlantic well enough to relay, and an early attempt to carry this out is to be made by the Radio Corporation of America.

Some idea of the weight of a broadcast transmitting aerial can be gained when it is stated that each of the insulators usually weighs 10 lb., while the swivel shackles, two in number, weigh 20 lb. each.

Scores of applications have been received by the B.B.C. from people who wish to become wireless inspectors.

The Transmitters' Section of the Bristol and District Radio Society has arranged to carry out various tests and experiments with a view to minimising the oscillation nuisance in Bristol and district.

When the aerial of 5 IT was lowered recently it was found that nearly an eighth of an inch of soot had collected on the insulators and wire.

Wireless programmes are to be relayed through a loud-speaker to a recreation room of the Storthing building for the entertainment of Norwegian M.P.'s while off duty.

A military band programme will be given on March 27 by the band of H.M. Grenadier Guards, the artistes being Miss Florence Holding (soprano), Miss Adelina Leon ('cellist), and Miss Leslie Elliott (entertainer at the piano).

Railwaymen at Nine Elms locomotive depot have given a three-valve wireless set to St. Thomas's Hospital as a thank-offering for the care bestowed on their comrades when in hospital.

Lieut.-Colonel Moore-Brabazon, M.C., Parliamentary Secretary to the Ministry of Transport, has installed a two-valve set, with an inside aerial, in his room at the House of Commons.

"The Roosters" will broadcast a series of cameos on March 23. In the last half-hour's programme, commencing at 10 p.m., the orchestral items will be separated by a group of original Cockney sketches given by Miss Mabel Constanduros.

The British Broadcasting Co. warns the

public that persons representing themselves to be B.B.C. inspectors are calling on owners of receiving sets and attempting to get possession of the sets on various pretexts.

The German authorities are losing close on 6,000,000 marks a year owing to the large number of unlicensed receivers.

A member of the Wireless Retailers' Association states that if the trade got a free hand they could have a broadcasting station erected in the Free State before next September.

The Bishop of Southwark says that listening to broadcast religious services will never take the place of worship within a church.

The Universala Esperantista Asocio (International Esperanto Association) has decided to build its own broadcasting station in Geneva. The total cost—a matter of some 90,000 Swiss francs—has been almost entirely subscribed by members of the association.

Belgian wireless experimenters are up in arms against the post and telegraph authorities, who have stated their intention to tax low-power transmitters to the extent of 300 francs per annum. The Belgian amateurs have combined to lodge a protest in view of the fact that their French colleagues are only asked to pay 100 francs yearly for the same type of licence.

Arrangements are being made to increase the power of the Hamburg station to 9 kilowatts.

The first hour of the programme from 5 XX on March 19 will be given by Robert Carr and his "Georgeans" concert party. Part of the Hallé concert from the Free Trade Hall, Manchester, will be relayed at 8.30 p.m.

The new Algerian broadcasting station, which is being erected at Bouzareah (in the neighbourhood of Algiers) will be ready for tests in the course of a few weeks. The wavelength has not yet been fixed, and tests will be made on lengths varying between 300 and 450 metres. This station will broadcast local programmes from its own studio in Algiers.

During the course of a trunk call between Perth and Dundee recently the conversation was interrupted by what the Dundee man thought was singing outside the other speaker's door, while at Perth it was believed a gramophone was playing at the Dundee end. It was ultimately dis-

covered that the music was a broadcast item from the Glasgow studio.

Questions have been asked in Parliament as to whether detailed financial accounts of the B.B.C. will be published showing the number and salaries of the staff employed, the number and remuneration of the artistes employed, and generally how the income of the company has been expended.

Mr. Ammon is to ask the Postmaster-General in Parliament whether he has any evidence that the British Broadcasting Company is overstaffed, and if he will state the full details and remuneration of the staff employed.

The second reading of the Wireless Telegraphy and Signalling Bill has been postponed until after Easter to enable the Post Office authorities to confer with the interests concerned, with a view to revision of the Bill's terms.

Electrical engineers are engaged in wiring up in St. Mary's Church, Nottingham, the necessary apparatus for broadcasting. The first service will be relayed from the church at 8.15 p.m. on March 29.

Transmitting station U1AVY, belonging to Mr. G. D. Rogers, of New Bedford (Mass.), has received in broad daylight signals transmitted from Castres (Tarn) by M. Sacazes on wavelengths of 100 and 47 metres.

PTT, Paris (450 metres), began an Esperanto course on March 12.

The St. Malo fishing fleet, which goes to Newfoundland waters, has three ships fitted with wireless this year. Last year only one vessel was equipped with wireless apparatus.

Radiopol, the Warsaw broadcasting station, is now testing daily on 375 metres between 17.00 and 18.00 G.M.T.

Broadcasting stations are being erected at Kovno (Lithuania) and at Riga (Lettland).

The East Fife Musical Association has presented a four-valve receiving set with loud-speaker to the inmates of Thornton Poorhouse.

A Gecophone three-valve cabinet-deluxe model receiving set, complete with loud-speaker and frame aerial, has been supplied to H.R.H. the Crown Princess of Roumania. This set was used to entertain Her Royal Highness whilst on a visit to London.

De Groot and the Piccadilly Orchestra have for months retained a wonderful popularity in evening programmes. Their programme for the afternoon of March 22 will therefore be anticipated with exceptional interest; it will provide items all of which have been specially requested by many listeners, including the "Rosenkavalier" Waltz, the Fantasy from *Manon*, an effective selection of Russian folk tunes, Liszt's "Liebestraum," and finally Liddle's "Abide with me."

Names famous
in combination.
No. 6.



David and Jonathan

IN the gallery of fame are many personages each of whose names is inevitably recalled with a certain other. The association of David and Jonathan is a notable instance.

An outstanding modern example is the conjunction of the names MARCONI and OSRAM. These on a wireless valve are your assurance of perfect design and efficiency in performance.

Read the 40-page wireless book, The Book of M.O.V. Free from your dealer or The M.O. Valve Co., Ltd., Hammersmith, London, W.6.

NEW REDUCED PRICES.		
For 2-volt Accumulators.		
Purpose.	Type.	Price.
†G.P.	D.E.R.	18/-
†L.S.	D.E.G.	22/6
For 4-volt Accumulators.		
G.P.	R.	11/-
G.P.	*D.E.3.	21/-
L.S.	D.E.4.	26/-
For 6-volt Accumulators.		
G.P.	R.3.V.	11/-
L.S.	D.E.5.	39/-
L.S.	*D.E.5b.	50/-
L.S.	L.S.5.	50/-
†G.P. = General Purpose.		
†L.S. = Specially suitable for low frequency amplification for Loud Speakers.		
*Can be used with Dry Batteries.		
For Resistance - capacity Amplification.		

MARCONI VALVES

MADE AT THE OSRAM LAMP WORKS

Sold by Wireless & Electrical Dealers, Stores, etc.

ANNOUNCEMENT OF THE M.O. VALVE CO. LTD.



GET THE VALVE
IN THE PURPLE BOX!



Pipless Valves

SIR,—With reference to the remarks by THERMION on page 397 of No. 144, we would like to point out that we have been manufacturers of pipless valves for the past five months. These are the B₃ and B₅ types. Up to the present our B₄, B₆ and B₇ valves have not been made pipless. —BRITISH THOMSON-HOUSTON CO., LTD. (London, W.C.2).

Amateur Transmission

SIR,—The Postmaster-General's attention has been called to the articles in AMATEUR WIRELESS entitled "Transmission Step by Step," number one of which appeared in the issue dated February 21. He is advised that the use of a buzzer transmitter in the way suggested would undoubtedly cause serious interference for some distance around the neighbourhood in which it was being operated, even when unconnected with an aerial, and that more serious interference would result from any attempt of an experimenter to connect the apparatus with an aerial in accordance with the diagrams of the article.

The author of the article also appears to be under the misapprehension that spark transmission is permissible on a wavelength of 440 metres outside broadcasting hours; and he proposes to describe a simple spark transmitter in a later issue. I am therefore to point out that the use of spark transmission is strictly forbidden at any time under all Post Office experimental licences.

In all the circumstances I am to ask, in the general interests of the large body of users of wireless apparatus, that the facts may be explained in an early issue of the journal and the readers warned also that a receiving licence does not cover the use of wireless-sending apparatus in any shape or form.—F. W. PHILLIPS, General Post Office, London.

SIR,—With reference to the letter from the General Post Office, dated March 7, 1925, which you submitted to me as the writer of the article, I note that the Postmaster-General is advised that the use of a buzzer wavemeter circuit would undoubtedly cause serious interference.

I have no comments to offer on this paragraph except to say that so far as my knowledge goes my own buzzer wavemeter cannot be heard on a three-valve set stationed ten yards away, and I cannot see that the P.M.G. has any jurisdiction

over the use of a buzzer wavemeter, which was one of the circuits referred to, if such is suggested.

As regards the second paragraph, nothing in these articles should be read as an incitement to transmit messages by wireless telegraphy without first applying to the Postmaster-General for permission so to do. The Wireless Telegraphy Act of 1904, paragraph 2, section 1, lays down that "where the applicant for a licence proves to the satisfaction of the Postmaster-General that the sole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy, a licence for the purpose shall be granted subject to such terms, conditions and restrictions as the Postmaster-General may think proper. . . ." It is maintained by many experimenters that there is a field still existing for useful experiments in spark transmission, especially on short waves, and it seems that should the applicant prove to the P.M.G. that such a field exists, the P.M.G. has no alternative but to issue the required licence.

My observations concerning transmission after broadcast hours were prompted by consideration for broadcast listeners, the wavelength of 440 metres being that allocated by the P.M.G. for experimental transmission outside broadcast hours.—A. J. C. (London).

"Seeing Music"

SIR,—In No. 144 E. E. H. takes exception to my original letter under the above heading in No. 141, and states: "It is perfectly obvious that the needle of a milliammeter in the H.T. lead of a L.F. amplifier would fluctuate. If there were no fluctuations no signals would be heard, as it is the variation in the steady plate current that affects the telephone diaphragm."

May I be allowed to point out that when voltage variations of speech or music frequencies are impressed on the grid of a valve they produce a variation in the normal anode current. If this anode current variation is confined to the straight portion of the characteristic of the valve it will be in linear ratio to the applied grid voltage. The milliammeter is a D.C. instrument, and is not therefore responsive to current variations of such frequencies. If, however, the applied grid volts due to the signal are of such values that the anode current is brought to the curved portion of the characteristic, a rectifying effect is produced and a movement of the

needle of the milliammeter may occur. In addition to this rectifying effect, the conditions governing this deflection are, of course, very largely those of the amplitude, the time period of the grid-volts swing, and both the inertia of the moving system of the instrument and the artificial damping.—C. E. W. (Parkstone).

SIR,—I am surprised to see in your columns (Correspondence, page 412, No. 144), under the heading "Seeing Music," that in these enlightened days people think that the reading of a milliammeter in the H.T. lead of an L.F. amplifier would fluctuate with speech or music. It is, or should be, well known that speech or music in electrical terms consists of alternating currents of various frequencies, and an ordinary direct-current milliammeter does not respond to alternating currents.

It is a criterion of linear amplification by valves that the D.C. or mean plate current should not vary when an alternating current is superimposed upon it.

I should like to point out that in our broadcasting stations we use, on the average, ten stages of L.F. magnification. We have meters in the various circuits, and under proper conditions there is not a flicker on these needles.—P. P. ECKERSLEY.

[This correspondence is now closed.—Ed.]

A New Peruvian Station

SIR,—As it will be of interest to your numerous readers, I enclose a cutting from the *West Coast Leader*, Lima, Peru, regarding the new broadcasting station there (OAB) which will commence operations this month.

Some of your readers will doubtless like to try to pick up the programmes from this new station, and on this point I would mention that Lima time is five hours behind Greenwich.—F. C. S. (London, S.W.).

[The wavelength of the new station is 360 metres, and the station is the property of the Peruvian Broadcasting Co., which has been granted a concession by the Peruvian Government.—Ed.]

