

A STATION A MINUTE *on the* "M.C. THREE"

MORE ABOUT THIS WONDERFUL SET

Amateur Wireless And Electrics

Vol. X. No. 244

SATURDAY, FEBRUARY 12, 1927

Price 3d

PRINCIPAL CONTENTS

DISTANT CONTROL FOR
YOUR SET

THE "WINTER" PORT-
ABLE

MORE ABOUT THE "M.C.
THREE"

THE TRANSATLANTIC
TELEPHONY — CAN IT
BE MADE SECRET?

THE SIMPLEST BROAD-
CAST WAVEMETER

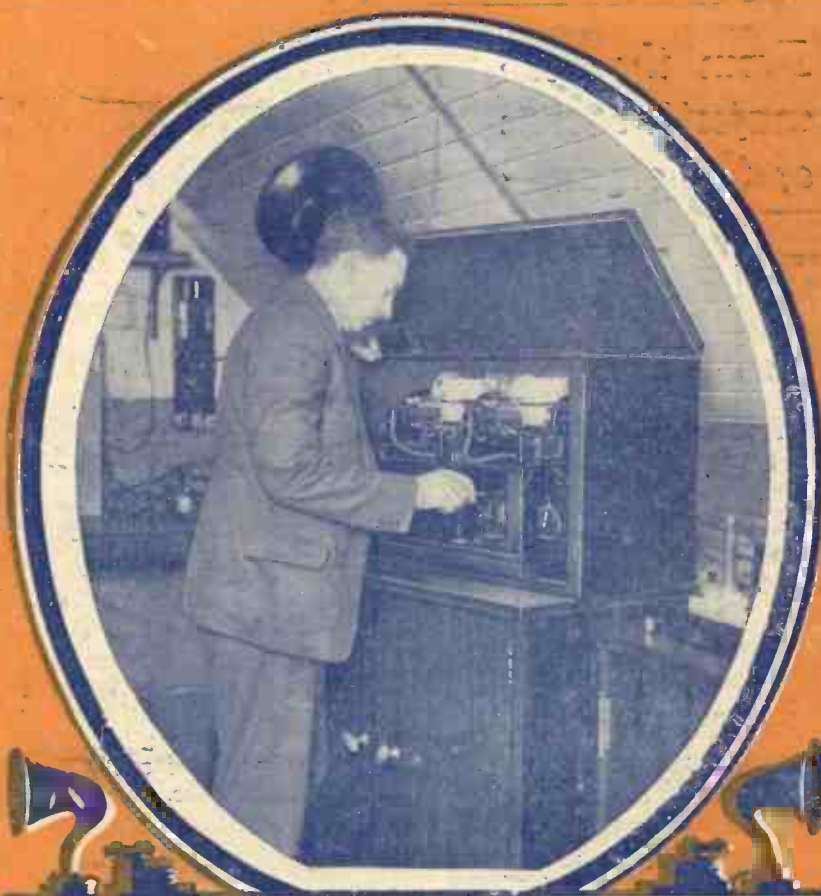
ON YOUR WAVELENGTH

THE "SAFEGUARD TWO"

**AN IMPORTANT
ANNOUNCEMENT: p. 250**

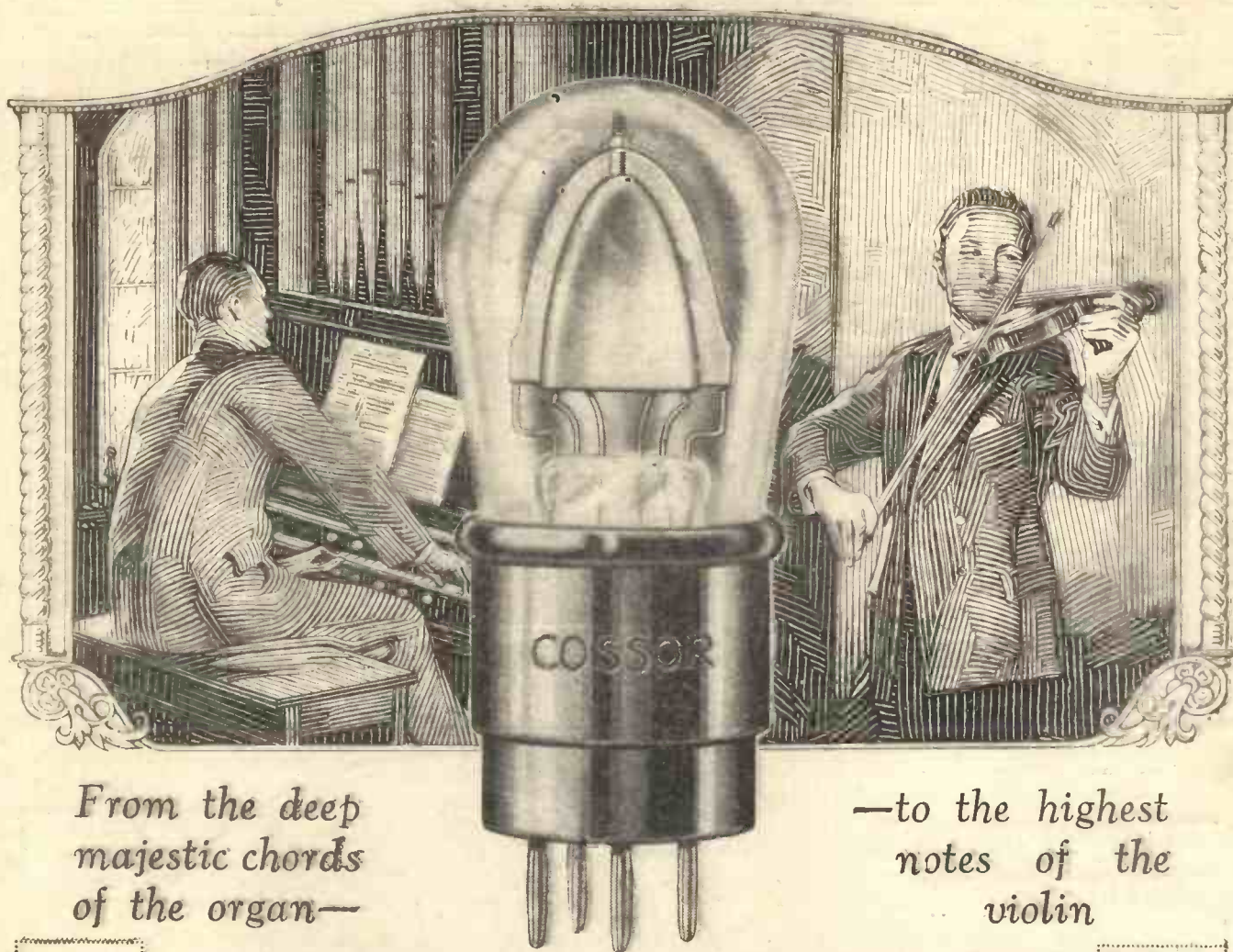
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Amateur Wireless

and Electrics

The Leading Radio Weekly for the Constructor, Listener
and Experimenter

Vol. X. No. 24

Edited by BERNARD E. JONES
Technical Editor: J. H. REYNER, B.Sc. (Hons.), A.M.I.E.E.

FEBRUARY 12, 1927

Constant Coupling Conquests—More Football Broadcasting—A Sleeping Draught!—Wireless Hotels!—On the Track!

Another Football Broadcast Coming

A RUNNING commentary will again be made on February 12, on the occasion of the England v. Ireland Rugby match at Twickenham. It will be relayed to London and Daventry, and taken via the wireless link by the provincial stations.

A Sleeping Draught!

A MONTANA cowpuncher, whose family consists of eight children ranging in age between six months and twelve years, recently appealed to the K O A (Denver) station to broadcast lullabies "to put my kids to sleep every night at 7.30"!

Constant Coupling Has Caught On!

FROM the large number of appreciative reports to hand from readers all over the country, it would certainly seem that our Technical Editor's latest development—constant coupling—has taken the radio fraternity by storm! Turn to another page in this issue for operating notes on the M.C.3, which, as readers know, incorporates the new constant-coupling principle.

Hotel Zum Rheinlandsender

THE opening of the German high-power station at Langenberg (Rhine-land) has brought such an influx of visitors to the Hordtberg, the hill on which the transmitter has been erected, that the local authorities have decided to erect an hotel in its immediate vicinity in order to make the new broadcaster one of the show places of the neighbourhood. In view of its transmissions of a well-known dance band, in the minds of Continental radio fans 2 LO already possesses a well-known Strand hotel; further it is thought to possess a church!

OUR WEEKLY NOTE

RECTIFICATION

The great question at the moment is whether "anode-bend" rectification is worth while. Admittedly the results are purer than when a grid condenser is used, but the difference is slight. On the other hand, the difference in sensitivity is considerable.

Whether or not "anode-bend" rectification is worth the sacrifice of sensitivity is a matter which each amateur should decide for himself. It is a simple matter to arrange for either method to be used at will without any elaborate switching.

If a grid condenser (with clips for the grid leak) is wired with one side to the grid of the detector valve, and the other side to the slider of a potentiometer, a grid leak can be inserted in the clips on the condenser and the potentiometer slider set a full positive. To use "anode-bend" rectification it is merely necessary to substitute for the grid leak a piece of copper tube of the same diameter and length, and to use the potentiometer.

Chocolate Soldiers!

THE little broadcasting station now working at Luxemburg advertises a relay of a military concert given at the *Place d'Armes*, in that city, every Sunday and Thursday at 11 a.m., but only in the event of fine weather. Apparently, if it rains "there ain't goin' to be no band"!

Not To Be Missed

MOST of the B.B.C. stations will broadcast the 2 LO performance of the comic opera *Paul Jones* on February 14. The music is, as readers may remember, from the pen of Robert Planquette, com-

poser of *Les Cloches de Corneville*, *Rip Van Winkle*, and other big successes.

Rival Broadcasting

2 HD, the experimental transmitting station operated by the Manchester Radio Society, has been broadcasting some really excellent concerts on recent Sundays. Whether these broadcasts constitute bona-fide experiments has yet to be decided by the G.P.O., and their finding will be awaited with interest by all experimenters. The owners of 2 HD maintain that since, in their opinion, they have undoubtedly improved the quality and tone of musical transmissions they are bona-fide experimenters, and they do not see why they should not go on improving!

Take It With You!

HAVE you ever seriously considered the undoubted advantages of a self-contained wireless set? Under the title of the "Winter Portable" is described in this issue a set which has the advantage over ordinary sets that with but little trouble it can be packed up and transplanted where you will.

On the Track!

WINDSOR "howlers" received a shock recently, when the Post Office oscillator-locating van bore down on them as a result of complaints of oscillation from listeners in that district. Several offenders were located, and the engineers found that in every case the use of reaction was being abused. The G.P.O. officials remind listeners that the penalty for oscillating is the withdrawal of their licences!

The Foldagraph!

MR. J. H. REYNER'S latest achievement is referred to on p. 250 of this issue. It is not *all* his, inasmuch as several thousands of readers have contributed to it.

PRINCIPAL CONTENTS

	PAGE		PAGE
Current Topics - - -	233	Practical Odds and Ends	246
Distant Control for Your Set - - -	234	The Simplest Broadcast Wavemeter - - -	249
The "Winter Portable" - - -	235	An Important Announcement - - -	250
More About the "M.C. Three" - - -	237	Without Fear or Favour	251
On Your Wavelength - - -	243	The "Safeguard Two" - - -	252
The Transatlantic Telephony - Can it be Made Secret? - - -	245	Our Information Bureau "A.W." Tests of Apparatus - - -	256
			258

Distant Control For Your Set

by 5 Y M

IN very many houses the one great difficulty in the enjoyment of broadcast reception is that the set has to be somewhere in the back of the house, usually for convenience of the lead-in from the aerial and to get a short connection to the main water supply, whilst the family desires to listen in a room at the front of the house.

It is well known that the expedient of taking the amplified music any considerable distance by means of two wires is not very good if pure reception is a consideration.

Single-line Supply

The connections used for feeding the loud-speaker in the case of the "Music Listener's Three" permit the use of single-line feed, as shown in Fig. 1. All that is necessary is to take a single wire from the plate terminal (L.S.) of the set to the room in which it is desired to have the loud-speaker, and arrange a simple earth outside a convenient window of that room. This earth connection is made to the other terminal of the loud-speaker.

There is no necessity to make this earth connection a particularly good one. A biscuit-tin lid, or a foot of iron tube, or even an iron spike driven into the ground is quite sufficient, provided that the ground is moist. This method lends itself very conveniently to the remote control of the set from the listening end of the wire.

Most methods of remote control that have been described hitherto necessitate a complicated relay or the making of this necessary piece of apparatus.

Relay Control

Messrs. Gamage and Co., Ltd., sell a most ingenious relay which has been specially designed for filament control. It is made up on a neat box, with a small dry battery in the base. If the little press switch, which is sold with the relay, is connected to the terminals marked 2, and the battery inside the box is connected up, pressing the switch brings the relay into action by rotating a small ebonite barrel on which contact studs alternate with blank spaces. If the spring contact is on a blank space on the barrel, a press of the switch operates the magnets and brings a contact against the spring. The next press of the switch turns the barrel again, and the spring rests on a blank. If, now, the terminals marked 1 are connected, one to the L.T. negative terminal of the set and the other to the L.T. negative terminal of the accumulator, the valves of the set will light up every time contact is made on the barrel switch, and will be shut off when the spring of the relay rests on a blank space.

To work this method of remote control with the "Music Listener's Three" only three wires are necessary. Ordinary bell wire is excellent for the purpose, and three

lengths may be taken the necessary distance and secured to the wainscoting or a picture rail by means of staples. It will be seen, by looking at the diagram (Fig. 2), that one wire is carrying the speech and music pulsations from the plate terminal of the set, and the other loud-speaker wire is the return to the earth of the set and is also used as one wire of the relay. Now the relay wires can be quite thin; as the relay battery is only in operation for the moment during which the switch is pressed.

Alternative Loud-speakers

In cases where two or more loud-speakers are used in different rooms, and some are wanted to be in operation whilst others are required to be silent, this can be arranged for as shown in Fig. 3. Here two switches are used, the second switch being of the ordinary contact kind which remains on or off. The press switch of the relay is, of course, always off until it is pressed. The second switch is placed in the lead from the plate terminal of the set. Normally it is in the off position. If reception is desired, it is closed. If one of the other loud-speakers in the house is in operation, the loud-speaker will function immediately. If no other loud-speaker is in operation, the relay switch is pressed to bring the set to life. In closing down, the relay switch is pressed and the second switch is opened. If others are listening, they have only to press their relay again to continue the programme. 5 Y M.

THE GRAMOPHONE AND WIRELESS

IT is interesting to note that instead of killing the gramophone trade, as a great number of people predicted, wireless technique has resulted in great improvements in gramophone record reproduction, as evidenced by the latest work of the Bell laboratories in America. Here the knowledge obtained from wireless broadcasting has been applied to produce a new process for the cutting of records. This new method comprises a valve-amplification system and an electro-mechanical cutter, the whole apparatus being arranged so that all frequencies are cut in their proper proportions.

The gramophone has also received serious attention, and has been designed to have the minimum of losses by reflection, very good volume range and efficiency.

S. B.

The French Bordeaux-Lafayette broadcasting station has altered its wavelength to 419.5 metres.

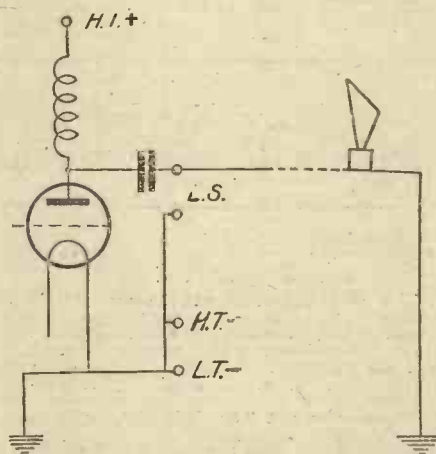


Fig. 1.—Single-line Supply to Loud-speaker.

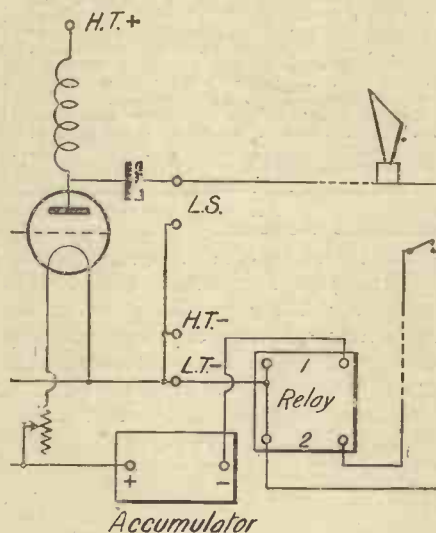


Fig. 2.—Remote Control with Relay.

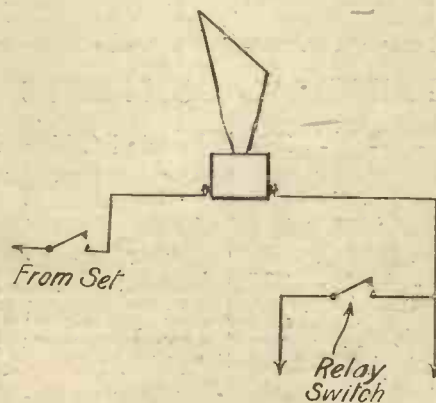


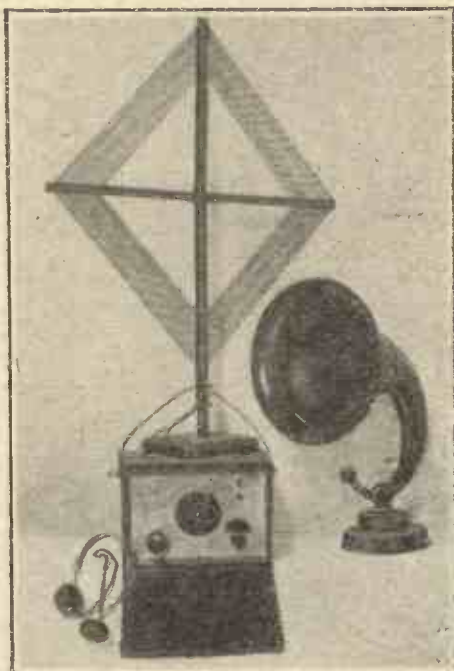
Fig. 3.—Arrangement for Alternative Loud-speakers.



A Miniature Receiver that You can Take Anywhere

A LARGE number of amateurs fail to realise the possibilities of a portable set, and when asked the question, "What is a portable set?" conjure up visions of a large leather-covered case containing a six- or eight-valve instrument with a Rolls-Royce car in the background. This, however, is not the case, as the ordinary amateur can build for himself a simple set which can be easily carried about. The advantages of a portable receiver are many. It can be carried from room to room; it can be used in the garden; lent to a sick friend; and taken to places where wireless has never been heard before. For testing purposes, where another receiving set has failed, or very poor results are being obtained, it is ideal.

The instrument which is to be described was primarily designed with the object of making a portable receiver for use with telephones for distant reception, and to operate a loud-speaker at reasonable dis-



The "Winter" Portable with Frame Aerial and Loud-speaker.

The circuit adopted (Fig. 1, page 236) was selected after a large number of tests, not only due to the low voltage required for the anodes, but also to stimulate an interest amongst fellow experimenters in four-electrode valves. The DE7 Osram valves work remarkably well with a high-tension of five pocket-lamp batteries connected in series, and the filaments may be operated from a 2-volt accumulator.

Metal Panel

One novel feature is that an aluminium panel is used, this being both cheaper and

lighter; it also automatically serves the useful purpose of an anti-capacity shield. Interchangeable coils allow for general reception, and the Polar series were chosen by the writer on account of their combined compactness and flexibility. Freedom of condenser backlash was eliminated by fitting a Metro-Vick vernier pulley-controlled condenser.

Before proceeding with the constructional matters, the writer would emphasise the importance of keeping to both the design and the components specified.

Components

The following is a list of components required:

- 1 variable condenser, Metro-Vick vernier .0005.
- 1 grid condenser, Edison-Bell .0003.
- 1 transformer condenser, Edison-Bell .001.
- 1 grid leak and holder, Dubilier 2-megohm.
- 1 filament resistance, Edison-Bell 5-ohm.

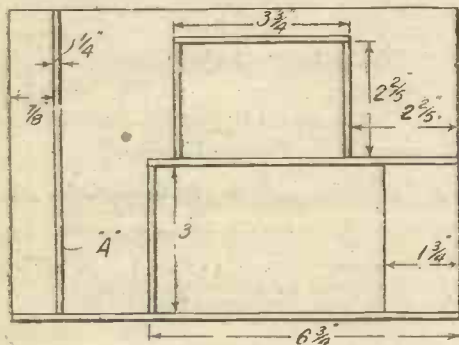


Fig. 4. Details of Framework.

tances from the local station when used in conjunction with a frame aerial and/or an earth lead. After careful consideration it was decided that, as a loud-speaker would only be used for more or less local work, compactness would be gained by not building-in the speaking unit, and further, as the majority of the potential constructors possess loud-speakers as part of their stock-in-trade, it would save the cost of another one. The frame aerial likewise is not incorporated in the cabinet.

Aerial Connections

To make the set so that it could be used under all conditions, connections have been provided for outside aerial and earth also.

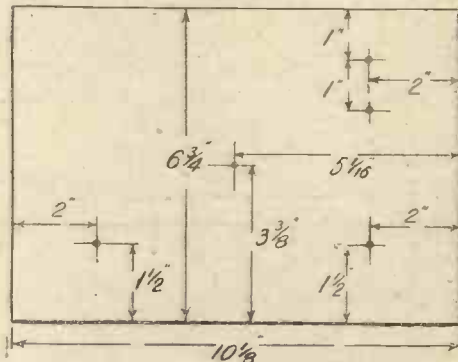
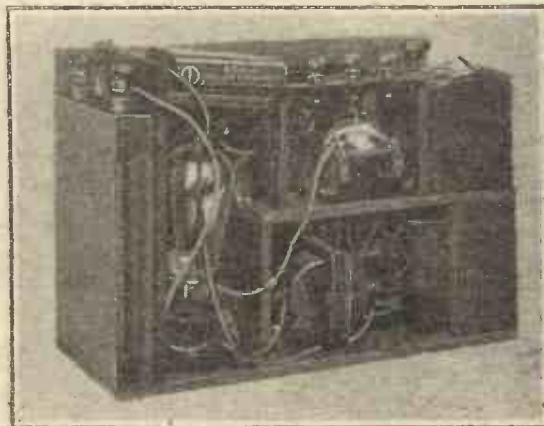


Fig. 2.—Details of Panel Drilling.

- 1 L.F. transformer, Kaynite 3 to 1.
- 1 tuning unit, Polar, with coils 400 and 500.

The Circuit

Fig. 1 gives the circuit diagram. The first valve functions as a detector, and the next valve as a low-frequency amplifier, transformer coupled. Reaction is obtained by coupling a coil from the plate circuit of the detector valve to a coil in the aerial circuit. The aerial circuit itself is tuned by a .0005 variable condenser which is placed across the frame and the aerial coil. The two valves are controlled by a single 5-ohm Edison-Bell filament resistance placed in the negative lead. The auxiliary grid and plate connections are joined to-



Photograph of Receiver with Front Removed.

gether in order to simplify the set. Before wiring is commenced, special notice should be taken of the connections of the grids; in the detector, the inside grid is taken to the grid condenser, and the outside grid to the high-tension positive. The outside grid of the amplifying valve goes to the secondary of the low-frequency transformer, while the inside grid of this valve is connected to the high-tension positive. Bear in mind also that in the case of the DE7 valve the inside grid is connected to a small terminal which is fitted on the valve cap and the outside grid is joined to the grid leg.

Grid Bias

An ordinary $4\frac{1}{2}$ -volt pocket-lamp battery is used for grid biasing, and this is inserted between the O.S. terminal of the Kaynite transformer and the low-tension negative. Connected in this manner, not only is the consumption of the H.T. reduced, but purer results are also secured. The three terminals at the back of the instrument unit provide for either the frame or earth being connected as desired. This allows the frame aerial leads to be well away from the hands when tuning.

The grid leak is not placed across the grid condenser, but taken to the low-tension positive. This prevents the burning out of a valve filament if the grid and plate are accidentally short circuited. The grid leak holder and the grid condenser are fastened to the aluminium panel with two small bolts and nuts. The panel (Fig. 2) measures $10\frac{1}{8}$ in. by $6\frac{3}{4}$ in., and

bushes insulate the stems of the telephone terminals from the aluminium. Constructional details of the cabinet are given in Figs. 3 and 4.

Operating the Instrument

Connect the frame aerial to the ter-

minate. When only a short length of wire is connected either to A or EF as the aerial, a 500-coil is suitable.

The two pocket-lamp batteries, shown in the photograph by the side of the Polar unit, are part of the high-tension; the other three batteries are beneath the shelf.

The whole of the wiring is executed with rubber-covered stranded wire.

Fig. 5 shows the necessary connections when a frame aerial is used.

Results Obtained

Tested in various parts of London, the receiver gave loud-speaker results either on a frame aerial or an earth lead. At present there are no four-electrode power valves on the market, and had they been obtainable, much more volume would have been secured.

On the frame aerial a test was conducted at Keston, Hayes and Chislehurst, and loud signals were received on the phones. Loud-speaker re-

sults were then secured by throwing a piece of wire 12 yd. long over the bough of a tree.

H. W. N.

GRID BIAS FROM H.T.

GRID bias can, if desired, be obtained from the H.T. battery. Move up the negative H.T. plug so that the grid bias may be taken from the negative end of the H.T. battery, inserting the grid-bias positive plug in the same socket as the H.T. negative plug or any other socket towards the negative end of the battery.

The negative grid-bias plugs may then

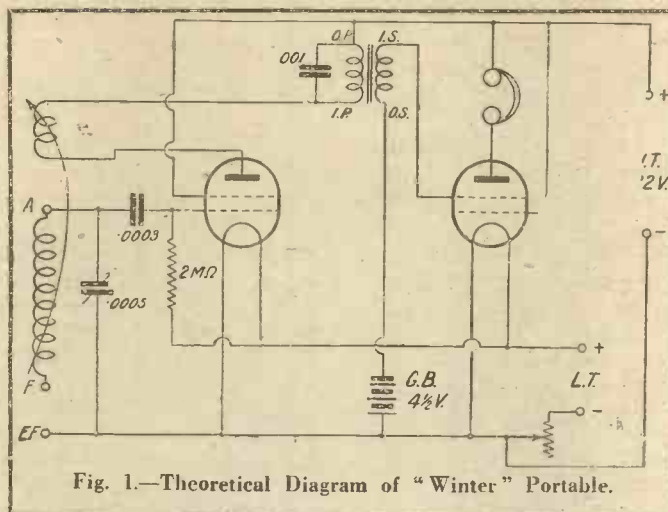
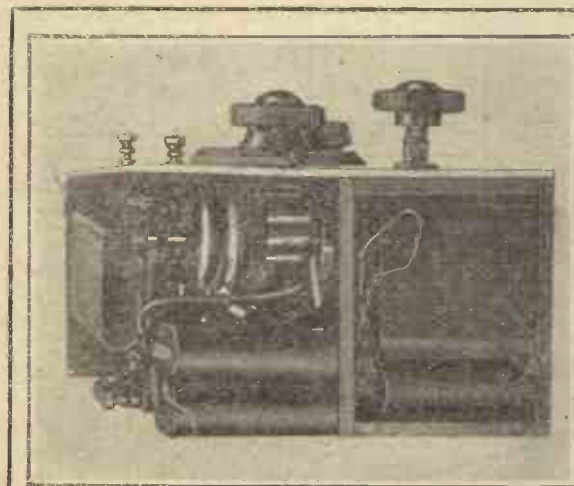


Fig. 1.—Theoretical Diagram of "Winter" Portable.

minals F and EF, which are at the back of the instrument, or alternatively run a lead from the nearest gas or water pipe and connect it to the aerial terminal A, in the latter case short-circuiting the frame-aerial terminals. The Polar coil in the aerial circuit—according to the size of the frame used—will be either a 400 or 500. With a frame consisting of 16 turns on a 30-in. cross, a 500-coil for the aerial circuit and a 400 for the reaction can be used. If the station to be received is a weak one, better results will be obtained by lowering the value of the high-tension of the auxiliary grid of the detector valve, and also



(Left).—Side View of Set Showing Coils and Batteries.