Other Correspondence Summarised

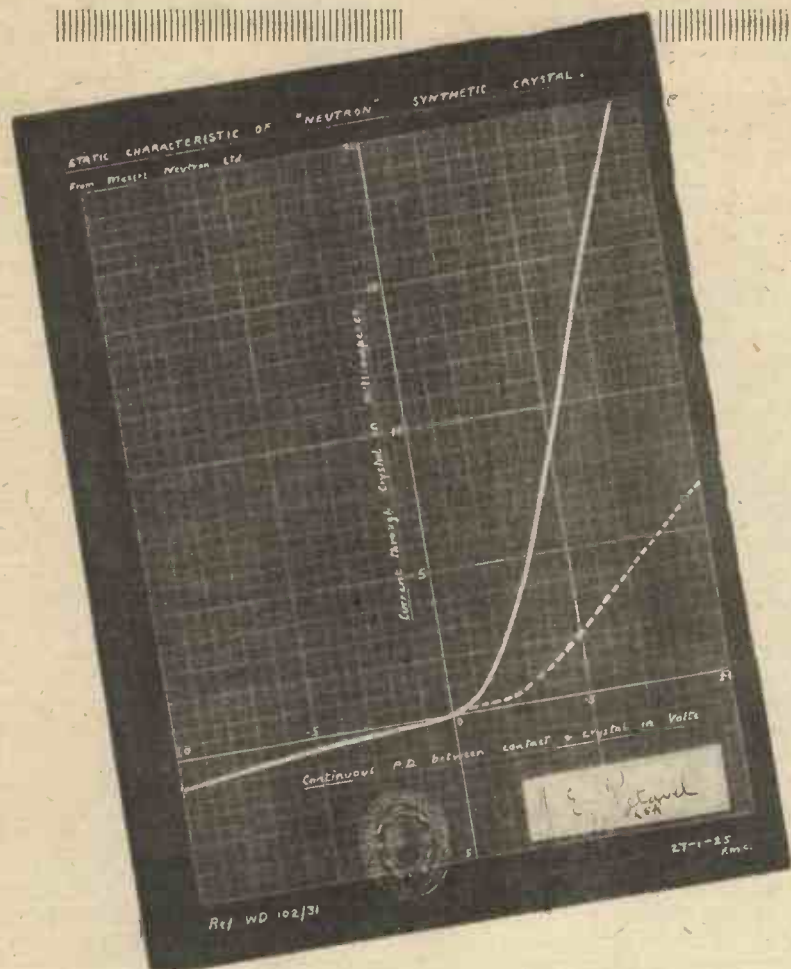
H. W. T. (Mildmay Park) would like to make known the kind treatment he received from the Cossor Valve Co., Ltd., of Highbury. His faulty P₂ valve was immediately replaced.

J. H. S. (East Sheen) writes us that reception in his district is completely spoilt by the oscillation fiend.

J. A. P. (Horne Hill) regularly receives WPG.

W. J. H. (Ulster) has received all the main B.B.C. stations and fifteen Continental stations on his two-valve set.

A. C. (Bolton) considers that the unequal conductivity of the earth is responsible for a great deal of the variation in broadcast reception.



THIS is a photographic reproduction of a curve supplied by the National Physical Laboratory, Teddington—part of a complete report, the other sections of which will be published from time to time. The only addition made to this photograph is the DOTTED curve, which is explained below.

What this Curve means to every Crystal user—

THE Neutron Curve is the solid white line. Vertically, the reading is representative of the strength of current operating your headphones; horizontally, the reading represents the strength of the incoming signal.

The dotted Curve represents an average taken from six Curves of other Crystals

which have been published in the Press; and since these other Curves have been obtained by similar methods of testing, it will be seen that Neutron Crystal passes more than twice as much current to operate your headphones.

Inferior Crystals (dotted line) whilst sensitive to strong signals, are insensitive to weak signals, as shown by the "kink" in the lower part of the dotted "curve." No known crystal is proportionately sensitive to weak signals as to strong signals; in other words, no crystal shows

the ideal straight line; but it is claimed that Neutron Crystal presents the nearest approach to the "straight line curve" that it is possible to attain. Neutron detects, and makes audible in your 'phones, weak, distant transmissions that other Crystals are powerless to detect.

A Laboratory proof of what every Neutron user knows; great sensitivity, particularly to weak distant signals.

Put Neutron Crystal in your Detector, and you will discover that not only does Neutron give you the fullest possible volume from your local Station, but also its remarkable sensitiveness enables you to listen (if your aerial equipment and other apparatus are efficient, of course) to two, three, four, or even five stations at will.

Sold by the Best Radio Dealers. Packed in tin, with silver cat-whisker. Insist on Neutron, in the Black and Yellow Tin. If unable to obtain, send 1/6 with dealer's name, and this wonderful crystal will be mailed by return ... 1/6

NEUTRON

TRADE MARK

Concert Tested and Guaranteed Radio Crystal

Sole Distributors for United Kingdom:—V. ZEITLIN & SONS, 144, THEOBALD'S ROAD, LONDON, W.C.1. 'Phones: Museum 3795 & 6841
Produced by:—NEUTRON, LTD., Sicilian House, Southampton Row, London, W.C.1. 'Phone: Museum 2677



"A TALK WITH CAPT. ECKERSLEY" (continued from page 482)
ception of each of our stations in turn. The solution of the problem lies in the 'superhet,' and I think the public will soon realise that more selective receivers are desirable."

Daventry

"What power do you hope to get from the new Daventry station?"

"Twenty-five kilowatts. This will cover quite an appreciable range, and should add greatly to the reception by crystal sets in districts somewhat remote from a main or relay station. We shall not do away with our relays, even should we eventually increase the power of our main stations. The relays have local interests, and in any case we do not aim at one programme for the United Kingdom."

"What are your views regarding the relaying of Continental programmes? Some of the foreign stations have officially stated that this would be an accomplished fact in the very near future."

"When foreign engineers have called here to study our organisation this matter has frequently cropped up, and in every instance I have stated my willingness to make the necessary experiments. On the other hand, I consider that they are somewhat too optimistic as to the success of the results in the present circumstances. Relaying is certainly possible, as we have already proved; but there is considerable interference on this side from morse

stations, one of which—I will not mention names—is particularly troublesome. In some instances it can, and has, wiped out our reception entirely, and until some improvement has been made in this respect the trouble will persist. We shall persevere in our efforts, and I have no doubt that at some period—it may be early, it may be remote—it will be possible for the possessor of a crystal set to hear concerts from Vienna, Stockholm, Madrid, Rome or elsewhere, on one and the same evening, through the local station. But when I cannot definitely say."

"When Daventry is opened will you retain the same wavelength?"

Captain Eckersley gave me just one look.

"I fought for the 1,600 metres for quite a long time, and now I've got it I intend to keep it, if I possibly can."

"What about Radio-Paris and the interference from Chelmsford?"

"I deeply regret it. I have never desired to spoil the reception of that station on this side."

"There is a question of Radio-Paris reducing its wavelength to 1,125 metres owing to incessant morse interference from PCH (Scheveningen). How would this affect matters?"

"It would be all to the good. You really must excuse me now. I—"

"You've been very good," I graciously replied as I withdrew the three chairs. "Just one more question. Are you in love with your new 'opening note,' a noise

which resembles the tuning of a very 'tinkly' piano?"

"No, and we are seeking something better. It has its advantages, as it allows the listener to tune his receiver and adjust his loud-speaker."

"It is hardly worthy of 2 L O, and not in keeping with Big Ben," I continued.

"Let your readers submit suggestions," replied Captain Eckersley, rising to show me the way out. "I will consider any practical idea."

JAY COOTE.

SCHOOLS RADIO SOCIETY

THE Schools Radio Society has decided to hold an exhibition of wireless work in schools, at some date to be decided later on, in the hall of the Beaufoy Institute, London. Members of the society will exhibit apparatus, and it has been decided to extend an invitation to all L.C.C. schools and technical institutes interested in the scheme.

The object is to acquaint educationalists and the public who are interested in the work which is now carried on in schools.

The exhibition will probably be opened by some prominent authority in the wireless world. A prize of five guineas has been offered for the best show of school radio apparatus.

It is hoped that the result of this exhibition will be an increased interest in the whole subject of wireless as part of the school curriculum.

K SQUARE-LAW CONDENSERS

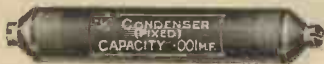
Extra stout vanes (19 gauge), ebonite end pieces; delightfully smooth movement, beautifully finished knob, and 3-inch graduated dial—these are some distinctive features of the "K" variable condensers.

The unique shape of the plates give the finest possible Square-Law tuning.

Capacity	Without Vernier	With Vernier
0.001 mf.	10/-	12/6
0.0005	8/3	11/6
0.0003	7/9	10/6
0.0002	7/3	—
0.0001	6/6	—



K TUBULAR FIXED CONDENSER



The latest Radio success—a tubular fixed condenser having a minimum of space, and ideal for wiring in modern circuits. Fixing brackets supplied with each condenser.

0.001 0.003 } 2/- each. 0.0001 0.0003 } 1/9 each.
0.002 0.006 } 0.0002 0.0005 }

Write, Phone or Call for our Latest Catalogue.

WATSON

BROS., LTD.

12-14, Great Queen St., Kingsway, W.C.2.
Phone: Gerrard 575/6. 'Grams: Zywaseng, Westcent.

G.W.I. Renew your Valves

THE FIRST OFFERED—NEARLY 3 YEARS AGO. EXTENSIVE ADDITIONAL VALVE MAKING PLANT—which includes the latest type appliances—IS NOW IN PRODUCTION.

ALMOST ANY TYPE VALVE CAN NOW BE SATISFACTORILY RENEWED

GUARANTEED TONE AND POWER PERFECT

STANDARD TYPES, Bright Emitters from 6/6 each, Cossor 7/-

DULL EMITTERS, 25 Amp. ... 10/6 " Carriage

'06 Amp. ... 12/6 " paid

WECOVALVES ... 12/6 "

POWER VALVES ... from 15/- "

Terms cash with order. Delivery promptly according to type.

G.W.I. LTD.,

THE PIONEER VALVE RENEWAL SPECIALISTS

43, Grafton Street, Tottenham Court Road, London, W.1

Agents wanted everywhere. Good terms, guaranteed deliveries.

WHY SPEND MONEY ON EXPENSIVE COILS when you can wind them yourself on the

"WESTMINSTER"

Adjustable coil-winder and save pounds. You can make coils of any size or weave on this machine. PRICE 5/-



If your local retailer cannot supply your order direct and send his name and address to:

WATSON, JONES & CO.
6 St. Stephen's House, Victoria
Embankment, London, S.W.1.

'Phone:
Victoria
7571.

Wholesale only.

FILAMENT SAFETY AND VERNIER CONTROL

The Efesca Vernistat makes your valves safe against an accidental burn-out through too rapid switching-on, because three complete revolutions of the knob are required to bring in or out the whole 5 ohms resistance. The Vernistat provides the most delicate filament control yet invented and should be used wherever a separate rheostat is employed for H.F. and detector valves. Ask your wireless dealer to show you the complete series of

EFESCA

ONE HOLE FIXING COMPONENTS

WHOLESALE ONLY:

FALK STADELMANN & CO., Ltd.

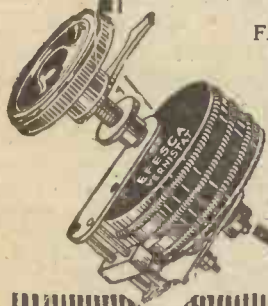
Efesca Electrical Works,

83, 85, 87, Farringdon Road, London, E.C.1.

And at Glasgow, Manchester and Birmingham.

EFESCA VERNISTAT (Patent)

Unique Construction. Smooth and silent in operation. Resistance 5 ohms, 6/- each, as illustrated.



IT'S THE
CARTRIDGE
THAT
COUNTS



PERFECTION IN VALVE CONTROL

AS INCORPORATED IN
A.W. Ultra Selective
FOUR-VALVE, 21/2/25.

"WIRELESS CONSTRUCTOR"
TWO-VALVE AMPLIFIER, March, 1925.

Suitable for all circuits.

0.5 ohms 0.10 ohms 0.20 ohms 0.30 ohms

3/6. 3/9. 4/- 4/3.

also made as Grid leak.

Anode Resistance. Loud Speaker
Modulator.

From all high-class dealers, or direct from

ENTERPRISE MFG. CO., LTD.,
GRAPE STREET, W.C.2.

Telephone: Gerrard 3018.

Wireless is attracting all men. The Amateur is entering the field in great numbers, and he wants to know all about it. He will require Materials, Parts, Tools. He will also want to sell surplus material.

"AMATEUR WIRELESS"

is out to cater for this class of reader, who will be eager for knowledge and bargains. To meet him, use the Sale and Exchange columns, which he is sure to search. Rate 4d. per word, 4s. minimum, prepaid. Latest date Thursday mornings.