Fig. 5 (Below).—Frame-aerial Connections.

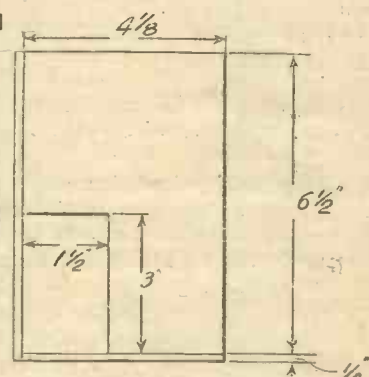
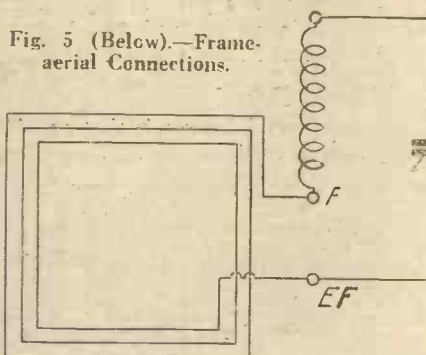


Fig. 3.—Details of Side Support for Accumulator.

is $\frac{1}{8}$ in. thick. The large central ebonite knob is the main control of the tuning condenser, and on the left-hand side of the panel is the vernier controlling knob. The filament resistance, which, as previously stated, controls both the valves, is on the right-hand side; the resistance of this component should be 5 ohms. Small ebonite

by increasing the value of the grid leak to 5 megohms. This, however, is not necessary when it is only desired to receive the local station.

A little care is needed when placing the Polar coils in position to ensure the reaction coil being put on to the spindle the correct way, otherwise the valve will not

be inserted in appropriate sockets nearer the negative end of the battery. If H.T. negative is connected to L.T. positive, the normal grid-bias voltage will have to be increased by an amount equal to the voltage of the L.T. supply, as in this case it will be equivalent to connecting the grid-bias positive to L.T. positive.

R. H. B.

MORE ABOUT The "M.C. THREE"

A Station a Minute: How to Wind the Coils: Getting the Best Results

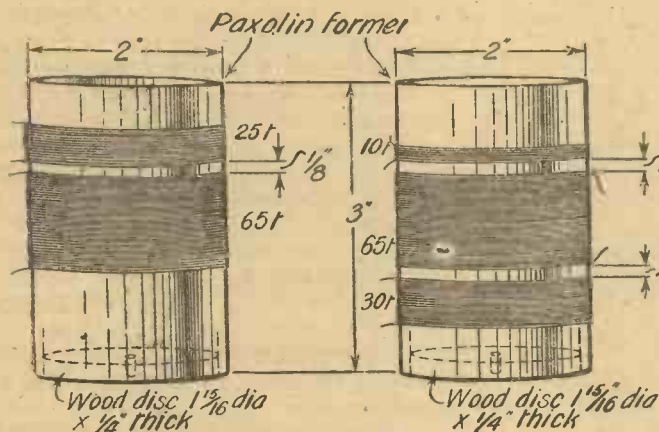
By J. H. Reyner B.Sc. (Hons) AM.I.E.E.

THE general description of the construction of the "M.C. Three" was given last week, and many readers, no doubt, will have built this set for themselves by now. A great deal of the success of the receiver depends upon the coils,

of the scale. It will be found very convenient to do the preliminary tuning on the 600-metre ship stations, which are nearly always to be found. Now increase the reaction adjustment until the receiver is just about to oscillate.

a receiver, and the H.T. voltage tapping should be altered to obtain the best results possible. Something like 40 to 60 volts will usually give satisfactory results. It will be noted that the grid leak on the detector valve has been connected to the positive of the filament, and this will give satisfactory reception on the 2-volt valves, which are exceedingly popular at the present time. With 6-volt valves, however, it may be found that this makes the grid rather too positive, and it is a matter of a little difficulty to get smooth reaction control. In such cases it is often better to connect the grid leak to the negative side of the filament. This does not reduce the strength to anything like the extent which is popularly supposed, and it certainly does give a much more pleasant reaction control, enabling the detector valve to be worked in a more sensitive position without any danger of instability.

The voltage on the H.F. and L.F. valves, both of which are provided from the same tapping, may be raised to 90 or 120 volts. The H.F. stage, by virtue of the capacity feed in the anode circuit, is quite stable however high is the H.T. voltage. As a matter of fact, in the test report which accompanies this article 90 volts was used for this tapping and 45 volts for the



All wound with No. 30 D.S.C. wire
Dimensions of Coils and Winding Details.

which, as was mentioned in the last article, are specially wound to give satisfactory coupling with the circuit and layout provided. For the benefit of those readers who prefer to wind their own coils, details of the former and necessary windings are given later on in this article. It was mentioned in the previous article that the receiver had been designed to give a certain amount of sensitivity, so that a reasonably constant coupling could be obtained once the receiver had been set, irrespective of any slight deviation in the make-up of the receiver by various readers.

It should not necessarily be expected that an absolutely constant reaction adjustment will be obtained, but it will be found that variation of the setting of the reaction condenser from the lowest point of the scale to the highest is not more than a few degrees, which is to all intents and purposes constant; and when the receiver has been nicely "hotted up" it will pull in stations by manipulating the two tuning condensers in a delightfully easy manner.

Operating the Set

The adjustment of the receiver to give its best results is a very simple matter. The various battery leads, the aerial, earth and telephones should be connected up to the appropriate terminals and the valves switched on. Set the reaction condenser about the middle of its swing, and place the two tuning condensers near the top

a fierce reaction control is not by any means the disadvantage that usually is the case.

At the same time, however, a smooth and easy reaction is a pleasant feature on



Sir John Reith, the Director-General of the B.B.C., is seen above (third from left) in the control room at the Glasgow station. On the extreme left are Mr. G. L. Marshall, the Glasgow Station Director, and Mr. D. Cleghorn Thomson, the Northern Area Director.

MORE ABOUT THE "M.C. THREE" (Continued from preceding page)

detector tapping. These values gave very satisfactory results.

Having adjusted the reaction condenser to make the receiver just about to oscillate, the tuning condensers should then be moved a few degrees at a time down the dial. It will then be found that numbers of stations can be tuned in one after the other, the approximate settings for different wavelengths being indicated by the test report which accompanies this article. The two tuning dials should be moved together, and it will be observed from the test report that in the upper half of the scale, at any rate, the dial readings are approximately the same. Towards the lower scale readings there is a slight falling apart, and the aerial condenser becomes 10 or 20 degrees below that of the H.F. stage.

Setting the Reaction

It may be found that as the receiver is tuned towards the bottom of the scale it commences to oscillate at some point, and the reaction adjustment should be slacked off slightly until the oscillation ceases. Continue to run down the scale, keeping the two condensers in tune until the bottom of the scale is reached. Right at the very bottom of the scale it may be found that the constant-coupling effect goes to pieces, and the reaction has to be taken right out before the receiver will stop oscillating. This, however, only occurs well below the 250-metre mark, so that it is not of any practical effect in ordinary reception.

Apart from this latter effect, however, it will be found that the reaction adjustment is nearly constant over the whole scale, and it should be left at the value required towards the bottom of the tuning condenser scale (at about 40 degrees). Various stations can then be tuned in by manipulating the two tuning dials, and it will be found in the majority of cases that adequate strength is obtained without any control over the reaction whatever. In some cases the station may be found to be a little weak, and strength may then be improved by a slight increase in the reaction condenser.

The delightful feature about the receiver, however, is that searching is carried out quite independently of the reaction adjustment, and as there are only two tuning dials to rotate, the matter is one of extreme simplicity. It will be observed that some twenty stations were obtained in a run from top to bottom of the scale, and more than half of these were sufficiently loud to operate a loud-speaker. In any case where the reception was doubtful the station was not put down, nor was it classified as suitable for the loud-speaker unless it was really good loud-speaker strength.

Coil Details

Details of the coils will be of interest to those who prefer to wind the coils them-

selves. They are constructed on 2-in. Paxolin formers, and comprise simple single-layer windings, both for the aerial coil and for the H.F. transformer. The coils are provided with small wooden discs in the bases, whereby they may be screwed

TEST REPORT ON THE "M.C. THREE."

Station	Wave-length	1st Dial	2nd Dial	Remarks
Gleiwitz	250	55	80	LS*
Dance music	275	80	100	Heavy mush
Edinburgh	288.5	95	115	LS
Belfast	306	110	115	LS
Newcastle	312	116	120	LS
Birmingham	326.1	127	130	LS
Nuremberg (?)	331.5	136	138	LS
London	361.4	165	165	LS
Hamburg	394.7	190	190	LS
Glasgow	405.4	200	200	LS
Unidentified	418	206	206	—
Frankfurt	423	216	214	—
Oslo	428.6	222	220	LS
Berlin	461.5	253	250	—
Bournemouth	483.9	278	275	—
Aberdeen	491.8	284	280	LS
Brussels	500	294	290	—
	508	300	296	LS

* LS denotes loud-speaker strength.

down to the baseboard of the receiver. Paxolin tube has been used because it can be obtained in 2-in. diameter size readily and cheaply, although if any reader wishes to use ebonite or fibre, this may be done. The Paxolin, of course, has the least loss of any of the usual in-

sulating materials, so that there is a small increase in efficiency derived from its use.

Owing to the fact that the various windings are all on the same former, the coupling between them is not as close as in the normal type of transformer where one winding is placed inside the other. It is essential, therefore, to keep the windings comparatively close together, and a space of $\frac{1}{8}$ in. only, as marked on the diagram, should be left between the various sections of the windings.

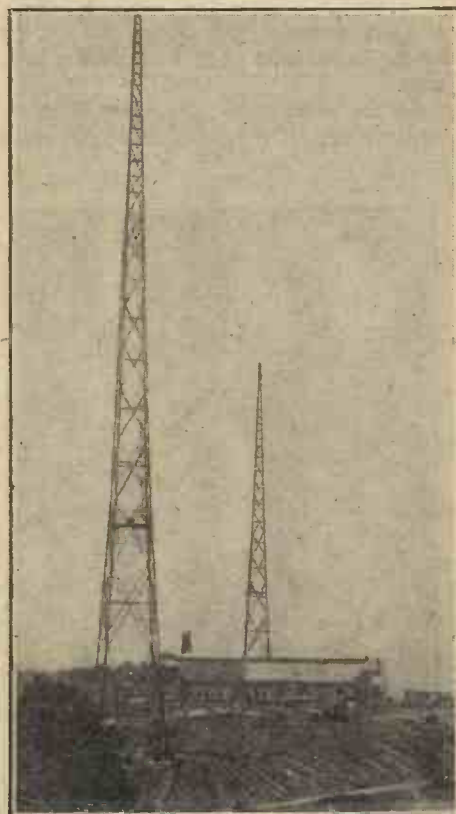
The aerial coil carries two windings. Starting at the top of the coil, we have first of all 25 turns of 30 d.s.c. wire wound in a single layer, unspaced, as shown in the diagram. There is then a gap of $\frac{1}{8}$ in., and then a winding consisting of 65 turns of the same gauge of wire in the same direction. This second winding constitutes the tuned winding, while the first winding is the aerial coupling coil.

The H.F. coil is wound in a very similar manner to the aerial coil, except that the various coupling turns are different. The primary winding of the transformer consists of 10 turns of 30 d.s.c. wire only. There is a gap of $\frac{1}{8}$ in., as before, and then the tuned winding, consisting of 65 turns of 30 d.s.c., is wound on the former. A further gap of $\frac{1}{8}$ in. is left, and the reaction winding is then wound on, consisting of 30 turns of the 30-gauge wire. All these three windings are wound in the same direction from start to finish, and are also in the same direction as the windings on the first coil.

Direction Important

This latter point is an important one, because there is a certain magnetic interaction between the two coils, which is impossible to avoid in the compact space provided unless screening is resorted to. As was explained in the last article, this was not done in the interest of simplicity, so that the interaction between the coils has to be arranged in a certain definite direction and allowed for in the make-up of the receiver. Thus with the particular layout given the interaction causes a slight damping effect in the receiver, which is made up for by the reaction adjustment. If one of the coils is inadvertently reversed, however, relative to the other, then this interaction is changed in direction, and uncontrollable oscillation will be produced.

This is the only point which is likely to give any trouble, and if the remainder of the layout is followed carefully some excellent results may be obtained. I have been particularly impressed by the simplicity of this receiver, and I have no doubt that many readers will be similarly impressed. I shall be very interested to hear the results obtained by readers, particularly in some of the provincial districts, where I have little doubt that the test report given will be considerably exceeded.



The photograph shows the new Langenburg super-power broadcasting station which recently came into operation. Using a power of 25 kw., this German "super" transmits on a wavelength of 468.8 metres.

3,600 HOURS

47, Milton Road,
Cambridge.

Nov. 15th, 1926.

Dear Sirs,

You will no doubt be interested to hear of my experience with three of your B.T.H. B5 .06 valves. Two of these, up to the present time have been used for 3,600 hrs. and the third for nearly this period.

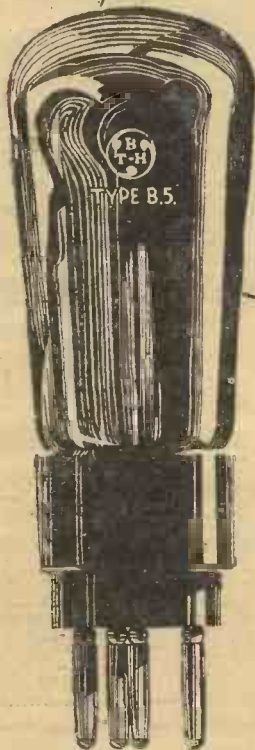
When I bought them (Jan. 4th 24.) it was after careful comparison with the best valves then on the market and in the best time I have frequently tested them alongside other makes and have failed to note any falling off in the efficiency of these valves.

On two occasions I have accidentally flashed H.T. current through the filaments, temporarily causing them not to function, but, by applying the current as per your instructions, the valves have come back to life and are an amazing testimony to your splendid production. They are used on a loud speaker set and have therefore had to work at good pressure.

Wishing you all success,

Yours faithfully,

Le. J. Stanley



B.5. VALVES

The Ideal 4 Volt Combination

High Frequency
B.5.H. 14/-
 Filament Volts 2.8
 Filament Current 0.06 amp
 Anode Volts 40 to 120
 Amplification Factor 17.5
 Impedance 55,000 ohms

Detector
B. 5. 14/-
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 Filament Current 0.06 amp
 Anode Volts 20 to 80
 Amplification Factor 7
 Impedance 17,000 ohms

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B.6. 18/6
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 Impedance 12,000 ohms

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Mr. Reyner
adjusting the
set.



The Wireless Magazine

for February, 1927

The PUSH-PULL H.F. THREE

Designed by J. H. REYNER,
B.Sc., A.M.I.E.E.

SOME OF THE CONTENTS

A WORD OF NEWS FROM
THE EDITOR.

THE PUSH-PULL H.F.
THREE. Designed by J. H.
REYNER, B.Sc., A.M.I.E.E.

LOUD-SPEAKERS FOR
1927.

POPULAR
BROADCASTERS.

BROADCASTING
PICTURES.

CAPTAIN ROUND'S
CAUSERIE: Wavelengths
and Wavemeters.

A STANDARD-COIL
TWO-VALVER.

CHOOSING A PRO-
GRAMME FOR
BROADCASTING. By
POUSHNOFF.

HEADPHONES v.
LOUD-SPEAKER.

GETTING USED TO THE
"MIKE." By Capt. JACK
FROST.

LOUD-SPEAKER
IMPROVEMENTS.

Free Coloured
Plate

Push-pull high-frequency amplification is an entirely new development due to J. H. Reyner, B.Sc.(Hons.), A.M.I.E.E., the new Research Editor of the "Wireless Magazine." It has a number of important advantages over other methods of high-frequency amplification—it minimises the number of tuned circuits, has great electrical efficiency, simplifies the reception of distant stations, and reduces cost.



The set here illustrated—the Push-pull H.F. Three—has a remarkably neat appearance, and, with the clear and detailed diagrams supplied, is not difficult to construct. Used in conjunction with an existing note-magnifying set, it will give astonishing range and volume on a loud-speaker. Buy your "W.M." now!

SOME OF THE CONTENTS

WORKING OUT A
GRAMOPHONE FROM
A CIRCUIT DIAGRAM!

MR. J.C.W. REITH'S OWN
STORY: How British
Broadcasting Started.

THE GLORIA FOUR. A
Special Loud-speaker Set.

TELEPHOTOGRAPHY. By
Dr. ALFRED GRADENWITZ.

LOUD-SPEAKERS
EXPLAINED.

"HULLO IMPERIAL!"
How Wireless is Used in
Aviation.

LOUD-SPEAKER OUTPUT
SHOULD BE MICRO-
PHONE INPUT.

ROUND THE STATIONS.

THE SELECTATUNE
CRYSTAL SET.


STUNT TESTS: Are They
Worth While?

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CRYSTAL POSSIBILITIES.

Over Fifty Features

THIS IS A SPECIAL LOUD-SPEAKER NUMBER



The name does not rotate

The head does not come off.

The slot and nut eliminate soldering.

The finish is perfect throughout.

Complete patent No. 248,921, 4th March, 1925, and registered designs.

Standard Large Insulated Model (polished black bakelite), Type B, 9d. each. Popular Model (non-insulated), Type M, 6d. each.

28 different engravings stocked. Catalogue free on request.

BELLING-LEE TERMINALS

Advt. of BELLING & LEE, Ltd., Queensway Works, Ponders End, Middlesex. M.C.14.

Weak Joints need Strong Treatment

An imperfect joint a tiny leakage gone are the chances of good, long-distance reception. The Fluxite Soldering Set will fix all joints quickly, and for ever. No trouble . . . no mess . . . and so simple.

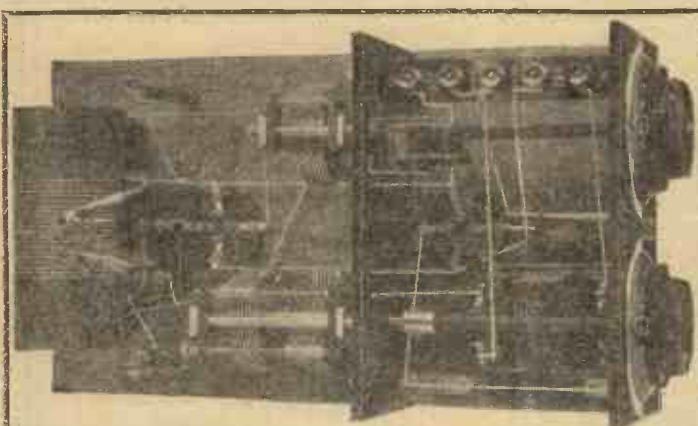
FLUXITE SOLDERING SET—complete 7/6

All Hardware and Ironmongery Stores sell FLUXITE in tins, price 8d., 1/4 and 2/8. Another use for Fluxite—Hardening Tools and Case Hardening. Ask for leaflet on improved methods.

FLUXITE, Ltd.
(Dept. 326),
Rotherhithe,
S.E.16.



FLUXITE



So that you may KNOW

we publish the following extract from one of the many authentic comments on the performance of the Short Wave Receiver.

... "We have built up a model for demonstration and must confess that it is the best Short Wave Set we have handled. It is as simple to use on an ordinary aerial as a set which has been designed for receiving broadcast. We wish you every success..."

Appearances cannot tell you what is the best range of components. The Bowyer-Lowe standardised series of components—built together in a set—make reception as perfect as possible. The Bowyer-Lowe Short Wave Receiver is a direct result of the use of Bowyer-Lowe Components—the best obtainable. Each component is made to rigid specifications for lasting and perfect service for its particular function. The Bowyer-Lowe Short Wave Receiver is a remarkably efficient set—send 1/- NOW for the Booklet giving the whole interesting story of its uses and capabilities.

Bowyer-Lowe

Announcement by the

Bowyer-Lowe Co., Ltd.,
Letchworth, Herts.

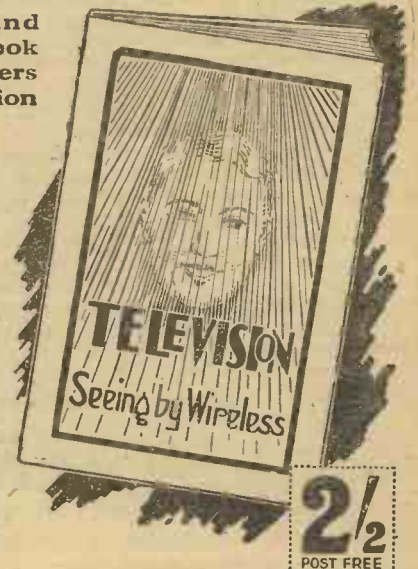
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An authoritative and popularly written book explaining the wonders of instantaneous vision by Wireless.

How many of you are aware that actual living scenes are already being broadcast nightly?

Television is now here and is developing rapidly before our eyes. As a wireless enthusiast your friends will expect you to know something about this latest wonder. Can you explain what it is, or how it is done? Get this book to-day. It explains lucidly, with illustrations, how Television is accomplished.

You can be well informed as to how events can be seen by wireless direct on a Television screen whilst they are actually happening.



CONTENTS. — Introduction. What TELEVISION is. Various attempts to solve the problem. The photo electric cell. The Baird Televisor. The problem solved. True Television demonstrated at last. 2 T V, the World's first Television Broadcasting Station. The development of TELEVISION.

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SIR ISAAC PITMAN & SONS, LTD. (Dept. A), 39, PARKER ST., KINGSWAY, LONDON, W.C.2

Amazing tributes to S.T. Valves!

We don't believe you or anyone else swallows half of what they read in any advertisements. S.T.'s say their valves give the best performance. Don't believe such a statement—without investigation, anyway. They'd probably say the same if they had a rotten valve. Well, we're only going by the fact that all valve manufacturers say their own valves are much better than others, and you know perfectly well that some valves are much worse than others. Well, to be fair to S.T.'s, let's see what responsible and independent people say about them in print or in letters.

Is the S.T. a good valve?

1. "A remarkably good one."—*Wireless World*.
2. "Cannot fail to command admiration . . . an outstanding range. . . . Through all three voltages, S.T.'s will operate with excellent results. . . . We have no hesitation in recommending S.T. valves to our readers."—*Popular Wireless*.
3. "We looked for something really good and were not disappointed, as every valve in the series came up to the maker's claims. The quality and volume are as near perfection as one could imagine."—*Manchester Evening Chronicle*.
4. "Find them very satisfactory indeed. . . . We shall have no hesitation whatever in recommending these valves. It is very satisfactory to us to know that such excellent components are available."—*Ferranti, Ltd.*
5. "Really better than is indicated by the rating."—*Wireless Trader*.
6. "They are of very high efficiency."—*The Broadcaster and Wireless Retailer*.
7. "Amongst the best we have tested. They gave great volume and exceptional purity of tone. Particularly efficient, and bring in the distant stations with surprising volume."—*Amateur Wireless*.
8. "We have tried it with excellent results. Gives remarkably good reproduction on strong signals."—*P. W. Harris, in Wireless Constructor*.

Are S.T. valves uniformly good?

1. A published statutory declaration made by John Scott-Taggart, F.Inst.P., A.M.I.E.E., before a commissioner of oaths (19th November, 1926), states that each valve is tested electrically on three occasions and once on actual broadcasting. Two of the electrical tests are the same, but are carried out by different test engineers, and each includes at least nine electrical measurements.
2. Anyone can inspect the testing work in progress at 2, Melbourne Place, London, W.C.2, and check any valves in stock against the standards.
3. The declaration states that every single valve has been thus tested, and comes within the specification.
4. "When using the H.F. valves in a superheterodyne it was noticed they were all perfectly matched, showing the extreme care the inspection department must have taken with the testing."—*H. E. Hassall, winner of the European Championship at the New York Exhibition*.
5. "As a further check, we visited S.T., Ltd., and ourselves picked specimens of the valves at random from stock. Again all were better than published characteristics."—*P. W. Harris, in Wireless Constructor*.
6. "They are, judging by the several samples of each type we have tested, absolutely consistent."—*Popular Wireless*.

Are the advertised characteristics of S.T.'s correct?

1. "Every S.T. has proved to be highly efficient, and to have characteristics as stated in advertisements. The whole range was checked and found to be as stated."—*Popular Wireless*.
2. "Every valve in the series came up to the maker's claims."—*Manchester Evening Chronicle*.
3. "The performance to be expected from the characteristic curves and technical data was obtained."—*Ferranti, Ltd.*
4. "The valve is really better than is indicated by the rating."—*Wireless Trader*.
5. "The individual specimens have shown themselves well up to published characteristics. In practically every case they have been distinctly superior."—*P. W. Harris, in Wireless Constructor*.

Are S.T.'s really built like the pyramids, to last?

1. The life of every S.T. is insured at Lloyd's. The S.T. is the only valve in 22 years, the life of which has been considered sufficiently certain to warrant the issue of such a policy. This is due to the torodium filament and Barguet vacuum.
2. No ravages of heat shorten the life of the S.T. filament—the coldest filament in the world. "No glow can be seen."—*Wireless World*.
3. If your S.T. valve should fail to give long and faithful service it will be instantly replaced by S.T., Ltd., without fuss or quibble. You can at any time send or bring your S.T. for a free "medical" report, if in any doubt.
4. A second statutory declaration has been made by John Scott-Taggart before a commissioner for oaths stating that the number of valves returned is negligible, and that there has not been a single case where replacement has been refused.

Are S.T.'s robust and non-microphonic?

1. "The valve is non-microphonic."—*Wireless Trader*.
2. "Herewith remains of an S.T.41 valve. An accumulator was accidentally dropped on it whilst it was laid on the bench. The glass, you will notice, was smashed to fragments, but the filament is still intact."—*J. Grimshaw*.
3. "Sound and robust."—*Wireless Constructor*.
4. "None of the S.T. valves are microphonic, and all are robust in construction."—*Popular Wireless*.

Are S.T.'s economical?

1. "They are economical."—*Popular Wireless*.
 2. "Their main features are economy in both filament and anode current (the readings in each case being extremely low), a high standard of efficiency, and they are inexpensive."—*J. H. E. Black, Silver Cup winner at the New York International Show*.
 3. "In spite of the very low filament consumption, the value of A.C. resistance for a given amplification factor is remarkably low."—*Wireless World*.
- (This implies that less H.T. voltage is needed while maintaining high efficiency.)

BIG VALVE PRICE REDUCTION

The S.T. Six-Volt Valves are now sold at 14/- and 18/6 (except the super-power valve), and it is consequently as cheap to buy 6-volt as 2-volt valves.

The S.T.61 H.F. valve is now replaced by S.T.61B, at 4/6 cheaper, although the two valves are similar in characteristics.

S.T.61A.—This is just out, and is a remarkably fine valve as a detector, when resistance capacity coupling is used or otherwise, and also as the first stage of resistance capacity coupling. It is also an excellent H.F. valve and gives very high selectivity. The amplification factor is extraordinarily high, and the valve is unique as regards being non-microphonic and having a long life.

Amplification Factor: 40.

Price 14/-

On Your Wavelength!

Were You One?

I AM willing to wager that not a few dwellers in the southern parts of this country got a big fright during the thunderstorms which occurred without any warning at many places recently. During the colder months heaps of us never bother to earth the aerial when we go to bed, especially if the earthing switch is outside and the night is cold or wet. Hence, if a sudden thunderstorm arrives at this time of year, not a few wireless men spend some unhappy moments. Myself, I had a great piece of luck. My own aerial, I confess, had remained attached to the receiving set for the past three or four months, but on the night before a big storm flashed and crashed and rumbled in this part of the world something inspired me to turn over the outdoor earthing switch. Hence, when I was awakened in the early hours of the following morning by one of Nature's firework displays, I felt perfectly happy, and only hoped that my neighbours had had the same kind of brain wave. I suppose really that one ought to make a practice of earthing the aerial at all times of the year when the set is out of use, for it is not only in thunderstorms that it can become charged up to a high potential. Driving powdered snow or fine rain may have similar effects.