Address:

The Advertisement Manager,
"Amateur Wireless,"
La Belle Sauvage,
Ludgate Hill, London, E.C.4



This ends your Search for Sensitive Spots

SYLVEREX ends your search for full sensitiveness in a Crystal: it is sensitive all over and right through; and in addition it carries the fullest possible guarantee, which is made possible by our exceedingly stringent methods of selecting, testing and re-testing. You can rely upon it that whenever you see the distinctive hand-and-crystal Trade Mark, the Crystal packed under it is fully efficient and already tried out on actual Broadcasting before being sealed in its air-tight container.

Sylverex

RADIO CRYSTAL

Silver-Toned Silver-Alloy.

In airtight container, with Special Cat-whisker and full directions. If you cannot obtain Sylverex from your Radio Dealer, send P.O. 2/- direct, with your Dealer's name and address, and we send the Crystal by return, post free. Remember, whether you buy Sylverex from your Dealer or

direct, you test it at our expense: if you are not satisfied in every way your money is returned.
Produced by SYLVEREX LIMITED,
25, Victoria Street, London, S.W.1.
TRADE ENQUIRIES INVITED.

WHEN YOU BUY

an L.F. Intervalve Transformer, you should know the factors governing its EFFICIENCY. They are:—

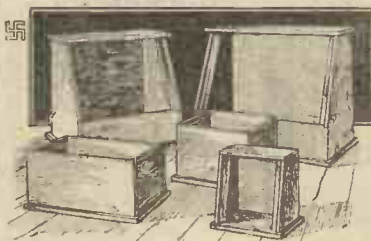
1. A sound closed Iron Core of ample dimensions leaving the absolute minimum of air space.
 2. A long Primary Winding, having correct impedance with negligible variation throughout the range of audible frequencies.
 3. Secondary having Turns relative to Primary, times the steps up required.
 4. Perfect Insulation.
 5. The whole correctly screened with Iron, and thorough protection of the inside from dampness.
 6. Self Capacity as low as possible.
- Add to these factors an outside finish that leaves nothing to be desired, an earthing nut fixing, a clearly marked terminal board with large terminals, in neat leather cover, and you have the distortionless, soundly constructed, British, guaranteed

"RENOVN"

30,000 TURN AMPLIFIER CHOKES. 7/6

RATIOS: 5:4:3:2: TO 1. PRICE 8/4 POST FREE.

We are still repairing any make of L.F. Transformer for 5/-, post free.
TRANSFORMER REPAIR CO., Hav St., Portsmouth



FREE Send postcard for illustrated list of panel sizes, prices and full details. Free on application to address below.

HOBBIES LIMITED


(Dept. 76) Dereham, Norfolk.

Branches at London, Glasgow, Manchester, Birmingham, Sheffield, Leeds, Southampton and Brighton.

CABINETS READY TO MAKE

Parcels of rich mahogany cut and planed to size and thickness to make up a fine cabinet. Price one third lower than bought cabinets.

Full instructions enclosed for any amateur to make up. To take panels from 6 1/2 x 7 ins. to 16 x 9 ins.



Unique in tonal purity

THE hollow and **un-**
I natural reproduction
which characterises so
many Loud Speakers is
entirely absent in the
BROWN.

Instead, there is an ex-
ceptional volume and
roundness of tone which
is a revelation to all who
think that Loud Speaker
reproduction is mechanical
and untrue-to-life.

If you are still sceptical
it must be because you
have never heard the
BROWN — the first
Loud Speaker ever in-
vented for Wireless.

Prices

H1. 21 inches high.
120 ohms £5:5:0
2000 ohms £5:8:0
4000 ohms £5:10:0

H2. 12 inches high.
120 ohms £2:5:0
2000 ohms £2:8:0
4000 ohms £2:10:0

Q. The de-luxe model
£15:15:0 in all
resistances

S.G. BROWN LIMITED
Victoria Road, N. Acton, W.3

Showrooms:
19 MORTIMER STREET, W.1
15 MOORFIELDS, LIVERPOOL
67 HIGH ST., SOUTHAMPTON

Brown
Wireless Apparatus

Gilbert Ad. 2485.



NOTE.—In the following list of transmissions these abbreviations are observed: con. for concert; lec. for lecture; orch. for orchestral concert; irr. for irregular; m. for metres; and sig. for signal.

GREAT BRITAIN

The times given are according to Greenwich Mean Time.

London (2LO), 365 m. 1-2 p.m., con.; 3-15-3-45 p.m., lec.; 4-5 p.m., con.; 5-30-6-15 p.m., children; 6-40 p.m. talk; 7-30 p.m., time sig., news, talk; 7-30-9-30 p.m., music; 9-30-10-0 p.m., time sig., news, talk; 10-0-10-30 p.m., music. Tues. and Thurs. the Savoy Bands are relayed until 11-0 p.m., and on Sat. until midnight. Sat. only, 4-5-30 p.m., con.

Aberdeen (2BD), 495 m. **Belfast** (2BE), 435 m. **Birmingham** (511), 475 m. **Bournemouth** (6BM), 385 m. **Cardiff** (5WA), 351 m. **Glasgow** (5SC), 420 m. **Manchester** (2ZY), 375 m. **Newcastle** (5NO), 400 m. Much the same as London times.

Bradford (2LS), 310 m. **Dundee** (2DE), 331 m. **Edinburgh** (2EH), 328 m. **Hull** (6KH), 335 m. **Leeds** (2LS), 346 m. **Liverpool** (6LV), 315 m. **Nottingham** (5NG), 326 m. **Plymouth** (5PY), 335 m. **Sheffield** (6FL), 301 m. **Stoke-on-Trent** (6ST), 306 m. **Swansea** (5SX), 481 m. **Chelmsford** (high-power station), 1,600 m.

Experimental transmission every Monday at 10-30 p.m. from one or other main or relay station.

CONTINENT

The times are according to the Continental system; for example, 16.30 is 4.30 p.m., and 08.00 is 8 a.m. (G.M.T.).

AUSTRIA.

Vienna (Radio Wien), 530 m. (1 kw.). Daily: 08.00, markets (exc. Sun.); 10.00, con.; 12.05, time sig.; 12.20, weather; 14.30, Stock Ex. (exc. Sun.); 15.00, news, con.; 15.10, children (Wed.); 17.00, lec. (Tues., Wed., Thurs., Sat.), children (Mon., Fri.); 17.20, women (Tues.); 18.00, news, weather; 19.00, time sig., con., news; 21.00, dance (Wed., Sat.).

Graz (relay), 404 m. Testing.

BELGIUM.

Brussels, 265 m. (1½ kw.). 17.00, orch., children (Wed. and Thurs.); dance (Tues. and Sat.); 18.00, news; 20.15, lec., con., news (opera, Mon. and Wed.).

Haeren (BAV) (250 w.), 1,100 m. (250 w.). 13.00, 14.00, 16.50, 18.50, weather.

CZECHO-SLOVAKIA.

Kbely (OKP), 1,160 m. (1 kw.). Weekdays: 09.00, 10.30, 12.30, 16.00 and 17.00, con. (Wed. and Sat.); 18.30, lec., news, weather, con. (time sig., 19.00), daily; 10.00, con. (Sun.).

Komarov (OKB), 1,180 m. (1 kw.). Weekdays: 13.00, Stock Ex., weather, news; 17.30, con. (Thurs.); 09.00, con. (Sun.).

Strasnice 430 m. (1 kw.). Testing.

DENMARK.

Copenhagen (Kjobenhavns Radiofoni station), 475 m. (1 kw.). 18.35, notices, lec., con.* (Tues., Thurs., Sat.). * This con. is also relayed by the Aalborg ship station on 510 m.

Lyngby (OXE), 2,400 m. and 2,700 m. Weekdays: 18.20, news, Stock Ex. (2,700 m.); 20.00 and 21.00, news, weather, time sig. (2,400 m.). Sundays: 15.00 and 20.00, news (2,400 m.).

Ryvang, 1,025 m. (1 kw.). 19.00, con., news (Tues., Wed., Thurs., Fri.).

FRANCE.

Elfiel Tower, 2,600 m. (6 kw.). 06.40,

weather (exc. Sun.); 11.00, markets (exc. Sun. and Mon.); 11.15, time sig., weather; 14.45, 15.35, 16.30,* Stock Ex. (exc. Sun. and Mon.); 18.00, con. (not daily); 18.45, Paris fashions (in English)—temp—(Wed. and Sat.); 19.00, weather; 20.30, con. relayed from PTT (Fri.); 22.10, weather (exc. Sun.). Frequent tests on 1,500 m.

* On 1st and 15th of each month at 16.45.

Radio-Paris (SFR), 1,780 m. (3-4 kw.). Sundays: 12.45, orch.; 13.45, news; 16.45, con.; 20.30, news, &c.; 21.00, dance music. Weekdays: 12.30, orch., Stock Ex., news; 16.30, markets, Stock Ex., con.; 17.45, Stock Ex., news, women; 20.50, con.; 21.00, time sig.; dance (Thurs.). Tests probable on 1,125 m.

L'Ecole Sup. des Postes et Télégraphes (PTT), Paris, 458 m. (400 w.). 14.00, lec. relayed from Sorbonne University (Thurs.); 15.00, outside relay (Sat., irr.); 15.45 and 17.00, lec. relayed from Sorbonne (Wed.); 16.00, outside relay (irr.); 20.00, Eng. talk (Tues.); 20.30, lec. or con., almost daily, con. relayed by F. L. (Fri.); 20.45, lec. (Sun.), organ recital 3rd Sun. each month; 21.30, con. (Sun.).

"Le Petit Parisien," 345 m. (500 w.). 21.30, con. (Sun., Tues., Thurs.), dance (Sat.).

Lyon (Radio Sud-Est), 87 and 440 m. Testing.

GERMANY.

Berlin (2), 505 m. (1½ kw.). 08.00, sacred con. (Sun.); 09.00, markets, news, weather; 10.00, factory con. and tests; 10.30, educat. hour (Sun.); 11.15, Stock Ex.; 12.00, time sig., news, weather; 13.15, Stock Ex.; 14.00, lec. (Sun.), markets; 14.30, children (Sun., Wed.); 15.00, Esperanto (Sat.); 15.30, orch., French (Tues.); 17.30, lec., women; 18.00, French (Mon.), lec. (Tues.); 18.30, lec., Engl. (Thurs.), theatre news (Tues.); 19.30,* con., weather, news, time sig.; 21.30, chess (Mon.), dance until 23.00 (Thurs., Sat., Sun.). * If opera relayed, at 18.30.

Königswusterhausen (LP), 2,450 m. (5 kw.). Wolff's Buro. Press Service: 06.00, 20.00, 2.900 m. (5 kw.): 10.30, con. (Sun.), Esperanto lec. 3.150 m.: Telegraphen Union, 06.45-18.45, news, 4.000 m. (10 kw.): News, 06.00-20.00 (daily).

Bremen, 330 m. (1 kw.). Relay from Hamburg.

Breslau, 418 m. (1½ kw.). 10.15, Stock Ex., weather; 11.00, factory con. (weekdays), sacred con. (Sun.); 11.55 (Sun.), time sig., weather, Stock Ex.; 14.00, news (weekdays); 15.00, children (Sun.); 16.00, orch., children (Fri.); 16.45, con. (Sat.); 17.00, shorthand (Sat.); 18.00, Esperanto (Mon.), Engl. (Thurs.), lec. (other days); 19.00, con., weather, time sig.; news; 20.30, dance (Sun.); 21.15 (Mon.).

Cassel, 288 m. (1½ kw.). Relay from Frankfurt.

Dresden, 280 m. (1½ kw.). Relay from Leipzig.

Eberswalde (Lorenz Co.), 280 m. Testing daily about 22.30.

Frankfurt-on-Main, 470 m. (1½ kw.). 07.30, sacred con. (Sun.); 10.10, Stock Ex.; 10.55, time sig., news; 15.00, children (Sun.), Stock Ex. (weekdays); 15.30, con., women; 16.00, con. (Sun.); 17.00, markets, lec., children (Wed.); 18.00, lec. (daily), shorthand (Wed.), Esperanto (Fri.); 18.30, educat. hour; 19.00, lec., Engl. (Mon.); 19.30, con. (daily), jazz band (Fri.); 20.30, time sig., weather, news; 21.00, dance or late con. (not daily).

Hamburg, 395 m. (1½ kw.). Sunday: 07.55, time sig., weather, news, lec., women; 10.00, sacred con., chess; 12.00, con., lec.; 16.00, children; 17.00, con.; 18.00, Engl. conv.; 19.00, sport, weather, news, con. or opera; 21.00 onwards, as weekdays. Weekdays: 06.25, time sig., news; 07.30, theatre news; 11.55, time sig.; 12.20, Engl. (Wed.); 14.00, political news, markets; 15.00, women; 15.30, lec., Esperanto (Mon.); 16.05, orch.; 17.00, con., lec.; 18.25, lec., Engl. conv. (Tues. and Fri.), Spanish

(Continued on page 496)

Louden Valves



Louden Dull - Emitter
Type F.E.R.1 for detec-
tion and L.F. Ampli-
fication.

Type F.E.R.2 for H.F.
Amplification.

Filament Volts 4—5
Filament Amps 0.1

Price 13/6

THE Louden Dull-Emitter at 13/6 combines the undoubted economical upkeep of the Dull-Emitter, the low initial cost of the ordinary "bright" valve, and the Silver Clear qualities common to all Loudens.

Its current consumption is only 0.1 amps, which is 1/7th of the consumption of the ordinary type of valve or 1/4th of that of the standard Louden. This reduces your accumulator bills correspondingly, so that the small extra first cost is rapidly repaid.

Your accumulators will run very much longer without recharging so you save trouble as well as money. The life of your accumulators also is greatly increased, as they discharge at a much slower rate when these valves are used.

No alterations need be made to your set to install these Valves, as they work off a 6-volt accumulator. Their use, therefore, does not involve disposing of an expensive battery.

The price of 13/6 brings a first-class Dull-Emitter within the reach of everybody. 13/6 is very little more than you have to pay for an ordinary "bright" valve.

It also has the Silver Clear qualities for which Loudens have justly become famous. Perfectly clear and distortionless reproduction are not the least of its good points.

Ask your nearest retailer for one, as its use is not only a revelation in clear reception but also a revelation in valve economy.

Should your local retailer for any reason be unable to supply you, write direct to us and your order will receive prompt attention.



Advt. of the Fellows Magneto Co., Ltd., Park Royal, London, N.W.10.

"BROADCAST TELEPHONY" (cont. from page 494)
(Mon. and Thur.); 19.00, weather, con. or opera; 21.00, weather, markets, news; 21.30, news (in English), dance (not daily). Will shortly be increased to 9 kw.

Hanover, 296 m. (1½ kw.). Relay from Hamburg. Also own con., 16.00.

Königsberg, 463 m. (1 kw.). 08.00, sacred con. (Sun.); 10.15, markets; 11.55, time sig., weather; 13.15 and 15.00, markets; 15.30, children (Tues., Wed., Sat.), orch.; 18.30, lec., Esperanto (Thurs., Sat.); 19.00, con. or opera; 20.00, orch., lec., weather, news, dance (Thurs., Sun.).

Leipzig, 454 m. (700 w.). 07.30, sacred con. (Sun.); 10.00, educat. hour (Sun.); 11.00, markets, orch., time sig.; 15.00, markets; 15.30, orch., children (Wed.); 16.30, lec. (Tues.); 17.30, lec. (Tues.), experimenters (Wed. and Sat.); 18.00, lec.; 19.00, lec. (irr.); 19.15, con. or opera, weather, news; 21.00, con. (not daily). Will shortly be increased to 5 kw.

Münich, 485 m. (1 kw.). 10.30, lec., con.; 13.00, news, weather, time sig., snow forecast; 14.00, con., lec. (Sun.); 15.30, orch. (16.00 Sun.), children (Wed.); 17.00, agric. talk (Mon.), con.; 18.00, lec., Engl. (Mon. and Fri.), Italian (Tues.), Russian (Sat.), Esperanto (Thurs.); 19.30, con.; 20.30, news, weather, time sig.; 21.00, late con. (Sun.), lec. (Tues.), dance (Sat.).

Munster, 410 m. (1½ kw.). 11.00, sacred con., news (Sun.); 11.30, news (other days); 11.55, time sig.; 14.30, markets; 15.30, children (Sun.), lec. (weekdays); 18.40, weather, lec., time sig.; 19.20, women, con. or opera, news, dance (Sat.); 21.00, English, Spanish or Esperanto, news, dance (Sat.).

Nuremberg, 340 m. (800 w.). Relay from Munich.

Stuttgart, 443 m. (1 kw.). 06.30, time sig., weather (weekdays); 10.30, con. (Sun.); 15.00, time sig., con., news (Sun.), children (Sat.);

16.45, children (Wed.); 18.30, lec. (weekdays); 19.00, con. (daily); 20.15, time sig.; 22.00, weather, news, dance (Sun.). Will shortly be increased to 6 kw.

FINLAND.

Haelsinki, 400 m. (temporary w.l.). Testing daily.

HOLLAND.

Amsterdam (PCFF), 2,125 m. (1 kw.). Daily: 07.55-16.10 (exc. Mon. and Sat., when 10.10-11.10), news, Stock Ex. (PX9), 1,070 m. (400 w.); con., 20.40 (Mon.). (PA5), 1,050 m. 19.40, con. (Wed.).

Hilversum (HDO), 1,090 m. (2½ kw.). 17.40, children (Mon.); 19.40, lec. (Fri.); 19.40, con. (Sun.), relay of Mendelberg orch. (Thurs.); con. (Sun.); 19.55, Radio talk (Wed.); 21.40, lec. (Sun.).

Bloemendaal, about 345 m. 09.40 and 16.40, sacred service (Sun.).

HUNGARY.

Buda-Pesth (1½ kw.). Testing shortly.

ITALY.

Rome (IRO), 425 m. (3 kw.). Weekdays: 16.00, orch., Stock Ex.; 19.30, time sig., news, con.; 20.15, news, Stock Ex., con.; 21.10, dance, weather. Sundays: 09.30, sacred con.; 15.45, children, Stock Ex.; 16.15, orch.; 16.45, jazz band, con., dance.

Milau, 650 m. (temp. W.L.). Testing shortly.

JUGO-SLAVIA.

Belgrade, 1,650 m. (2 kw.). 17.30, con., news, weather (Tues., Thurs., Sat.), weather, news only (Mon., Wed., Fri.).

NORWAY.

Oslo, 320 m. (500 w.). Testing, daily, about 19.30.

POLAND.

Warsaw (Radiopol), 385 m. (1 kw.). 17.00, tests.

RUSSIA.

Moscow (Central Wireless Station), 1,450 m. Sundays: 12.45, lec.; 15.30, news and con. Weekdays: 13.00, markets; 15.30, news or con. (Sokolniki Station), 1,010 m. Sundays: 14.30, con.; 17.00, lec. and con. (Tues., Thurs., Fri.). (Trades Union Council Station), 450 m. 17.00, con. (Mon., Wed.).

SPAIN.

Madrid (Radio-Iberica) (3 kw.), 392 m. 12.30, news, talks (weekdays only); 22.00, weather, Stock Ex., time sig., con., news.

Barcelona (EAJ1), 325 m. 18.00, lec., Stock Ex. markets, con. or relay of opera; 20.30, news and con.

Seville (EAJ5), 350 m. 18.30, lec., con., news.

SWEDEN.

Stockholm (SASA), 430 m. (500 w.). Sundays: 09.55, sacred service; 16.00, children; sacred service; 19.00, con., news, weather. Weekdays: 11.30, weather, Stock Ex., time sig.; 18.00, lec. (irr.); 19.00, con., lec., news, weather.

Gothenburg (SASB), 290 m. (500 w.), also 700 m. 10.00, fishery reports (700 m.); 11.55, time sig.; 19.00,* programme s.b. from Stockholm.

Malmö (SASC), 270 m. 11.00, weather; 19.00,* programme s.b. from Stockholm.

Boden (SASE), 1,200 m. 18.00, con. (Tues., Fri., Sun.).

* Local programmes are also broadcast at times.


Sundsvall (SASD), 450 m. (500 w.). Testing.

SWITZERLAND.

Geneva (HB1), 1,100 m. (500 w.). 13.15, lec. No Sun. transmissions.


(Continued at bottom of third column on page 498)

VALVES repaired Quick!



We are actual makers of valves, therefore we can repair and exhaust the valve to give the necessary high vacuum. In fact we do this job so well that we guarantee:—
Same Amplification. Same Radiation. Not to consume more current. Space won't permit of full price list here, but we'll gladly send you BOOKLET post free on request. Here are prices for the most popular types of valves.
Bright Emitters 6/6. Dull Emitters: 2 volt type 9/-; .06 type 10/6 Postage 3d. extra.
If your dealer is not alert enough to collect valves, for RADION repair, send straight off to us with remittance and obtain real prompt service.

RADIONS Ltd., BOLLINGTON, Near Macclesfield



Good Trade Terms

FREE BOOK entitled: "How long should my accumulator charge last?" gives this information and curves of RADION Valves—high in performance, low in cost. Send Now.

ANOTHER INVENTION

A bright valve that will function at ALL POSITIONS. Made in 4 and 5 Volts. Try a "LUMOS" and be UP-TO-DATE. BRITISH.

The Valve with a GAUZE ANODE. All unwanted heat escapes THROUGH the gauze "plate" and so makes reception more CONSISTENT and PURE in tone.

11/- each, post free.

Agents Wanted. Write for our exceptional terms.



THE LUMOS RADIO VALVE Co.
64, Mill Hill Road, Acton,
London, W.3.

Phone Chiswick 3018.

MAXEL ACCUMULATORS

GUARANTEED TWELVE MONTHS

	40 amp.	60 amp.	80 amp.	110 amp.
4 Volt	14/-	17/6	21/-	24/6
6 Volt	—	25/9	31/-	36/-

Charged Batteries always in stock for callers.

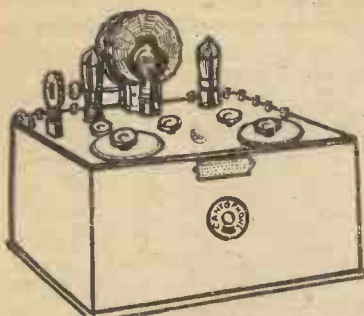
SPECIAL:—2v.60a. for D.E. VALVES, 9/- each

Packing and Carriage 1/6 (over 100 miles 1/- extra)

N.B.—Repairs to any make of Battery in 24 hours.

MAXEL ELECTRICAL Co., 28, Clipstone Street, LONDON, W.1
Telephone: MUSEUM 708.

AGENTS WANTED



THE "CANTOPHONE" THREE

£12 - 12 - 0

Complete ready for working

All Marconi Royalties paid

The Circuit consists of 1 High Frequency Detector and Low Frequency Amplifying Valve. Specially built to receive B.B.C. and Continental stations on Loud Speaker. Mullard Valves are used. Accessories include:

Mullard Valves, 60 volt Variable H.T. Battery with wandler plugs, Grid Bias Battery, 4 volt 40 amp. accumulator, 1 pair Phones, 100 ft. aerial wire, 3 shell insulators, lead-in tube, lead-in wire and earth wire, leads from batteries to instrument. Components used are: Igranite Rheostat, Igranite Transformer, Dubilier Fixed Condensers and Square-Law Variable Condensers. All mounted on ebonite panel in polished mahogany Cabinet. The above set is the best Value for Money ever put on the market.

Orders executed in strict rotation.

"CANTO" Mounted Basket Coils up to 600 metres. 7/- the set

Manufactured by JAMES A. IRELAND,
ENGINEER

Phone 567 355, WETMORE RD., Burton-on-Trent

ACCUMULATOR BARGAINS

C.A.V. & Fuller's, soiled, but guaranteed 12 months. Sent on approval against cash.

2v-10a .. 9/6	4v-80a .. 27/8	6v-60a .. 32/6
4v-40a .. 17/-	4v-100a .. 32/6	6v-80a .. 40/-
4v-100a .. 27/12	6v-40a .. 25/6	6v-100a .. 46/-

MAUDE RUBBER CO., 58, PRAED STREET, W.