Good Again

The week before the thundery period we had atmospherics of the intermittent "crasher" type; then came a period during which those that made noises like the tearing of strips of American cloth were in evidence. These, though, did not last long, and at the moment of writing the ether has been as quiet as one could wish for two or three days. Reception conditions are now particularly good, large numbers of foreign stations coming in at splendid strength. Those who are fond of DX work should certainly lose no opportunity of trying round just now, for it is a long time since conditions were so good. The only drawback to DX just now is the amount of howling that is taking place.

For Crystallisers

I rather thought that when Langenberg had got really into his stride his transmissions would be receivable in good localities in this country with simple crystal sets. His strength was, as you know, nothing to write home about for the first week or so after his official opening, but after that it became very big. The station has now been received on crystal sets by hundreds of people in all parts of this country. If, therefore, you are a crystalliser, and want an alterna-

tive programme, you should, at all events, give Langenberg a trial. I am not saying that you will find him, though the odds are that, if you do not live in a place where reception is normally poor and if you have a good aerial, you may be successful.

It would be just as well, before making an attempt, to see that your gear is in thorough order, and to spend a little time in finding a really sensitive spot on the crystal. When a crystal has been in use for some little time, it is apt to lose some of its old vigour. Another German station

THE "A.W." FREE PRIZE BALLOT, AND THE "A.W." "BALLOT THREE"

Do not fail to read the special
announcement on page 250.

that is quite frequently heard by crystal users is Frankfort, though his power is, in most cases, not so great as Langenberg's. At my station Langenberg's strength is not vastly inferior to 2 L.O.'s, and very respectable crystal reception is possible with a decent aerial.

Results of Piracy

It is sad to hear that the Johannesburg broadcasting station has had to close down through lack of revenue. The plain and simple reason is that wireless piracy is rampant in that part of the world, and that the Government has not taken sufficiently strong steps to enforce the payment of licence fees. Though I have never heard of its transmissions being received in this country, Johannesburg, despite its small power, achieved very long ranges in Africa; its news and entertainment programmes having been much appreciated by travellers, as well as by dwellers in out-of-the-way places. The transmitting plant is a standard $\frac{1}{2}$ -kilowatt Marconi unit, and the studio was always said to be one of the finest in the Dominions. Let us hope that the closing down of Jo'burg is only temporary.

QSL Cards

After some recent transmission tests I received the usual batch of QSL cards, and amongst these I perceived a new brand which I had not seen before. On inquiry I learned that this card, which bore the letters BRS, followed by a number, was the report of a receiving member

of the T and R Section of the Radio Society of Great Britain. It appears that the society grants members who apply for it a BRS number, which being interpreted means a British receiving station number, and this number is used by members in their reports.

Needless to say, the identification number is very much sought after by those amateurs who are not fortunate enough to possess a transmitting licence for various reasons. It certainly gives "tone" to their reports, and classes them above the amateur who is merely seeking a card in return for the mere purpose of hanging it in his den. Of course, there is no reason why this kind of trophy hunting should not be encouraged, for it gives a zest to listening, especially on the shorter waves; and the cards make a very nice wall decoration, which increases in value as time goes on, especially if the operator is able to receive foreign amateurs. The hobby of QSL hunting is growing apace in this country, and is certainly worth indulging in if the amateur is keen enough to listen for new stations.

—and QSL Equipment

If you are contemplating indulging in a QSL hunt you will have to build the necessary equipment to reach out to these stations, and the best thing to do is to build the very best short-wave receiver you can. Such a receiver is not an expensive proposition, seeing that the coils and chokes are very easily made by the amateur, and all the outlay involved is the cost of one or two 2-volt dull-emitter valves. I mention these valves because obviously the amateur who possesses a 6-volt valve set will not want to be forever charging accumulators, and it is a simple matter to tap off 2 volts from almost any ordinary accumulator to feed the short-wave set. The main thing is to see that you get some good low-loss small-capacity condensers with a vernier control, and then experiment with circuits and the few components available until you get what you want.

The cost of the average short-wave receiver need not be very high, and the low-frequency transformers need not be of the pure-tone variety, for there will be very little broadcast to listen to. Having reached the best possible results, the next thing to do is to rig up the set into a working form and hook it on to any old aerial, and you will spend many hours with the phones on before you want to change again.

An advantage of these short waves is that any aerial gives quite respectable results, and there is no need to go to any great amount of trouble in erecting some-

On Your Wavelength! (continued)

thing out of the way in aerial equipment. I know an amateur who spends many evenings during broadcast listening to short-wave signals obtained from a temporary aerial slung up in the roof whilst the broadcast aerial is used by the family. He says that it is ever so much more enjoyable than listening to the various talks and lectures now put through the ether by the broadcasting stations.

WIZ

Every short-wave listener must, at some time or another, have noted with amazement the apparently everlasting activity of the United States Government station WIZ. At midnight and at noon his crystal-clear note can be heard perpetually calling "ABC." At almost any hour between, there he is, still at it. Sometimes, of course, conditions are against him, and he does not come through to this side. But one feels sure that he is working. There is a legend to the effect that "ABC" did once answer him, and that he has been heard actually working a station instead of merely calling.

The funny men of the "ham" world assert that he is ready and waiting for the Aerial Board of Control, foretold by Mr. Kipling as the ruler of the world in the year two thousand and something, and known to the characters of his stories about it as the "ABC." Whatever he is doing, he has been at it for some years now, and if ever he stops many of us will have a distinct feeling of loss.

A Transmitting Tip

Here is a little tip that may be of use to beginners in the great transmitting game, particularly those who take their power from the mains or some form of generator, and who are troubled by reports of a bad or wobbly note. The beginner's usual procedure is to tune for maximum reading on the aerial ammeter. This puts a big load on the supply, and is often the cause of all sorts of troubles.

The best thing to do is to have the aerial coil as loosely coupled as possible—anything from five inches to a foot is not too much for an aerial tuned to a harmonic—and then tune for maximum efficiency; that is, the biggest reading on the aerial hot-wire meter combined with the lowest reading on the input milliammeter. This arrangement almost always solves the problem of getting a good and steady note. But don't forget to short your aerial meter before transmitting. If you leave it in circuit, the resistance of the wire will be almost sure to give you a chirpy note.

International Call Letters

The new list of "intermediates"—that is, international call letters—put out by

the United States amateurs is not likely to be accepted by European amateurs. It purports to be a list so complete that it will serve for all time; but it neglects the fact that the vast body of short-wave enthusiasts have got used to the present system of calls. For instance, any short-wave transmitter or listener knows the usual calls by heart. If he hears "FA," followed by a number and letters, he knows that the transmitting station is in French Africa. If he hears "B" or "K" or "U" or "Z," he is equally sure of the country of origin.

He would have to learn all the new intermediates by heart. Of course, that could be done in time; but the various European governments would have something to say. It is not at all likely that our own Post Office would consent to the letters "EG" instead of just "G" for Britain. Also, the new list altogether ignores national sentiments, which are very strong. It would take a great deal to persuade Austria to give up its "O," which is the initial letter of the Austrian name for the country. There are many other examples of this lack of knowledge and sympathy in the list as published.

Finding the Best Programme

It is amusing to note how broadcasting is just as susceptible to change and fashion as the theatre. The moment is seeing the total eclipse of "Revue" from our theatres, except, perhaps, one or two of the *intimé* variety. Likewise, the authorities at Savoy Hill have decided that the long concert must be reintroduced. Yet it is but six months ago that the idea of splitting up the programmes into small groups was hailed as the panacea of all ills, or at least the best compromise that could be found. It was argued that the long unbroken programme tended to boredom, while by quick changes the interest of the listener might be held, or that something to suit everyone would be found each night. Thus we had talks, interludes, short recitals, etc., splitting up the evening.

Now the policy is that of reversion. The exponents of the much split or revuesical programme have quietly dropped their panacea, and again we are to have two long concerts. I do not think that the loss of one of the fixed interludes will be mourned by many. This whole question is one of alternatives. At present there is practically no choice, but we are promised that towards the end of this year the new scheme for regional stations will be near completion.

Squaring up the Decks

Savoy Hill is slowly recovering from the effects of hammer and chisel. This time last year its long passages looked prim and neat. An air of finality had

scarce settled on the premises when along came an army of workmen who proceeded to pull the newly-painted walls to pieces and uproot the carefully constructed studios.

Now, after months of chaos, the scars are beginning to heal. Some beautiful studios have been added. The large one, which traverses two floors in height, has a golden colour scheme. There are also some new ones of average size.

That Choking Feeling

These additions bear the stamp of new broadcasting ideas. They are not over-draped, and they have light and plenty of fresh air. Broadcasting has always suffered from the devastating effect a studio has upon the artistic temperament. In the past a slightly excited artiste on arrival was hushed by awesome signals, led mutely to a torture chamber, and there the wretch (sic) found that a good deal of his or her voice had been left in the lift shaft. There was also little or no air. The new studios do not retain these drawbacks.

The Frogs Who Clamoured for a King!

For some little time past Paris radio fans have been clamouring for the establishment of a high-power station, and the French press in general has devoted columns on the subject of the urgency of placing France in the forefront of the radio world. At the moment all the various organisations interested in wireless transmissions are competing for the possession of France's "loud-speaker," with the ultimate result that, so far as recent reports show, Paris should in the very near future be blessed with four stations ranging in power from 10 to 60 kilowatts.

Radio-Paris during the past three weeks has been busy testing out its new 30-kw. plant at Clichy. P.T.T., equally feverishly, is working on the reconstruction of its transmitter with a view to increasing its power some twentyfold, and Eiffel Tower, without undue advertisement, has been experimenting on 50 kilowatts. As if this were not deemed sufficient, a National Broadcasting Company has been launched by the Syndicate of Wireless Industries, with a nominal capital of some ten million francs; its purpose is to acquire the *St. Assise* telegraphy station with a view to its conversion to telephony. The promoters contemplate a nine-hour broadcast programme daily. The announcement of these different competitive schemes is causing considerable excitement in French radio circles, as it is feared that should all the plans mature—a consummation devoutly *not* to be wished—chaos in the ether would be complete, and considerable harm would result to the French wireless industries.

THERMION.

The TRANS-ATLANTIC TELEPHONY

CAN IT BE MADE SECRET?

PERHAPS the most interesting feature of the new radio-telephone link between London and America is the use of a special type of radiation in which the pure carrier-wave is eliminated. In connection with this point some difference of opinion exists as to whether the transmitted messages can or cannot be received upon an ordinary broadcast receiving set.

Wavelength

The signals are sent out on a wavelength of 1,550 metres, so that they come within the tuning range of a standard P.M.C. aerial loaded to pick up Daventry.

It is certain that single side-band signals cannot be received intelligibly unless the missing carrier-wave is supplied or reintroduced at the receiving end. This eliminates the ordinary crystal set, which is incapable of producing local oscillations and could not therefore "detect" the original messages.

A back-coupled valve can, however, be made to oscillate, as we know only too well, and if tuned to the fundamental carrier frequency, it could in skilful hands be used to overhear the London-New York service.

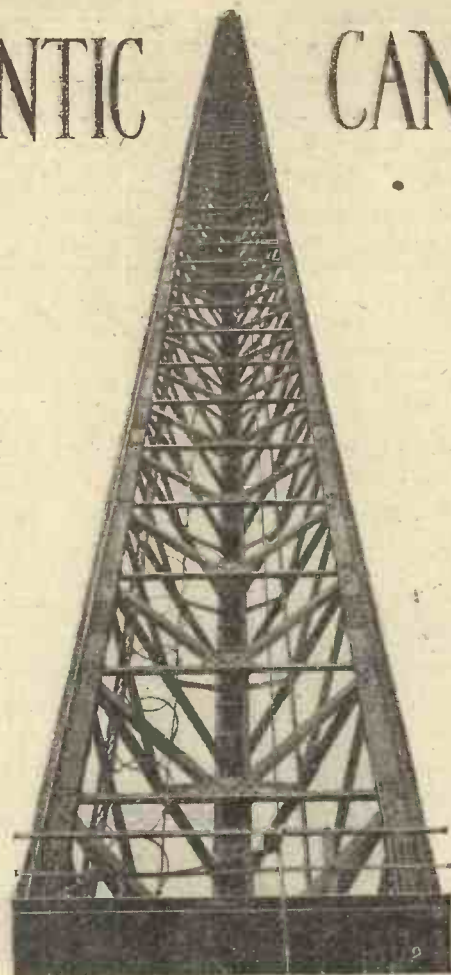
At the same time it would be difficult to intercept the messages at any considerable range without employing high-frequency amplification, which at once necessitates the use of an elaborate circuit of the super-heterodyne type. Most of the cases of long-distance "interception" recorded in the Press were no doubt secured by means of a multivalve set of this kind.

Lack of Secrecy

In any case criticisms of the new telephony service, based upon its alleged lack of secrecy, will soon lose their force. Experiments have already been made which show that it is possible to introduce complications of such a nature as to frustrate absolutely any attempt at unauthorised eavesdropping, as it is called.

One such method depends upon the use of a double or super-sonic modulation, in which either the carrier or the super-sonic frequency is continually varied or wobbled, so that detection becomes dependent upon the use of special synchronising apparatus at the receiving station.

Another comparatively simple precaution which can be taken to increase the difficulty of the outside listener is to radiate the lower instead of the upper side-band. This introduces a peculiar distortion or inversion of the original speech frequencies, which involves the use of



A new picture of one of the giant Aerial Masts in use at the Rugby Station. Over 800 feet high, an electric lift ascends the interior.

special compensating means before clear speech can be received.

Sidebands

In ordinary broadcasting, when the microphone currents are superposed upon the high-frequency carrier, the resulting complex of waves can be analysed into (a) an upper side-band in which the speech currents are preserved in their original form although each frequency is increased by a fixed amount equal to the carrier frequency, (b) the carrier-wave which contains no voice frequencies, and (c) a lower side-band in which the frequencies are equal to the carrier frequency minus the original voice frequencies.