RADIO "CROXSONIA" PANELS

See Croxsonia seal on all panels

Black matt finish, insulation perfect, rigid without being brittle, drills, cuts and taps perfect:—7" x 5", 1/-; 8" x 5", 1/2; 7" x 6", 1/3; 9" x 6", 1/7; 10" x 8", 2/1; 11" x 8", 2/3; 10" x 9", 2/4; 12" x 8", 2/6; 11" x 9", 2/7; 12" x 9", 2/10; 12" x 10", 3/-; 14" x 10", 3/5; 14" x 12", 4/-, 1/2 thick. Post free. Callers, cut any size, and quote by Post. Exceptional Terms, sample and prices post free to the Trade. To sole Manufacturers:

CROXSONIA COMPANY, 10 South St., MOORCOTE, E.C.2



Established
27 Years

PROMPT REPAIRS

TO HEADPHONES
TO LOUDSPEAKERS

Rewound to any resistance, remagnetized and made equal to new. Prices quoted on receipt of instruments. First class workmanship only.

THE VARLEY MAGNET CO.

Phone: 11 Woolwich 888. Woolwich, S.E. 18.

EXCEL TERMINAL TAGS

Ensure Perfect Contact—50 p.c. is often a low estimate of your total pooriness in reception through faulty contacts.

USE EXCEL

TERMINAL TAGS

for every radio job and secure perfect reception. Quick and easy to fix. Your dealer will supply all types.

See the name "COLLETT," London, on every tag.

Barclays 914

Undoubtedly

the Best Value in LOUD SPEAKERS

PUBLIC opinion amongst Radio users during the last three years has been unanimous in acclaiming the "Senior" AMPLION Models of the "Swan-Neck" and "Dragon" patterns as absolutely supreme, although so highly competitive in price.

Produced by the *actual originators* of Loud Speakers, they represent the highest development in construction and performance.

Following this unparalleled success the range of New Junior "Dragon" Models recommend themselves by their exceptionally moderate price, allied to remarkable volume and tonal quality, thus upholding fully the AMPLION Motto:—

Better Radio Reproduction

At the same time they provide the *best value-for-money proposition* on the market.

The
World's
Standard

AMPLION

Wireless
Loud
Speaker

Obtainable from AMPLION STOCKISTS
and wireless dealers everywhere.

Patentees & Manufacturers:

ALFRED GRAHAM & COMPANY,
(E. A. GRAHAM)

St. Andrew's Works, Crofton Park,
LONDON, S.E.

Demonstrations
gladly given during
broadcasting hours at the
AMPLION showrooms:
25-26, Savile Row, W.1.
and 79-82, High Street,
Clapham, S.W.4.



AR 111



AR 102.



AR 114.

The "Junior" Dragon Range, combining artistic appearance with "Senior" Loud Speaker quality:—

"Dragonfly" A.R. 102 ... 25/-
"New" Junior A.R. 111 ... 50/-
"New" Junior-de-Luxe, A.R. 114 ... 65/-

WIRELESS IN PARLIAMENT



From Our Own Correspondent.

IN reply to a question by Mr. Stephen Mitchell, Sir William Mitchell-Thomson, the Postmaster-General, stated that there was no intention to place obstacles in the way of useful experiments in wireless telegraphy, and some 2,200 licences for the use of wireless apparatus for experimental purposes were now in force. It was the practice to give permission to qualified experimenters to undertake wireless telegraph experiments in coal mines, provided that the consent of the authorities responsible for the safety of the mines was obtained.

The high-power wireless station at Rugby is, according to a statement made by Sir Wm. Mitchell-Thomson, expected to be completed in about eight months' time. A smaller station for communication on the beam system with a similar station in Canada is expected to be completed in September or October next. Permission had been given to the Marconi Company for the erection of a group of beam stations near Dorchester for communication with the United States and with South America, but the terms of the licence to be granted for the stations were still under discussion with the company.

In reply to a question by Lieutenant Commander Kenworthy, who suggested that the wireless licence fee might be paid quarterly or half-yearly, Lord Wolmer, the Assistant Postmaster-General, said that there were at present 1,200,000 licences, and the cost of collecting and accounting for the fees and securing the renewal of licences is already considerable. The introduction of a system of half-yearly payments of 5s., or quarterly payments of 2s. 6d., would practically double or quadruple this work, and the additional expense involved would be out of proportion to the benefit derived by the public.

"A Distortionless Loud-speaker Set."

With reference to this article in No. 144, it should be noted that the coil converted for reception of 5XX was a No. 200 Igranitic, and not a No. 250 coil as stated.

The new broadcasting station in course of erection at San Sebastian (Spain) will work with a power of 500 watts.

"BROADCAST TELEPHONY" (cont. from page 496)

Lausanne (HB2), 850 m. (500 w.). 07.05, weather; 12.30, weather, markets, time sig., news; 16.00, children (Wed.); 17.55, weather, news; 20.15, con. (exc. Wed.), dance (Thurs. and Sat.).

Zurich (Höngg), 515 m. (500 w.). 11.00, weather; 11.55, time sig., weather, news, Stock Ex.; 15.00, con. (exc. Sun.); 17.15, children (Mon., Wed., Thurs., Sat.); 18.00, weather, news (exc. Sun.); 19.15, lec., con., dance (Fri.); 20.45, news.

"Building a Portable Workshop" is the title of an article appearing in the current issue of "The Amateur Mechanic and Work" (3d.), and describes a structure that is also suitable for the storage of bicycles, etc. Other articles appearing in the same number are: "On the Proper Way of Doing a Job," "A Garden Seed-frame and Plant Protector," "Our Small Car Page," "An Efficient Crystal Receiver Made in Two Hours," "Helpful Notes on Keeping the Wireless Set in Good Condition," "An Anti-tampering Switch," "A Variometer for the Crystal Set," "Notes by the Way," "A Mincer for Marmalade Making," "Making Money by Inventing," "Practical Photography: Getting Ready for the Spring," "Motor-cycle Practicalities," "Pip Lamps for Country Dwellers."

Mr. T. W. MacCallum, professor at the University of Vienna, will broadcast a course of English lectures from the Radio Wien station every Monday and Wednesday at 18.45 G.M.T.

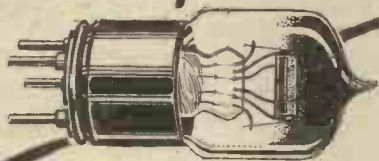
The Prague broadcasting station is now connected by landline to the National Theatre.

Finland has under construction a new broadcasting station to work with a power of 20 k.w.

Two further relay stations are under construction in Germany: at Kiel, to serve Schleswig-Holstein, and Dortmund, for the Ruhr district.



A Sturdy Fellow



**built for hard work—but
sensitive and always reliable**

The C. & S. DULL EMITTER 2v. 0.2a. (227) gives increased amplification and purer reception, without distortion—NEW ZEALAND & NEW YORK RECEIVED ON A SINGLE VALVE ... each 12/-
Also made 0.06a. (227L) price 15/-

Special Process Dry Batteries for
227 ... 7/6 227L ... 4/6

Send for Illustrated Catalogue.

CRAIK & SMITH (Desk B)
Allen Street, E.C.1

Phone :

Clerkenwell 7346



COMPLETE SET OF M.H. H.F. PLUG-IN TRANSFORMERS

in handsome case. The H.F. Transformers are in six ranges of wavelength, necessitating six transformers. This case has been designed to take these six, and supplies, therefore, the entire requirements for all wavelengths.

PRICE 55/-

Separate units each in carton, 10/- each. Any number supplied matched if requested when ordering.

L. M. MICHAEL LTD
179, STRAND, LONDON, W.C.2

Manufacturers
of Wireless
and Scientific
Apparatus.

Barclays 838

VALVES REPAIRED

DON'T scrap your burnt-out valves—send them to us for repair. Our valve renewal plant is of the very latest type, and process employed ensures a high vacuum.

We guarantee to return your valves equal to new and to function at the maker's voltage and consumption.

Delivery in 7 days.

PRICE
BRIGHT EMITTERS ONLY

6/6

WATSON, JONES & CO.,
VALVE REPAIR DEPOT, 6, ST. STEPHENS HOUSE,
VICTORIA EMBANKMENT, S.W.1

TRADE ENQUIRIES INVITED.

READ THESE UNSOLICITED TESTIMONIALS

Please find enclosed 2 valves for repair... The last one I had repaired is working quite well both as H.F. and Detector. I will recommend your firm to all my friends. A. W. Walsall. I beg to acknowledge safe receipt of one M.O. valve... This is excellent treatment and I shall not fail to place your address with my wireless friends. O. J. C. Brighton.

My repaired valve received... was tested on a 2 valve set working both as H.F. valve and detector... equally good as any other valve. I am highly satisfied and will recommend. E. C. S., B'ham.

Phone Victoria 7571

The Radio Mail

Published periodically in the interest of Valve Users

For sensitiveness
USE
**Wuncell
Valves**

A new type of Dull Emitter

Experts declare new Wuncell Dull Emitter likely to revolutionise Valve design

TO produce a Dull Emitter Valve which operates with a glow that is almost invisible in daylight is a feat that has just been accomplished by the London firm of A. C. Cossor Ltd. This new Valve—called the Wuncell because it requires only one cell to operate it—is certainly the nearest approach to the ideal of a "cold valve" that we have yet seen. Viewed under working conditions the filament could just be seen glowing in daylight, while in a dark room it could readily be likened to the embers of a dying match.

Asked to give some approximate idea of the actual temperature, a representative of the firm stated that, according to pyrometer tests, the reading was 800 degrees as against the 2,000 degrees required by Bright Emitters and even some types of Dull Emitters. For our benefit actual tests were made between the amount of heat (or light) generated by a Wuncell and other types of Valves. The differences were most marked, and demonstrated to the lay mind in a very striking manner that such a low filament temperature must mean a vastly increased life for the Valve.

The British Valve still the best

But it was on actual Broadcasting tests that this new Wuncell showed that, so far as this country is concerned, we have nothing to fear from Continental Valve manufacturers. For the purposes of demonstration a good four-Valve set was used. For the first Valve—which acted as a high-frequency amplifier—a Wuncell type W.2 was used, while for the last stage one of the new Wuncell Loud Speaker Valves was used as a power amplifier. The other two Valves were the standard W.1 Wuncells.

Connected to a fairly good aerial in North London, 2LO had to be considerably de-tuned even for three Valves in order to prevent "blasting" from the Loud Speaker, while with the fourth valve in operation every B.B.C. main station, with the exception of Cardiff, was brought in with incredible volume and exceptional purity. Cardiff

—owing to our close proximity to 2LO—could not be tuned in. The following Continental stations were also received at good Loud Speaker strength: Hilversum (a Dutch broadcasting station with call sign HDO), Bremen on 330 metres, Zurich, Radio Iberica of Madrid, and a further Continental station which could not be identified owing to "fading" but which corresponded in wave-length to Vienna.

Wuncells just as sensitive as Bright Emitter Valves

The result of these tests certainly demonstrated that the new Wuncell Valves are not one whit less sensitive than standard Bright Emitter Valves. Another remarkable feature of these Wuncell Valves was their complete freedom from microphonic noises. It has hitherto always been an inherent disadvantage of other dull emitters that even footsteps in the room or other slight vibrations are communicated to the Valve to cause ringing noises in the headphones or Loud Speaker. All the usual tests, such as tapping the table on which the receiver was placed, adjustments of the rheostats, etc., failed to produce the slightest suggestion of a microphonic noise.

We understand that the reason for this improvement is to be found in the special Wuncell method of mounting the filament. Instead of being supported between two electrodes, spring apart to counteract expansion and contraction, its filament is arched (following standard Cossor practice) and supported at the centre by a third electrode. No doubt, too, the grid—cleverly designed and very rigid—is a contributory factor to this result.

Use Wuncells along with Bright Emitters in the same Set

We were most impressed, not only by the very neat appearance of the Wuncell, but with the vast amount of forethought and research work that must obviously have been put into its construction. For instance, because it was realised by the designers that

many multi-valve users would like to try out one Wuncell in conjunction with their ordinary Valves, a special base was designed. This base carries a resistance in series with the filament to permit the valve being used with either a 4- or 6-volt accumulator. Normally, of course, the Wuncell functions at rather less than 2 volts. This excellent idea gives any amateur a chance of trying out one of these new Dull Emitters and comparing its behaviour with the Bright Emitters he may be using. At any later date—by the use of a small screw—the resistance can be short-circuited and the Wuncell used at its correct current of 2 volts. It is worth while noting, too, that all Wuncell Valves are being supplied with the new black low-capacity base in which air only is used at the dielectric between the leads to the four valve legs.

Experts that have witnessed demonstrations of Wuncell valves have expressed their satisfaction at the production of a Dull Emitter which can compare most favourably with the best Bright Emitters. It has always been felt that hitherto a sacrifice of at least 20 per cent. in volume has been the price that must be paid to obtain the conveniences offered by Dull Emitters.

Valves to be in sealed boxes

One well-known manufacturer definitely decides to issue all future Valves in sealed cartons only

A move of the utmost importance has been made by A. C. Cossor Ltd.—the well-known British Valve manufacturers. They have decided that, in order to protect the public and to ensure their Valves being used in absolutely new condition, they are now sealing every Valve in its carton at the Works. Asked how it would be possible for the shopkeeper to be certain that he was selling a sound Cossor Valve, a member of the firm explained to a representative of the *Radio Mail* that this was a matter which had certainly presented some difficulties. Various methods had been carefully tried out, including sealing the legs of the Valves and other devices, but none had proved so satisfactory in practice as the method they were now adopting. This consists of wrapping the Valves in a very generous covering of cotton wool, after having first brought two copper wires from the filament legs to two studs on the end of the box. When a customer wants a Cossor Valve, these two brass contacts are placed in series with an electric flash-lamp battery and a bulb. If the filament should happen to be damaged, the circuit will not be complete and the lamp will not light. This test can be easily carried out without breaking the seal of the box by means of a very ingenious showcard, which we understand Cossor's are supplying free of charge to all Wireless dealers.

A prominent manufacturer of Broadcast Instruments explicitly endorsed this new idea. He agreed that it was a wise move that had been long awaited. The public, he declared, welcomed any method of purchasing usable accessories under a seal. In his opinion the Wireless dealer—while not shirking responsibility—considered that the manufacturer ought to take steps to see that his (the manufacturer's) responsibility ended only when the article reached the actual user.

How long should Valves last?

Many keen wireless amateurs get over twelve months' service

How long a Valve lasts depends very largely on how it is used. Some men can make their suits last very much longer than others—a little care and attention now and again will prevent creases forming and the material from losing its freshness. The same applies to Valve. For instance, how many amateurs know that the use of filament switches in a Receiving Set—although a great convenience—shorten the lives of the Valves very considerably. Rheostats should be used for the purpose of turning current on and off; to throw the full load on at the turn of a switch is to cause a sudden expansion of the wire used in the filament, and to switch off suddenly is to cause a sudden contraction. No Valves built can withstand such strains indefinitely.

Treat your Valves properly and you'll find they'll last very much longer. For instance, Mr. G. H. Hasciner, of 9 Galliard Road, writes as follows:—

"I think it is only right to testify to the excellence of Cossor Valves, more particularly as far as I am concerned the P.1. On December 1, 1923, I purchased two of these Valves and they have been going strong ever since, and are functioning well now. They have been in use on an average of 24 hours per day from date of purchase, which brings present life up to nearly 1,000 hours. How long they will last I cannot say—perhaps you can estimate. However, I shall certainly repeat a selection of Cossor P.1."

While Mr. J. Harris, of 13 Stepney Bank, Newcastle-on-Tyne, thinks that sixteen months' regular service for one Cossor Valve is something of a record. Writing on January 27, 1925, he says:—

"In September of 1923 I purchased a P.1 Cossor Valve, and wish to state that it has given me excellent service until to-day. The Valve in question has never missed the Savoy Bands, nor Official News of the B.B.C. Total life of Valve, sixteen months. Perhaps there are others who can beat this record, but I, as an old user of Cossors, am perfectly satisfied."

Even this record would seem to be eclipsed by a Cossor P.1 which has been doing yeoman service every day for a period of 1,700 working hours on a One-Valve Reflex Set. The owner, Mr. Harold Cooper, of 8 Cotherstone Road, London, S.W. 2, expresses his satisfaction in these terms:—

"I should like to mention that I have used a Cossor No. V. 9132 in use since last September, and averaging at four hours per day (very moderate average for afternoons and evenings) it has given over 1,700 working hours and is still going strong, and therefore bears out conclusively all you claim in your advertisement: my circuit is One-Valve Crystal Reflex."

Cossor Valves



The Valves that give your Set that long distance feeling!

Gilbert Ad. 2479

Have you got down to the short waves yet?

Get ready for the new Broadcasting Stations operating on 100 metres or less

There's lots of enjoyment to be obtained from short-wave reception. If you can read Morse, you should certainly alter your set so that you can get down to 80 metres and under. Any evening will find scores of British amateurs corresponding with their friends across the seas. The most extraordinary thing about these short waves is their tremendous power of penetration. Using but very little power, amateurs can send messages immense distances. Incidentally, the tuning of short waves means

the use only of high-grade components and suitable Valves. How far American amateurs can send on short waves is a matter of conjecture—it is sufficient to say that signals have been received in this country without aerial or earth. In this connection, Mr. J. Gordon Ritchie, the well-known Glasgow experimenter, writes as follows:—

"10th December, 1924.

"Some time ago I wrote you concerning the excellent reception of American broadcasting obtained with two of your P.1 Valves. They have since demonstrated their capabilities in another way.

I am now using a Reinartz-type receiver on the very short waves of 80 metres and under, consisting of detector and one low-frequency, and during the past fortnight have logged 100 American amateurs, of which twenty were heard on one night without either aerial or earth. Either of my two 'Cossors' now almost two years old, are the only Valves I have got to oscillate below about 60 metres.

Considering the constant use and incidental knocking about to which these Valves have been subjected, I think this speaks highly for your products, and I am looking forward to a further period of their usefulness."

CHIEF EVENTS OF THE WEEK

SUNDAY, March 22.		
London	3.0	De Groot and the Piccadilly Orchestra.
London	9.0	Ballad Programme.
Birmingham	3.0	Classical Programme.
Cardiff	9.0	The Song of Miriam (Schubert).
Manchester and 5XX	9.0	Wagner Programme by the B.N.O.C.
Glasgow	9.0	"Art in Italy."
MONDAY		
Bournemouth	8.0	Winter Gardens Programme.
Glasgow	7.30	"In Days of Old."
TUESDAY		
5XX	7.30	Casano's Octet.
All Stations except 5XX	7.30	A Ballad Opera, <i>The Red Pen</i> .
WEDNESDAY		
London and 5XX	7.30	Popular Classics.
Birmingham	7.30	Operatic Programme.
Bournemouth	7.30	Early Italian Opera.
Cardiff	8.30	A Few Welsh Favourites.
Manchester	7.30	Band of the Prince of Wales Volunteers.
Glasgow	7.30	"Where the West Begins."
Belfast	7.30	Symphony Concert.
THURSDAY		
5XX	7.30	Chamber Music Evening.
Cardiff	7.35	An Hour with Beethoven.
Manchester	7.30	The Hallé Orchestra Pensions Fund Concert.
Aberdeen	7.35	Music and Drama.
FRIDAY		
London and 5XX	7.30	Band of H.M. Grenadier Guards.
Birmingham	7.30	Ballad Programme.
Bournemouth	7.30	"Bournemouth Calling Belgium."
Cardiff	7.30	"A Night of Adventure."
Manchester	7.30	Symphony Concert.
Aberdeen	7.30	Brahms and Schumann.
Glasgow	8.0	John Ireland Recital.
SATURDAY		
Birmingham and 5XX	7.30	Light Symphony Programme.
Newcastle	7.30	Music and Drama.
Aberdeen	7.30	The Barnardo Musical Boys.

TRADE NOTES

FROM Romac Motor Accessories, Ltd., 14-18, Bloomsbury Street, W.C.1, we have received a neat type of "Crawford" aerial earthing jack. Many other uses will suggest themselves to the users of this handy little plug and jack. We have also received an illustrated leaflet dealing with this component.

An illustrated catalogue of wireless sets and components has been sent us by the U.S. Radio Co., Ltd., 155, High Street, Lewisham, S.E.13.

From R. F. Winder, Cross Belgrave Street, Leeds, we have received an illustrated folder describing the Derwin battery carrier.

We are informed by the St. Helens Cable and Rubber Co., Ltd., that in order to give better service to their London customers it has been found necessary to install an extra telephone line in the London office (70, Petty France, Westminster, S.W.). This has meant changing over the telephone number to Franklin 6181 and 6182.

We are informed by J. H. Collie and Co., of 8, Harrington Street, Liverpool, that the retail price of the Chaslyn battery tester is 4s. each, and not 5s., as stated in a recent issue of AMATEUR WIRELESS.

Ripaults, Ltd., the well-known specialists in motor electrical components, are undertaking extensive addi-

tions to their works in order to deal with the demand for their wireless products.

A catalogue of Marconi valves at the reduced prices has been sent us by the Marconiphone Co., Ltd., Marconi House, Strand, W.C.2.

Constructors who are faced with the difficulty of fixing screws in awkward places may be interested to know that the use of the special Recess screws, manufactured by The Rawlplug Co., Ltd., Gloucester House, Cromwell Road, S.W.7, simplifies an otherwise awkward job.

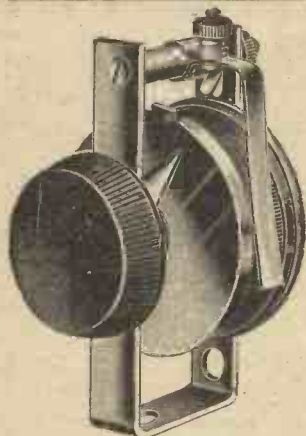
The new Radio Association Handbook for 1925 will shortly be published, and may be obtained from the Secretary, The Radio Association, Sentinel House, Southampton Row, W.C.

On March 24 will be given the first performance of a "sort of opera" in two acts entitled *The Red Pen*. This is by A. P. Herbert, the music being by Geoffrey Toye.

The annual Pensions Fund Concert of the Hallé Concert Society will be relayed from the Free Trade Hall, Manchester, on March 26.

Arrangements are being made in Germany to broadcast warnings to towns in danger of sudden floods.

ETHITA
FULL of GOOD POINTS



IGRANIC Filament Rheostat for D.E. Valves, 20-30 ohm.

IGRANIC Radio Devices

include

HONEYCOMB DUOLATERAL COILS.
FIXED CONDENSERS.
FILAMENT RHEOSTATS.
INTERVALVE TRANSFORMERS.
VARIOMETERS.
VARIO-COUPERS.
BI-PLUG COIL HOLDERS.
TRI-PLUG COIL HOLDERS.
BATTERY POTENTIOMETERS.
VERNIER FRICTION PENCILS.
etc. etc.

All carry the IGRANIC guarantee.

Safety for Dull Emitter Valves

The sensitivity of the dull emitter valve calls for a resistance which is heat resisting and so does not allow a fluctuating resistance. Many are the Dull Emitter Valves whose lives have been prematurely cut off by the rheostat failing to remain constant. Don't let it happen to yours — fit Igranic Dull Emitter Rheostats.

They are smoothly and evenly variable over their whole resistance range and afford 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, either 20 or 30 ohms resistance ... 7/-.

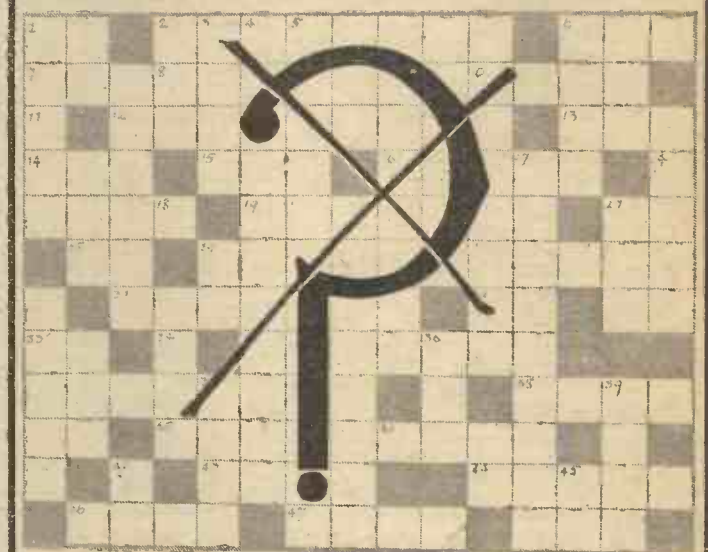
All reputable dealers carry stocks. Write for List Z443.



149, Queen Victoria St., LONDON.
Works: BEDFORD.