As these are usually broadcast simultaneously and are recombined and detected by the crystal or valve, there is no particular interest or purpose served by analysing or regarding them separately. When, however, one or the other of these components is deliberately excluded from the transmitting aerial, as is the case in transatlantic service, then a very important distinction comes into play.

As previously explained, if the upper side-band is chosen for radiation, it is only necessary at the receiving end to reintroduce the missing carrier-wave by means of a local oscillator.

If, on the other hand, by using suitable filters, only the lower side-band is radiated, then the use of a simple local oscillator does not suffice to restore intelligible speech at the receiving end.

In this case detection by means of a local oscillator will produce speech in which the high-pitched notes are inverted into low-pitched notes, and viceversa. Whilst this may not in itself ensure absolute secrecy, it goes a long way towards that end.

Receiving Apparatus

The receiving apparatus at the Houlton Station, in Maine, U.S.A., would, of course, be fitted with special demodulating valves, adapted to compensate for the deliberate inversion, and to restore the message to its clear form.

Quite apart from any question of secrecy, the use of carrier-eliminated side-band telephony has certain other definite advantages.

Although waves much longer than those now used for the London-New York service have previously been employed for wireless telegraphy, their application to the transmission of speech raises several points of peculiar difficulty as regards ether congestion.

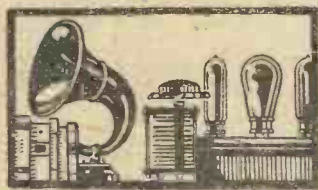
For undistorted telephony, in the ordinary way, a band of frequencies ranging from a lower limit of about 30 to an upper limit of about 5,000 is required. When this low-frequency band is modulated on a carrier-wave of 1,550 metres (194,000 cycles per second), two side-bands are produced, the lower side-band comprising the frequencies 189,000-193,970, and the upper side-band 194,030-199,000.

Thus, practically, the whole range of frequencies from 189,000 to 199,000 is occupied by one single telephony channel through the ether. In these circumstances the number of long-wave ether channels available for telephony is surprisingly small, particularly when allowance is made for the gaps already torn in the ether by existing long-wave telegraphic services.

Fortunately, the outlook is not quite so unpromising as would appear. Owing to the use of single side-band radiation, the suppression of one side-band results in two channels being made available where only one channel would exist if the full carrier were radiated.

In point of fact, the frequency range of 5,000 for the speech band necessary for undistorted reproduction could probably be reduced to 3,000 for commercial communications.

M. A. L.



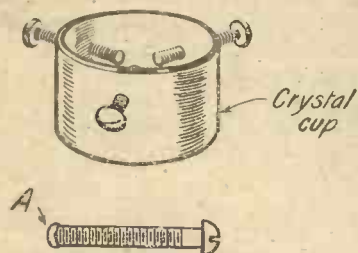
PRACTICAL ODDS & ENDS



Preventing Crystal Breakage

MANY good crystals are broken when tightening up the detector cup screws in order to make a good contact.

A simple method of preventing breakage which has been successfully used is shown in the diagram.



An Improved Crystal Cup.

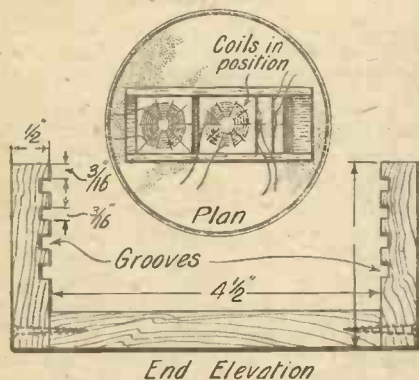
A small blob of soft solder should be melted on to the end of each screw as shown at A.

This can be done while the screws are in the cup if the ends are first tinned. On tightening up the screws on to the crystal the solder tip will be found to give a little and hold the crystal firmly at the same time, making good contact with the latter.

M. R.

A Four-way Coil Holder

IT is sometimes necessary for the experimenter to have a four-way coil holder.



Home-made Four-way Coil Holder.

Shown in the sketch is a simple method whereby four basket coils can be variably coupled together.

Three pieces of hardwood, dimensions of which are shown, are required for the coil stand. One piece is used as a base, and the other two as upright supports for the coils.

Four grooves are cut on the inside of

each support, the width of which will depend on the thickness of the coils.

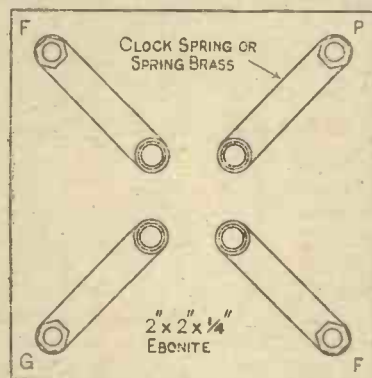
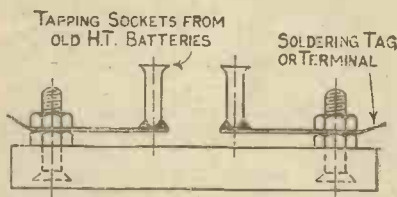
The grooves can, if desired, be arranged to take thin sheets of ebonite or wood on which can rest the coils.

J. G. S.

Anti-microphonic Valve Holder

SHOWN in the drawings below is a home-made anti-microphonic valve holder, which can be made from odds and ends.

Four sockets from an old tapped H.T. battery are required. These are used as valve sockets, and if they are slightly "pinched" they will be quite efficient for the purpose.



Details of Anti-microphonic Valve Holder.

Four shaped pieces of spring brass are arranged as shown in the lower drawing, the four outer ends being connected to terminals mounted on a 2-in. square of ebonite.

If the four battery sockets are slipped on to the legs of an old valve it will be easy to solder the sockets to the inner ends of the strips of brass, so that the spacing between the sockets is accurate.

R. B.

Guarding Against H.T. Battery Short-circuits

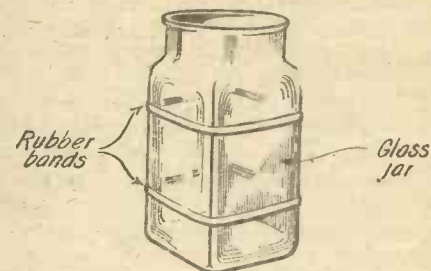
IF the H.T. battery is not enclosed in a cabinet, always stand it on its edge. It will then be impossible for people thoughtlessly to put metal ash trays, scissors, etc., across the sockets, and shorts are prevented.

R. H. B.

Protecting H.T. Battery Cells

TO prevent damage to the glass container of a wet H.T. battery, the writer has successfully used rubber bands cut from an old cycle inner tube.

These are placed round every alternate



Protected Battery Container.

cell and enable the cells to be wedged firmly in the box without risk of breakage.

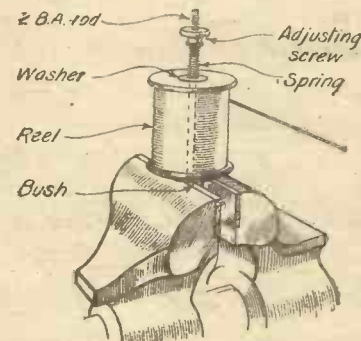
This enables the whole battery to be turned upside down (after removing the elements), when it is required to empty the cells for refilling with fresh solution.

R. M.

A Simple Coil Winder

WHEN a coil has to be wound single-handed it is necessary to improvise some method of keeping the wire taut. The sketch shows a simple coil winder which can be assembled in a few minutes.

First clamp a length of 2 BA rod in the



A Simple Coil Winder.

jaws of a vice. Then slip over this rod the reel of wire.

Over the reel slip a short coil spring, and press this against the reel with a terminal head. Washers and additional nuts can be added as desired.

N. P.

"A.W." Solves Your Wireless Troubles



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Now that the wavelength question has been effectively disposed of, the supersonic heterodyne receiver comes more and more into its own.

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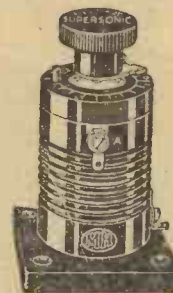
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1 MH Tuned Filter	21/-	
1 MH Autodyne No. 1 and Reactor Unit for Broadcast Band ...	21/-	

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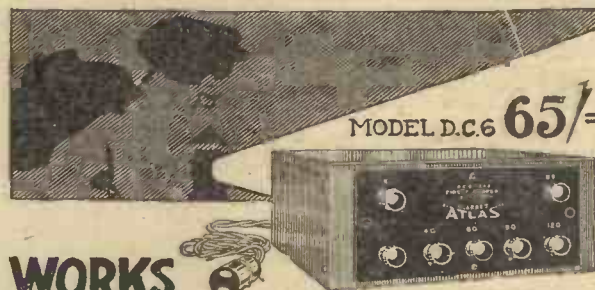
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A Front View of the Simplest Broadcast Wavemeter.

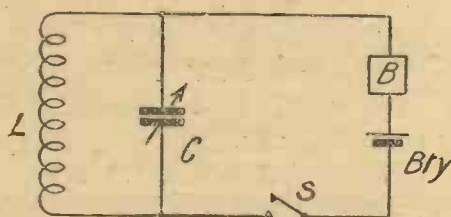


Fig. 1.—The Circuit Diagram.

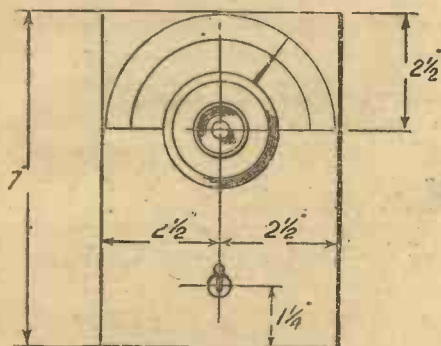
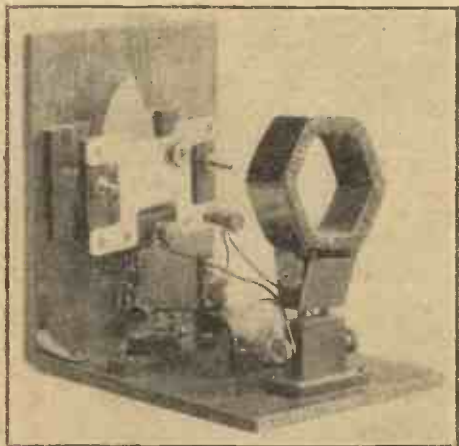


Fig. 2.—Layout of Panel.



The Simple Construction of the Wavemeter will be Apparent from this Back-of-panel View.

The SIMPLEST BROADCAST WAVEMETER *and how to make it*

THE wavemeter is an almost essential accessory for anyone who goes in at all for long-distance reception, especially if his set is, as it should be if success in this line is looked for, so selective that tuning is very sharp indeed. Where there are several circuits to be kept in resonance, searching is an exceedingly difficult matter without a wavemeter, for one can never feel quite sure in moving up and down that all are exactly together unless there is some means of testing the tuning from time to time. The possession of a wavemeter, besides greatly assisting the picking up of known stations, also makes it comparatively easy to identify an unknown transmission that has been tuned in. All that one has to do is to take the wavelength of the station with the meter and then to refer to the list of regular transmissions which appears weekly in *AMATEUR WIRELESS*.

A Good Testing Instrument

And there is one other point of importance about the wavemeter; it enables you to determine at once whether your set is working properly or not. Suppose, for example, that you are listening to the local station and that signals die away until they finally disappear. Is your set at fault, or has there been a breakdown at the other end? Set the wavemeter buzzing and adjust its pointer to the local station's wavelength. If you hear the note as loudly as usual, the fault is not yours; but should nothing be heard, then something is wrong with your set.

The loudness of the note obtained when all circuits are tuned to resonance is also a good indication of the condition of the set. If it is heard at a good deal below normal strength, you know at once that something is wrong; probably one of the batteries is run down, or if these are fully "up," one of the valves may have lost its emission.

For the purposes of the average amateur a precision wavemeter of the laboratory type, which will read to a fraction of a metre, is quite unnecessary. To purchase or to make such an instrument would in-

volve a considerable outlay, and in use it would not be found much more helpful than a simple instrument of the kind to be described, which can be put together for very little cost. The meter illustrated in the photographs was made up in a couple of hours, and it is quite as accurate as one can reasonably desire over the broadcast waveband. It is generally held that with such an instrument the average error to be expected is about plus or minus two per cent.; that claimed in the present instance is rather less than one per cent., though in actual working results are even better than this.

Components

Now that a new scale of broadcast wavelengths has been adopted on a frequency basis, readers must please themselves whether they use a square-law condenser, which gives practically equal spacing all round the scale of wavelengths, or a straight-line-frequency condenser, which gives similar spacing to frequencies. Whichever type of condenser is decided upon, the construction of the wavemeter is unaffected. The components required are:

Square-law (or SLF) variable condenser, .0003 microfarad (Ormond).

On-and-off flush-mounting switch (Grafton Electric Co.).

Silvertown buzzer (Grafton Electric Co.).

Baseboard-mounting single-coil holder (Grafton Electric Co.).

Single small dry cell (Ever-ready).

Mahogany or oak panel 5 in. by 7 in. by 1/4 in.

Baseboard 5 in. by 7 in. by 1/2 in.

One No. 60 coil (Lissen).

Two small brackets (obtainable from any ironmonger).

Glazite for wiring.

The Circuit

The simple circuit is shown in Fig. 1. What happens briefly when the switch S is closed and the buzzer B set going is that every time the armature makes contact the condenser is charged up, whilst when the contact is broken owing to the armature being pulled away by the magnets, the condenser discharges through the coil L. Since L and C form a tuned circuit, this can be brought into resonance with any wavelength within the limits of the coil and condenser, and oscillations at the corresponding frequency are radiated from the coil. Thus when the wavemeter is brought near a receiving set tuned to the same wavelength, these oscillations are picked up, amplified and rectified, and then the note of the buzzer is heard.