Branches:
Birmingham Cardiff Glasgow
Leeds Manchester Newcastle

DON'T BE PUZZLED



THERE IS NO QUESTION

ULTRA LOUD SPEAKERS
REGISTERED TRADE MARK

ARE THE BEST
ASK YOUR DEALER FOR THEM

Should you have any difficulty in obtaining same, write direct to:

27/6

Messrs. EDWARD E. ROSEN & CO.
159-160, City Road, London, E.C.

with the name of your dealer.

WRITE FOR OUR ILLUSTRATED PAMPHLET



The Little Green Tag carries a Big Promise

Attached to every Bowyer-Lowe Square-Law Condenser is a little green tag which certifies the tested maximum capacity of the instrument. Why is it there?

It is a promise that the condenser you are buying will have a bigger wavelength range than any other obtainable anywhere. It tells you that this condenser obtains the square-law effect in a way that has remarkable results.

Bowyer-Lowe Square-Law Condensers do much more than make tuning easy. They have the lowest losses of any, and so give signals of unusual musical purity. They give increased wavelength range and enable you to separate stations which previously jammed.

Install them, and you will find that they make your sets more responsive in every way because they are built with knowledge.

Bowyer-Lowe Condensers are NO larger than the ordinary non-square-law type. They can be installed in any set without alteration of layout. Buy them to-day and prove their worth.

A FEW CURRENT PRICES.

Single	Double (each half)
.00025 15/-	.00025 28/-
.0003 16/-	.0003 29/-
.0005 17/-	.0005 31/-

Including Dial, Drilling Template and 3 Calibration Charts.

Bowyer-Lowe Tested SQUARE-LAW CONDENSERS

COMPLETE LIST FREE

Send name and address with 1½d. stamp to cover postage for informative new Price List of all our TESTED LOW LOSS PARTS. They make responsive sets.

BOWYER-LOWE CO., LTD., LETCHWORTH



**Guaranteed
for 12 Months**

The Only British Telephones with this Warranty.

THE guarantee on Revco Headphones is like the hall mark on Silver or "Sheffield" on steel. It's the outward sign of inward worth. Unsurpassed for sensitivity and clarity—whether on broadcast or morse reception.

No nipping, no heavy head pressure, just a gentle lightness hardly felt. Can be worn for hours. Just the telephone for the feminine listeners-in of your family. At all good agents. If unobtainable locally send us your nearest dealer's name.

Let us send you illustrated and informative literature descriptive of our loudspeakers, crystal and valve sets, amplifiers, etc.



19/6

A worthy contemporary of Revco Headphones — the Revco Loudspeaker in three sizes, Senior, Junior and Baby: 80/-, 48/-, 25/- respectively. Like the Telephones are guaranteed for 12 months.

Cable Accessories Co., Ltd.,
Tivdale, Tipton, Staffs.

“Revco”

“The Name for Perfect Radio”



Singapore Radio Society

Hon. Sec.—MR. B. C. WALTERS, 3, Malacca Street, Singapore.
The above society has just been formed and new members will be welcomed. All particulars can be obtained from the secretary.

North Middlesex Wireless Club

Hon. Sec.—MR. H. A. GREEN, 100, Pellatt Grove, Wood Green, N.22.
The annual general meeting was held on March 4 when the officers of the club presented their reports.

Coventry and District Co-operative Radio Society
Hon. Sec.—MR. A. CURTIS, West Orchard, Coventry.
At the meeting held on March 4 a resolution of protest was carried against the "Search" clause in the new Wireless Telegraphy and Signalling Bill, and a copy will be sent to the local M.P., the P.M.G. and others. Mr. I. Oscar lectured on "How to Add One Stage of High Frequency and One Stage of Low Frequency to a One-valve Receiver."

Dublin Wireless Club

Hon. Sec.—MR. A. C. BRIDLE, 29, South Anne Street, Dublin.
A MEETING was held on March 5 when Mr. J. C. Mangan delivered an instructive lecture on "The Use and Abuse of Reaction," in which he dealt with the various means of obtaining reaction, and pointed out the way of intelligently using reaction.

Colders Green and Hendon Radio Society

Hon. Sec.—MR. W. J. T. CREWE, "The Dawn," 111, Princes Park Avenue, N.W.11.
ON March 4 Mr. Maitland, a representative of Messrs. L. McMichael, gave a lecture on high frequency amplification which was followed by a discussion.

Liverpool Co-operative Radio Association.

Hon. Sec.—MR. J. KEARNS, 107, Walton Breck Road, Anfield, Liverpool.
At a recent lecture on radio transmission and amateur transmitters Mr. H. Hardy outlined the history of wireless transmission of signals, describing the open-aerial spark system, tuned spark

and coupled systems with quenched gaps. The I.C.W., C.W. and W/T tests were received on a four-valve set and loud-speaker 20 ft. from the transmitter, which was working on a dummy aerial.

Inland Revenue Radio Society

Hon. Sec.—MR. J. O. CLAXTON, 570, Salisbury House, E.C.2.

The regular meeting was held on February 20, when the evening opened with morse practice. Mr. M. A. Beeston, M.I.E.E., gave a lecture on the subject of induction and its application in regard to transformers, and Mr. A. H. Sheffield talked about "The Control Room at 2 L.O."

Ilford and District Radio Society

Hon. Sec.—MR. F. W. GEDGE, 157, High Road, Ilford.

ON February 17 Mr. A. E. Gregory lectured on "Selective Circuits." He explained the properties of a selective receiver, mentioning all the circuit arrangements for ensuring selective reception, and discussed double-circuit tuning (including the Marconi multiple tuner), wave traps and rejector circuits.

FOUR
"AMATEUR WIRELESS"
HANDBOOKS—1s. 6d. EACH
WIRELESS TELEPHONY
EXPLAINED
SIMPLE CRYSTAL
RECEIVING SETS
WIRELESS COMPONENT
PARTS
SIMPLE VALVE
RECEIVING SETS

From all newsagents and booksellers, 1/6 net each, or post free by return 1/9 from the editor of "Amateur Wireless," La Belle Sauvage, London, E.C.4.

Dublin Wireless Club

Hon. Sec.—MR. E. JACKSON, Redan Lodge, 188 Rathcar Road, Dublin.

A MEETING was held on February 19 with Mr. T. H. Lurring in the chair. Comm. J. Smyth delivered a lecture on "Laboratory Experiments in Wireless," when he dealt with the calibration of a wavemeter.

Barnet and District Radio Society

Hon. Sec.—MR. J. NOKES, Sunnyside, Stapylton Road, Barnet.

At the monthly meeting held on February 19 Mr. H. B. Gardner, Barnet's first amateur transmitter, gave an instructive talk on "Transmission." The secretary reported that he had drafted a letter to Col. Fremantle, M.P. for the St. Albans division, pointing out that certain clauses in the Wireless Bill, now before the House of Commons, were likely seriously to retard the progress of wireless and urging the revision of the Bill. The letter was approved.

ANNOUNCEMENTS

"Amateur Wireless and Electronics." Edited by Bernard E. Jones. Price Threepence. Published on Thursdays and bearing the date of Saturday immediately following. It will be sent post free to any part of the world—3 months, 4s. 6d.; 6 months, 8s. 9d.; 12 months, 17s. 6d. Postal Orders, Post Office Orders, or Cheques should be made payable to the Proprietors, Cassell & Co., Ltd.

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

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

Queries should be addressed to the Editor, and the conditions printed at the head of "Our Information Bureau" should be closely observed.

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

THE NATURAL CRYSTAL

Trade Mark
IS SECOND TO NONE
Sample post free 2s. Please send local dealer's name, etc.
Proprietors: THE BRIGHT CO., LONDON, N.8.
Phone: Mountview 1295
Sole Wholesale Agent for London and Home Counties only.
J. CONWAY, 86, GREENWOOD ROAD, LONDON, E.8
Phone: Clissold 4936.

Convert your 'phones

into a

LOUD SPEAKER

with "THE

GRAMAPHIX"

A most efficient device to which ordinary headphones are clipped by simple pressure on the spring clips.

HORNS TO MOUNT ON GRAMAPHIX: Straight Horn (Bell 10 in.), 6/-; Swan-necked Horn (Bell 11½ in.), 15/-; Small Curved Horn (Bell 8½ in.), 7/6. Post 9d. extra.

The Gramaphix requires (according to distance from the Broadcasting Station) at least one stage of low-frequency amplification to give satisfactory volume.

TOOLS

Make your own
Wireless Sets



The IDEAL
Soldering Lamp
for Wireless
Amateurs

5/-
Postage
6d. extra

Straight or hatchet
shaped Soldering
Irons to use with
above, 1/- extra.
Postage 3d. extra.

HAND DRILL
Takes up to ½ in.
diameter; powerful
3-jaw chuck.
Postage
9d. extra
Set of Six Twist
Drills
Post Free 2/-



WIRELESS LIST "E" SENT POST FREE
RICHARD MELHUISH, LTD.,
Tool, Machine and Electrical Experts. Established 1828
50, 51 & 84, FETTER LANE, Holborn Circus, London, E.C.1

Reactone Coils bring
Stations in that you would never
hear without them

With tension-winding we are able to dispense with all ebonite, empire tape, or other substances which introduce additional self-capacity, and at the same time secure a unique low-capacity formation that makes TUNING SHARPER, SIGNALS STRONGER, and REACTION READIER.

The Tension-wound formation of Reactone Coils gives them greater rigidity, complete uniformity, and thin structure (better for coupling). They are the only correctly tension-wound, former-less Coils.

Supplied in sets of 5 (Nos. 25, 35, 50, 75, and 100), and each set is boxed. Be sure to see the name "Reactone."

3/-

No. 150 (Chelmsford), Price 1/9.
No. 200 ... 2/3.
Reactone Coil
Holder ... 1/8.



Reactone
TENSION-WOUND
Inductance Coils

Ask your Wireless Dealer: In case of difficulty send P.O. (adding 3d. for postage) with your Dealer's name and address, to The Manufacturers:

LEWIS HARFORTH & CO.,
88-90, Chancery Lane, London, W.C.2.
Phone: Holborn 2213.

Wholesale from V. Zeitlin and Sons,
144, Theobald's Rd., London, W.C.1.
Agents wanted in all Broadcasting Centres.

"Popular Gardening" Great Spring Number

Now on Sale



A reproduction of the brilliantly Coloured Cover of the Great Spring Number of "Popular Gardening," which is now on Sale

Amateur Wireless

COUPON
Available until Saturday,
March 28th, 1925

THIS IMPROVED **Athol** MEANS INSULATION



The **ATHOL**
Reversible
VALVE HOLDER
1/3
each.

SPECIALLY SUITABLE FOR
BASEBOARD MOUNTING

and can be used back or front of:
Vertical and Horizontal panels.

Lists Free

We will send goods post free
if you mention dealer's name

Athol ENGINEERING CO
CORNET STREET, H² BROUGHTON, MANCHESTER

INSULATE YOUR PANEL WIRING WITH "CELAS"

The perfect insulating solution recommended by
Radio Experts. Prepared in RED, GREEN, BLUE,
YELLOW. 3d. Tube. 1/- per Tin.
TRANSPARENT for coils, etc., 10d. per Tin.

Of all Radio Stores, or direct from Manufacturers:
HEADSONS, 183, Belmsley Road, Newcastle-on-Tyne.
Trade Terms on application.

T. J. S. HEADPHONES, 8,000 ohms. A.D.J. DIAPHRAGMS HIGH CLASS FINISH, 20/- COMFORTABLE

Send for Lists of Everything for Wireless

Groix Transformers ... 9/6 D.E. Valves ... 9/6
Rheostat, 7 ohms with dial 2/6 Headphones, 4,000 ohms ... 12/6
do. 5 do. with dial 2/- 2-way Coil holders for panel mtg 2/-
Safety Valveholders, small 1/- Variable condensers, .0005 sq. law 8/6
do. do. large 1/3 Basket Coil holders ... 1/-

All goods carr. paid. **TRADE SUPPLIED,**
T. JACKSON, SONS & CO., LTD. BEXLEY HEATH
Wireless Manufacturers, LONDON, S.E.

SERVICE COUNTS in Wireless Trading!

We strive to serve you and in more ways than one have
so far succeeded. This week we are giving, FREE, a
little gadget to prevent Burn-outs on valves—it costs you
nothing, simply a stamp for return postage, that's all.

RADIO WAREHOUSE,
FOUNTAIN STREET, FENTON, STAFFS.