Fig. 2 shows how the wooden panel is marked out and drilled. Having done this, mount the condenser and the switch and attach the panel to the baseboard by means of two small metal brackets. Next mount the buzzer upon a small piece of wood, ebonite or fibre, making recesses in the material for the projecting parts so as

(Concluded on page 264)

NEXT WEEK

The
"A.W." "Ballot Three"

Designed by

J. H. REYNER, B.Sc.(Hons.), A.M.I.E.E.

A NOVEL AND IMPORTANT GIFT

EVERY reader will remember the AMATEUR WIRELESS Free Prize Ballot, a competition which we announced in the Christmas Number published December 11 last. We asked readers to answer twelve different questions, and in due course we received many thousands of such replies, from which we have been able to extract information showing quite clearly the popular trend in receiver design.

We made over the results to Mr. J. H. Reyner, B.Sc.(Hons.), A.M.I.E.E., and he has been engaged for some time in studying them and in designing, constructing and testing a three-valver based upon the data produced by the competition. Next week he gives the result of his work to our readers in the form of a

FOLDAGRAPH

A combined full-size layout blueprint and constructional guide, absolutely complete and self-contained

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Will every reader do us the favour of ordering next week's copy at once? Special numbers such as these go out of print very rapidly and it is quite impossible to re-print to meet any extra demand that has not been anticipated. So please tell all your wireless friends and ask them all to

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WITHOUT FEAR OR FAVOUR



A Weekly Programme Criticism by Sydney A. Moseley

It will come as a surprise to a good many readers to know that although the B.B.C. is in the nature of being under Government auspices, the staff are the hardest worked in the Civil Service. The other night I was passing Savoy Hill on my way to the station, and I saw two of the staff coming out laden with parcels.

"Now then—what's that you're carrying?" I said in my special constable tone. Alas! it was home-work that these fellows were carrying after a hard day's grind.

"It's the only way I can tackle this job," one of them said to me.

No doubt in the course of time these things will be altered, but readers may take it from me that it has been no mere child's play running the programmes up to now.

That, I admit, is not the concern of the public, although, when you have a knowledge of such things it helps one to moderate armchair criticism.

Who was responsible for timing Delius's programme? Quite charming music, I am sure, and I hope the eminent composer appreciated this somewhat tardy recognition of his genius. Mr. Geoffrey Toye conducted the Wireless Symphony Orchestra for this hour's programme, and the timing was only 25 per cent. out! The result was that the popular classics had to suffer. Mr. Edward Isaacs's second Chopin pianoforte solo, the Impromptu in G flat, had to be sacrificed, as well as the Five-four Movement from the Pathetic Symphony. That is not the way to popularise unknown works.

By the way, those who are responsible for the news bulletin seem to have a strange idea of news value. Apparently, social events have more importance in the eyes of Savoy Hill than news items of world-wide interest. The news about China, for instance, comes after a detailed report of Lord Something-or-other's birthday. That is unmitigated snobbishness or sheer journalistic incapacity.

In regard to my recent criticism of the Sunday service, I am glad to say that the last studio service I heard was a great improvement. The Rev. John Bevan, of the Balham Congregational Church, is a pleasing speaker and knew when to stop.

Nor was he quite so dogmatic as a good many other wireless preachers. The choir, too, sang beautifully, and, as I say, I cannot see that it is necessary for local choirs to come into the picture at all.

The Casano Octet made quite a good Sunday turn, and the reading of the description of the death of Socrates by Mr. J. C. Squire was simply and eloquently rendered. Although the announcement, breaking in as it did between the items of the Octet, chilled me somewhat, it wasn't very long before Mr. Squire warmed me to sincere admiration.

Shaw, needless to say, did the trick again. If only they could get him to be an announcer-in-chief! He made up for the controversialists, Lady Rhondda and Mr. G. K. Chesterton, who both dealt with amazing vagueness on a subject bristling with good points. Lady Rhondda, for instance, spent a quarter of her time in an unnecessary introduction, while G.K.C. went well beyond his time, and only succeeded in entertaining us with his own inimitable chuckles. It is a curious thing that these broadcast debates

from the Kingsway Hall have been rich in names but dismally weak in debating points. However, it was an hour well worth while, if only for Shaw's sake.

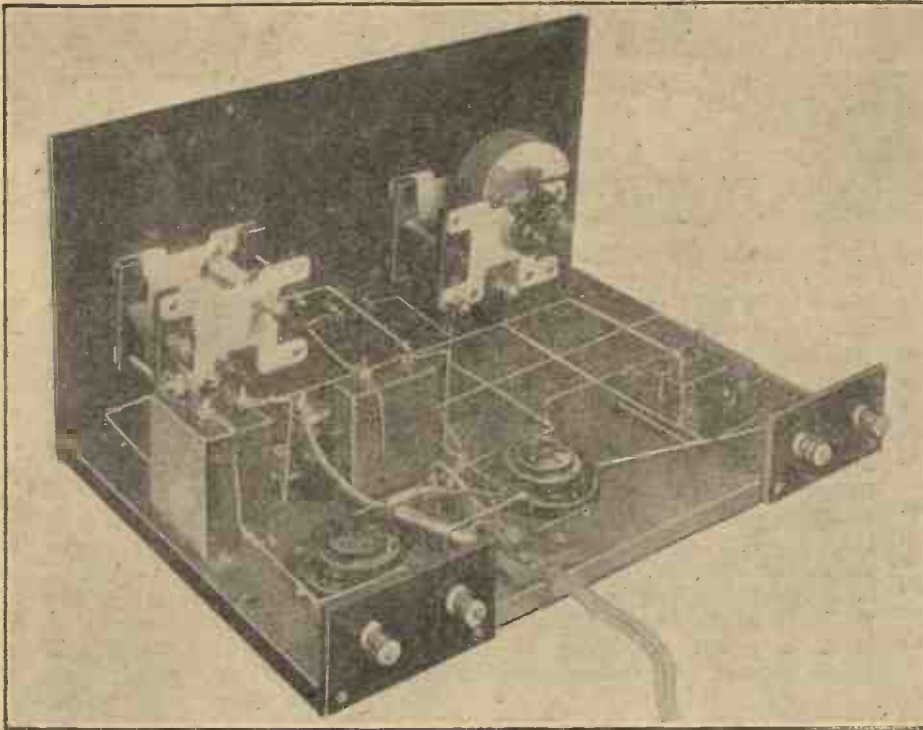
I would have given anything to have heard the comments of a good many listeners on the Stravinsky broadcast. The introductory apology to listeners that some of the notes might seem to be out of tune was not borne out. I found the weird music fascinating, and the play itself was admirably read. In the room with me were half a dozen low-brows, and I apologised for keeping the wireless on. "Not at all!" was the hearty reply. "This stuff is much better than your Bach fugues and things." Which surprised me not a little.

It is a pity that Captain Harry Grahame's "Ought the children—or not?" developed into a reading instead of a talk. When I first made my appearance before the microphone, it was pointed out to me very earnestly that one should try and be as conversational as possible. I find that this excellent rule has been forgotten of late.



LADY RHONDDA TILTS WITH MR. CHESTERTON.

George Bernard Shaw presided at a debate relayed from Kingsway Hall and broadcast from 2 L.O. The subject of the debate was "Is there a menace associated with women of the leisured class?"



The Simplicity of the Receiver is apparent from this Photograph.

SEVERAL circuits have been devised for preventing radiation from a receiving aerial, but for the most part they are complicated, and have necessitated very careful arrangement and adjustment of the apparatus. A very large number of experimenters normally pick up distant stations by using direct reaction from the detector valve into the aerial circuit. This being the case, the writer carried out some experiments with a view to arriving at a circuit which, although directly oscillating in the aerial circuit, would radiate only to a very small extent.

A Simple Principle

We know that the greater the power we apply to an oscillating valve the greater will be the radiation, and, of course, the greater will be the amount of interference which will result. What we have to do, therefore, is to see if we can make the power supply to the oscillating valve in the aerial circuit so small that the resulting radiation will not be sufficiently powerful to carry any appreciable distance.

Fig. 1 (p. 254) shows a circuit which fulfils these conditions. Actually it looks perfectly straightforward, and the success of the arrangement simply depends upon the values which are chosen for the various components. If we want to make the power expended in the valve very small, it means that we must work at a very low anode current, which, in turn, necessitates the use of a very low voltage. The first step, then, is to use a very high impedance valve. A high-impedance valve,

however, is conveniently coupled by means of a resistance, and since we have, therefore, to use a high-impedance resistance-coupled valve, we can conveniently employ bottom-bend rectification.

If a valve is to rectify efficiently in this manner when the aerial circuit is connected to the negative end of the filament, we require a very low anode voltage, and we can obtain this by feeding the anode through a high resistance of the order of anything from 100,000 to 250,000 ohms, using a high-tension voltage of the order of 20 to 25 volts. Under these conditions the valve functions extremely well as a detector of weak signals, i.e. under conditions when reaction and actual oscillation may be required.

In Fig. 1 the reaction coil L_2 is shown in series with

THE "SAFEGUARD"

Oscillation Wires

By PAUL

a coupling resistance R_1 , which has to be shunted by a by-pass condenser C_2 . The valve is not connected directly to the grid, but is taken to a tapping on the aerial inductance. This arrangement, of course, is optional, but tends to minimise still further the radiation from the circuit. It is interesting to note that under normal working conditions the anode current is not milliamps, but only a comparatively few microamps.

Some Experiments

A set embodying this circuit was allowed to oscillate, and was connected to an aerial parallel with and about twelve yards from another similar aerial. No howling (trace of radiation) was experienced when listening on the other aerial.

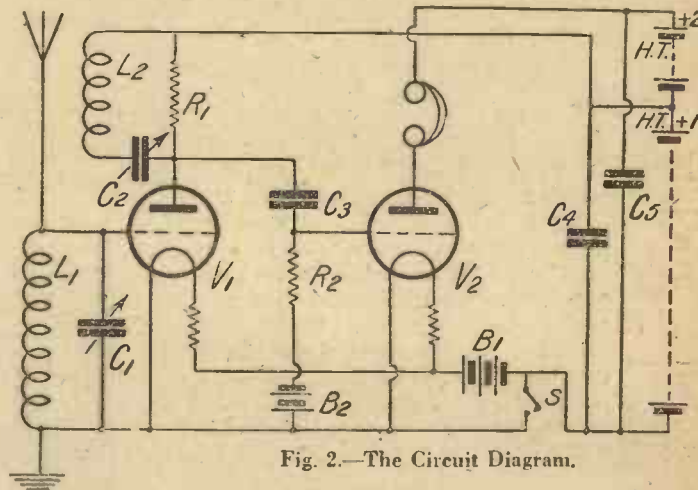


Fig. 2.—The Circuit Diagram.

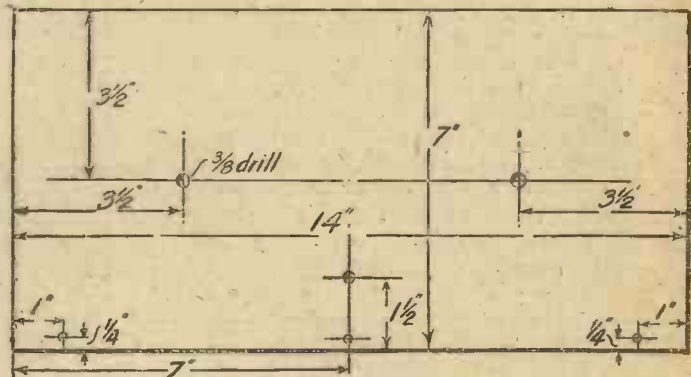


Fig. 3.—Drilling Diagram of Panel.

GUARD TWO"

without Howling

D. TYERS

although when the other aerial, which was used with an ordinary type of oscillating valve receiver, was caused to radiate it completely interfered with the reception on the special circuit. Tests were also made at greater distances, but again no appreciable radiation was experienced. The oscillating valve in the special circuit which has just been described must be a very high resistance valve. A Cosmos short-path blue spot valve is a suitable example of a two-volt valve, while a SP55/B, DE5B or PM5A are suitable 6-volt valves.

The Circuit

Fig. 2 shows a two-valve receiver utilising the circuit arrangement shown in Fig. 1. The reaction is controlled by a variable condenser C2, the reaction coil

being permanently fixed at the side of the aerial coil L1. The reaction circuit L2 C2

is a shunt arrangement, and is connected across the coupling resistance R1 (250,000 ohms).

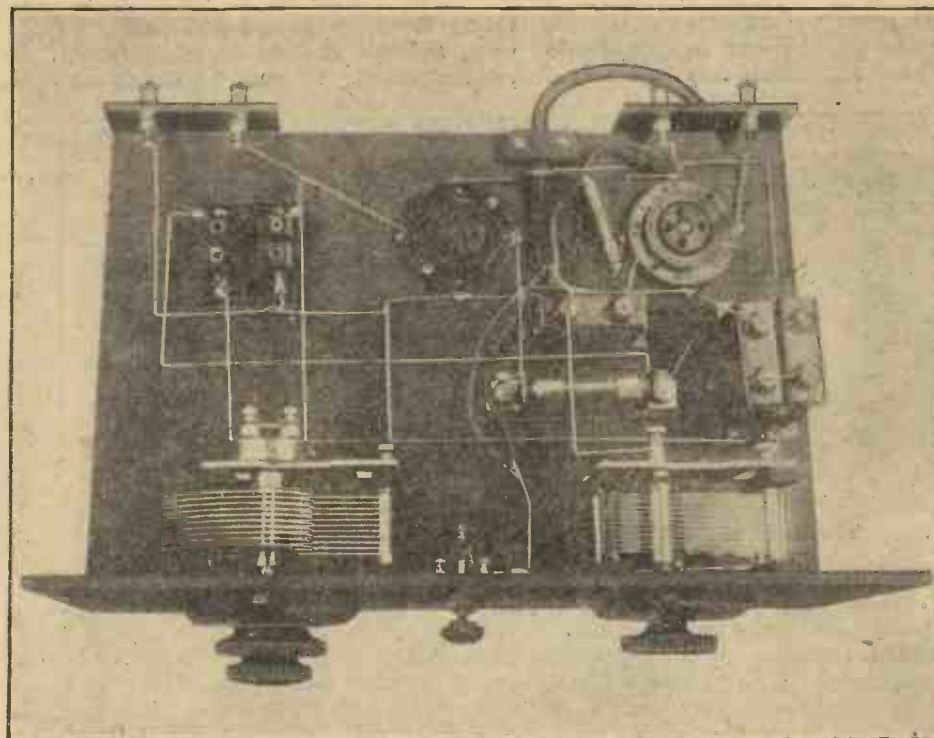
If desired, of course, an ordinary series reaction coil variably coupled to the aerial coil may be used instead, and does not affect the arrangement at all, except, of course, that a by-pass condenser of about .0003 microfarad must be connected across the coupling resistance. The rectified currents are transferred from the resistance through a coupling condenser C3 of .1 mfd., a grid leak (R2) of $\frac{1}{2}$ to $\frac{1}{4}$ megohm being connected between the grid of the second valve and a negative bias battery B2. The second valve should be a lower impedance valve when used to work a loud-speaker from a local

station, a valve such as Cosmos short-path red spot being a suitable 2-volt valve, while a DE5 or a PM6 may be used for 6-volt valves. When the set is used with phones only, for reception of distant stations a very much higher-impedance valve may be used, when the amplification of the arrangement will be considerably increased. In fact, one may use in the second stage a valve similar to that used in the first, with the exception that the grid bias must be considerably reduced.