TELEPHONES RE-WOUND

0.4,000 ohms. Guaranteed. All makes 5/-, except
Brown "A" 6/- and Sullivan. Wax filled, 10/- per
pair. Ex-army converted to high resistance 2/6
each earpiece. Re-magnetisms 9/- per earpiece.
Postage extra 6d. per pair. Write for prospectus.

JOHN W. MILLER, 68 Farringdon St., E.C.4
(2nd and 3rd Floors). Phone: CENTRAL 1930

The Symphony Three!

THE "P.P.S.3"

THE PERFECT CIRCUIT AT LAST. COLOSSAL VOLUME—enough for
an entertainment hall. Long range, from 600 to 4,000 miles, and a wonderful
tonal purity that will delight the music lover, amaze the experimenter,
and make even mediocre loud speakers sound like symphony orchestras.

Only a few simple components are required to build the P.P.S.3, the "Master Circuit."
Those who have constructed our "P.P." sets have most of them. This simple circuit
has features which have never before appeared in any wireless plan.

THE P.P.S.3 is exhaustively illustrated and described in
RADIO PLAN No. 4

THE P.P.S.3, the Circuit of 1925, will become as famous as our
P.P.V.2, the set that has become notorious throughout the whole world.

SIMPLE PICTORIAL DIAGRAMS, SCALED LAY-OUT AND ALL NECESSARY
INFORMATION IN AN ELEGANT BOOKLET OBTAINABLE

PRICE TWO SHILLINGS

From PRESS EXCLUSIVES, WIRELESS PUBLISHERS,
2, WINE OFFICE COURT, FLEET STREET, LONDON, E.C.4

GEORGE ADAMS

255 HIGH HOLBORN LONDON



Weight
23 lb.,
post
3/3.

Verschoyle Patent Lathe

List V2. Swings 6 in. diam., 12 in. long, 12 in. diam. in gap.
For all wireless work, coil winding, vulcanite sawing and boring
and all other metal and woodwork. This tool will earn a living
and last a lifetime. Complete with 5 in. chuck, £5, post 3/3.

Saves you pounds

48 pages of illustrations. Lowest prices
in London for highest grade Radio Apparatus.
Send 3d. at once. Large illustrated folders
describing Unit System, interchangeable
Linettes and Pilot Receivers, sent free.

PETO-SCOTT CO., LTD.
Head Office: 77, City Ed., E.C.1.
Branches:
London—69, High Holborn, W.C.1
Walthamstow—230, Wood Street,
Liverpool—4, Manchester Street,
Cardiff—94, Queen Street,
Plymouth—Near Derry's Clock.

**Peto-Scott's
Catalogue** 2492

WHO WANTS CABINETS?

PICKETTS—are used for Finest Sets.

Estimates Per Return.

Send for Cabinet Lists FREE

PICKETTS CABINET (A.W.) WORKS.
BEXLEY HEATH, S.E.

Secure your Aerials!

Flexible Steel Wire Rope

For use where strength and strain
is required. Extremely flexible and
easily handled on pulleys.

No.	Diameter	Breaking Strain	Price 100 ft.
0	1/16 in.	5 cwt.	4/6
1	3/32 "	10 "	6/-
51	5/32 "	25 "	10/-
52	3/16 "	35 "	12/-

Strainers, double ended, for use with
above, 9d. each, 8/6 doz. Orders
of 10/- and over carr. paid, other-
wise please add 9d. extra.

SMITH & ELLIS LTD., (DEPT. 66),
11, Little Britain, Aldersgate St., E.C.1.

PREPAID ADVERTISEMENTS.

Advertisements under this head are charged
FOURPENCE PER WORD, minimum charge
FOUR SHILLINGS.

DEPOSIT SYSTEM.

As the Publishers cannot accept responsibility
for the bona fides of Advertisers in this publication
they have introduced a system of deposit which it
is recommended should be adopted by readers
when dealing with persons with whom they are
unacquainted. It is here explained.

Intending purchasers should forward to the Pub-
lishers the amount of the purchase money of the
article advertised. This will be acknowledged to
both the Depositor and the Vendor, whose names
and addresses must necessarily be given. The
Deposit is retained until advice is received of the
completion of the purchase, or of the article having
been returned to and accepted by the Vendor. In
addition to the amount of the Deposit, a Fee of
6d. for sums of £1 and under, and 1s. for amounts
in excess of £1, to cover postage, etc., must be
remitted at the same time. In cases of persons
not resident within the United Kingdom, double
fees are charged.

The amount of the Deposit and Fee must be re-
mitted by Postal Order or Registered Letter
(Cheques cannot be accepted), addressed to

"AMATEUR WIRELESS."

ADVERTISEMENT DEPARTMENT,

LA BELLE SAUVAGE, LONDON, E.C.4.

FIT YOUR SPEAKER with the "ALL WOODERN."—Maddison,
25, Ronalds Road, N.5. Manufacturer of wood horns. (29 r)
PERFECT SQUARE LAW CONDENSERS, .0005, 5s. 6d. With
Vernier, 5s. 3d. Trade samples.—**ALLITT'S WIRELESS MANU-
FACTURERS**, 59, Church Hill Rd., Handsworth, Birmingham. (18 r)
WIRELESS LEVERHOIS—Patents and Trade Marks. Advice,
Handbook, and Consultations free.—**B. T. King**, Regd. Patent Agents,
146A Queen Victoria Street, London. Phone, 682 Central.

CONJURING TAUGHT BY POST. Success guaranteed. Stamp
for particulars.—**Ernest Sewell**, 25, Cathcart Hill, London, N.19. (25 r)

WIRELESS parts manufactured—Accurate capstan, Press, vice,
milling, or Lathe work.—**Stellar Mfg. Co.**, Redditch. (10 r)

10% REDUCTION IN PRICES! Special Advertising
offer. No inferior work. Quality and Delivery Guaranteed. Sam-
ples and Price List free.—**Sargent and Co.**, (A.W.) 83, Piccadilly Hill,
Belvedere. (23 r)

2-VALVE CABINET SET, 26; 3-Valve, 27 5s. B.B.C. and Contin-
ental Stations. Loudspeaker results. Royalties Paid. 4,000 ohms
Adjustable Loudspeakers, 21s.; Headphones, 10s. 6d.; "Chronicle"
Variometers, 7s.; Complete Crystal Outfit "De-Luxe," 25s. All
Carriage paid.—**Haynes Bros.**, 6 Norton St., Liverpool. (24 r)

FOR COMPONENTS. Sets made up, estimates, etc. Terms, cash
with order.—**Rickard**, 26, Windsor Road, Siderup, Kent. (27 r)

VALVES REPAIRED for 6s. only, and every repaired valve guar-
anteed. Delivered free in London, Provinces, postage 3d. Send at
once to:—**The Eclipse Novelty Co.**, Francis Terrace, London, N.19.

PATENTS and Trade Marks obtained—**H. T. P. Gee**, Patent Agent,
Member Radio Society Gt. Britain, 51, 52, Chancery Lane, London,
W.C.2. Phone, Holborn, 1525.

SETS, PARTS, PHONES, LOUD-SPEAKERS supplied on easy
payment system. Send for latest Catalogue, just issued.—**The**
Wireless Distributing Co., Ltd., Wireless House, Stoke Newington,
Road, N.16.

ETHITA

For PERFECT Reception

IF YOU ARE IN THE CITY VISIT SPENCER'S STORES, LTD.

4-5, MASON'S AV., COLEMAN ST., E.C.2
Telephone: London Wall, 2292

F VALVE RENEWALS ALL TYPES
O KENITE PANELS ANY SIZE
R BEST PHONES from 10/9
INDIVIDUAL ATTENTION AND ADVICE

WE REPAIR BY OUR PATENT PROCESS ALL STANDARD TYPES of VALVES

(Except Dull Emitters.)

Up to 3 valves send
by letter post.

6/6
Carr. Paid.

Remittance must be
enclosed with valves.

GUARANTEE:

Equal to new or better—Return in
seven days—Satisfaction.

THE
Eclat Electric Manufacturing Co., Limited.
Spencer Works, Spencer Hill Road, Wimbledon, London, S.W.

Do this for increased Volume and Clarity



JUST take out your last L.F. stage valve and insert a Mullard D.F.A. MASTER VALVE. You will be delighted with the immediate increase in volume and clarity from your loud speaker. The special construction of these Master Valves gives powerful and pure amplification and yet requires LESS current than your present valves.

If you use a 4-volt accumulator,
ASK FOR A MULLARD D.F.A.0, Price 26/-

If you use a 6-volt accumulator,
ASK FOR A MULLARD D.F.A.1, Price 30/-

If you use dry cells (6 volts)
ASK FOR A MULLARD D.F.A.3 (.06 amp.), Price 32/-

Leaflet P.A.A gives full technical information. Obtainable from all wireless stores, electricians, ironmongers, etc.

Mullard

THE MASTER VALVE

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

LISSENIUM Coils that are responsive to faint signals



LISSENAGON Wave-length CHART

TABLE I. Wavelength range when used as Primary Coils with Standard P.M.G. Aerial and .001 mfd. condenser in parallel.			TABLE II. Wavelength range when used as Secondary Coils with .001 mfd. condenser in parallel.		
No. of Coil.	Minimum Wave- length.	Maximum Wave- length.	Minimum Wave- length.	Maximum Wave- length.	PRICE.
25	185	350	100	325	4/10
30	235	440	130	425	4/10
35	285	530	160	490	4/10
40	360	675	200	635	4/10
50	480	850	250	800	5/-
60	500	950	285	900	5/4
75	600	1,300	360	1,100	5/4
100	820	1,700	500	1,550	6/9
150	965	2,300	700	2,150	7/7
200	1,855	3,200	925	3,000	8/5
250	2,300	3,800	1,100	3,600	8/9
300	2,500	4,600	1,400	4,300	9/2

GALVANOMETERS are largely used to detect electrical currents. There is, for instance, the type known as the linesman's galvanometer, and there is the fine mirror spot-light galvanometer which costs quite a lot of money. Both are the same in so far as they are used to detect electrical currents, but there is a vast difference in the sensitivity of the two types of instruments. The spot-light mirror galvanometer will detect currents where no deflection of the needle at all could be obtained with the linesman's instrument.

Now LISSENAGON coils are to other coils what the fine spot-light galvanometer is to the linesman's instrument—they are responsive to faint signals in the same way as the spot-light galvanometer is to minute electrical currents.

The analogy can be strikingly proved by alternatively plugging in LISSENAGON coils on distant signals and then plugging in other coils. Distant stations that will be distinct on LISSENAGON coils often cannot be heard at all as soon as the other coils have been substituted. In the design and making of LISSEN-

AGON coils provision has been made for the fact that the low wave-length coils have to deal with enormously higher frequencies than high wave-length coils. Each LISSENAGON coil has been designed to be strongly resonant to a certain predetermined band of frequencies. The appropriate LISSENAGON coil for a given wave-length is more resonant to the frequency corresponding to that wave-length than any other make of coil, and will also more effectively bar out all frequencies except that to which it is definitely tuned—in other words, LISSENAGON coils are highly selective, and the circuits in which they are used can be tuned much more sharply than the same circuits when other coils are used. This gives LISSENAGON coils an immense advantage on distant Telephony. Whilst LISSENAGON coils are more efficient than any other coils, they are still interchangeable with them.

A NEW RANGE of LISSENAGON Coils

LISSENAGON "X" COILS are similar to standard LISSENAGON COILS but have the addition of two tapping points brought out to easily accessible terminals on the coil mount. Used for aperiodic aerial tuning LISSENAGON "X" COILS give very great selectivity and generally improve signal strength. No alteration to the receiver is necessary. Used in Neutrodyne circuits, the high frequency amplification obtained, when using LISSENAGON "X" COILS is remarkably stable, the use of one or other of the tapping points having the effect of neutralising the grid-plate capacity of the valve. Reaction is exceptionally smooth and much finer than is usually obtainable. The No. 60 LISSENAGON "X" COIL is now available and covers all broadcast wave-lengths whether used for aerial or anode circuit.



Price
6/4

LISSENAGON Coils tune so sharply and so strongly because they tune without energy loss.

Hold a LISSENAGON Coil up to the light—the unique air-spacing tells of low distributed capacity.

LISSEN LIMITED

16-20, WOODGER ROAD, GOLDHAWK ROAD,
SHEPHERD'S BUSH, LONDON, W.12

Telephones: Riverside 3380, 3381, 3382, 1072.
Telegrams: "Lissenium, London."