Construction

The illustrations Figs. 3 to 6 show the layout and general construction of the set. The front panel carries a tuning condenser of .0005 microfarad, with a slow-motion control, and a reaction condenser of .0003 microfarad or .0005 microfarad, the lower value usually being sufficient. The aerial and reaction coils are held in single-coil mounts fixed to the baseboard, the relative direction of the plug and socket members being important. The front panel also carries an on-and-off switch, which breaks the filament circuit. It would be better, however, to employ one which breaks both the filament and high-tension circuits.

A 250,000-ohm resistance and a .1 microfarad coupling condenser and the grid leak are mounted behind the reaction condenser, while to the left are the two shunt condensers across the H.T. tapplings, these condensers being about 1 microfarad. The two valve holders are at the back of the baseboard, which carries two terminal



A Plan View of the "Safeguard Two."

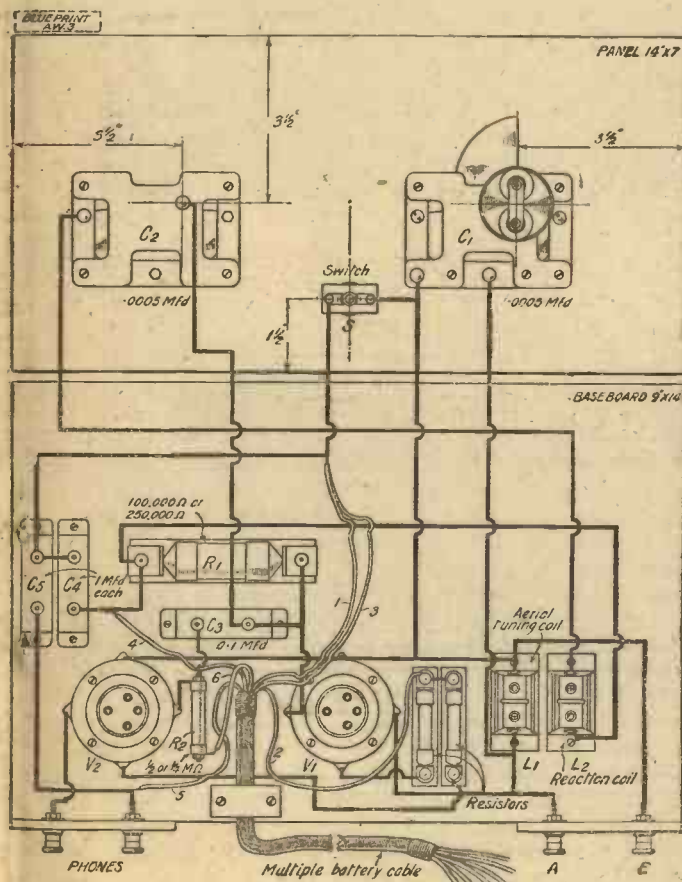


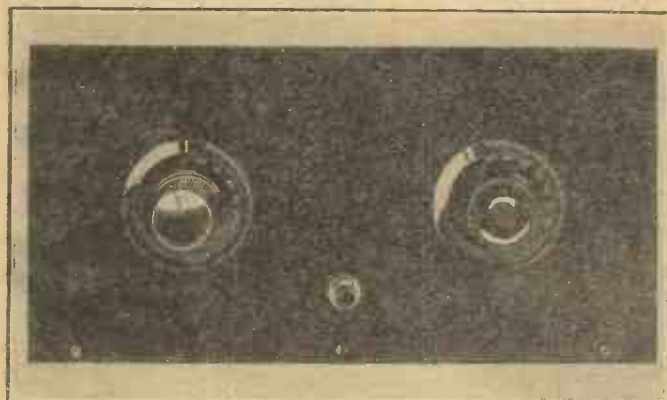
Fig. 4.—Developed Wiring Diagram.

plates for the aerial and earth and phone or loud-speaker terminals respectively.

A multiple battery cable will be recognised for supplying the power to the set, but if preferred, of course, an ebonite strip with a row of terminals may be mounted

valve may be increased, practically no reaction being necessary. When, however, the set is used for distant reception, the voltage should be lowered to about 20 or 24 volts, and full reaction up to oscillation point employed. The aerial is shown con-

be necessary. With some valves, and with a very high resistance aerial and earth circuit, the set might not oscillate at all. In this case it would be necessary to include a high-frequency choke in series with the coupling resistance to the first valve. This



The Panel of the "Safeguard Two."

along the back of the baseboard. The dimensional drawing will assist in laying out the panel. No special precautions need be taken with regard to the wiring, which is straightforward. It will be noticed that no filament resistances, either variable or fixed, are shown in the photographs, as it was intended to be used with a battery to which was connected a master rheostat;

connected directly to the top of the tuned circuit of the grid of the valve, but, as previously explained, it may be taken to a tapping on the coil, or used with one of the special coupled aerial coils with which readers are no doubt familiar. This type of aerial circuit, while perhaps lowering the signal strength, will give increased selectivity and minimise the radiation.

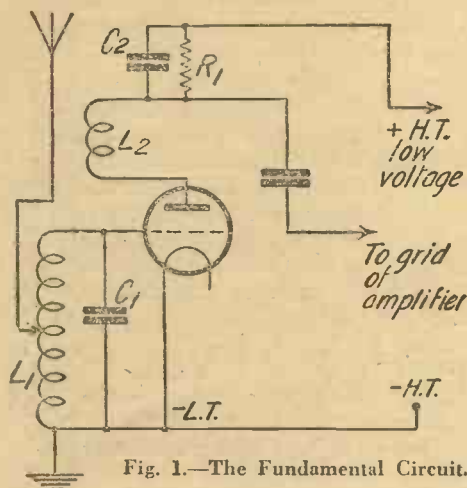


Fig. 1.—The Fundamental Circuit.

these are, however, indicated in the wiring diagram.

When using the set for receiving from the local station the voltage on the first

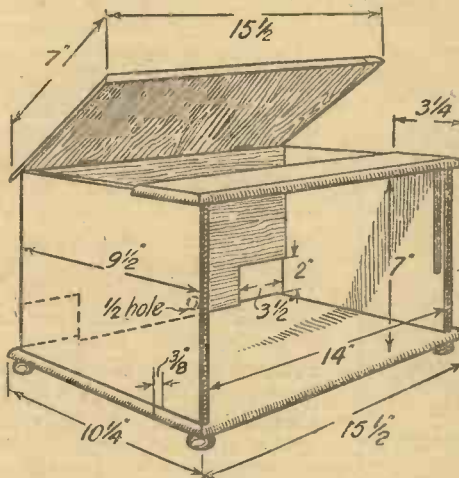


Fig. 6.—Details of Cabinet.

With careful handling many foreign stations can easily be received. When using the set on the lower wavelengths a rather larger reaction coil than usual may

"all round the dial." The fact that the set can sometimes be made to oscillate whichever way round the aperiodic coil happens to be, is a frequent source of bewilderment to the short-wave novice.

If, however, a larger aperiodic coil is used than is usually advocated, there will be only one direction of coupling in which the set will oscillate.

A six- or eight-turn aperiodic coil can be quite closely coupled to the grid coil, while oscillation is maintained over the whole tuning range of the grid coil if the aperiodic coil is correctly coupled. J. B.

SHORT-WAVE OSCILLATION

SOMETIMES it is difficult to make a receiver oscillate on the 45-metre wave band, no matter how "loose" the aerial coupling may be. If this trouble is encountered it is a good plan to try the effect of reversing the coupling between the aperiodic coil and the grid coil.

The writer has found that by this simple act a Reinartz receiver, which previously only oscillated freely at certain points on the condenser scale, was made to oscillate

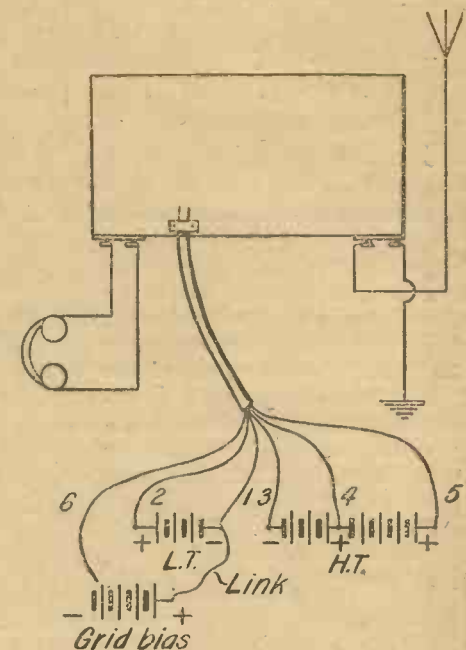


Fig. 5.—Cable Connections.

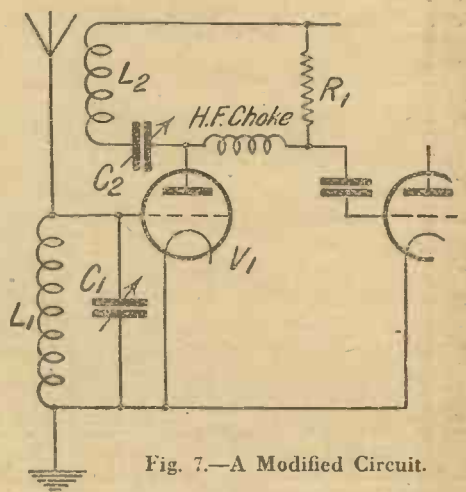


Fig. 7.—A Modified Circuit.

is clearly shown in Fig. 7. Should this be necessary it indicates that there is plenty of room for improvement in the aerial and earth system.

PROVING WHEN DULL-EMITTERS ARE GLOWING

SOME dull-emitters are so dull that no glow is visible. To ascertain whether the filaments are intact, a pocket-lamp bulb may be temporarily connected in one of the L.T. leads, i.e. between the battery terminal and the corresponding terminal on the valve socket.

If the bulb glows, it will show that the filament is intact. Do not, however, expect it to glow with its usual brilliance.

R. H. B.

THE RISKS THAT LISSEN RUN TO SAVE YOU THIS 5/1 ON EVERY BATTERY!

And a day for all Battery buyers to remember—Monday, Jan. 24th, 1927

On that day the reduced price for the Lissen New Process Battery first came into operation. Before that, however, Lissen had had to take a big risk. Prior to August 16th, 1926, Lissen had been distributing through wholesale factors, but on that day a new policy of direct-from-factory-to-dealer distribution was put into operation by Lissen which eliminated all wholesalers' profits. Intended first for sale at 13/- it was only possible to sell the Lissen New Process Battery at 10/6 by drastically altering the previous method of distribution, and the decision to do this was fraught with serious possibilities, for Lissen at once had to do business with some thousands of retailers instead of a smaller number of wholesalers. There was a great risk that the wholesalers would use their influence with their retail customers to block the new Lissen policy; at any rate no wholesaler could be expected to uphold it. **BUT LISSEN HAS WON THROUGH.** That step alone saves users 2/6 on every Lissen

New Process Battery purchase, 1/- on many other Lissen parts, and made Lissen mean to the user the best value for money in radio operators;

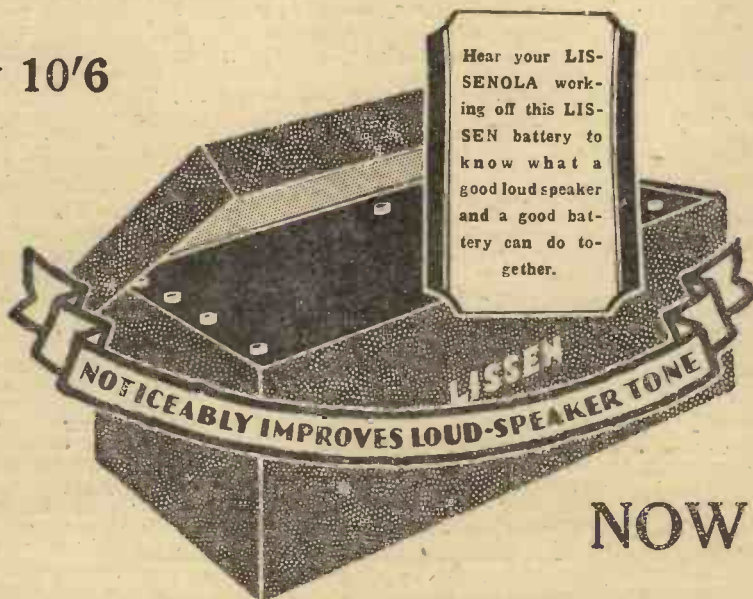
NOW LISSEN HAS TAKEN STILL ANOTHER BOLD STEP. To make the new reduced price for the LISSEN New Process Battery possible, a price actually less than many inferior foreign batteries are sold at, LISSEN have had to reduce the profit previously allowed to the retail trade, and have had to make a big sacrifice in profits themselves as well.

No user of H.T. batteries can remain unattracted by the thought of being able to obtain a LISSEN New Process Battery for 7/11—and the justification of the new step will come through largely increased sales.

It is through the co-operation of our retail friends that LISSEN batteries will be made available to you at thousands of shops throughout the country, and we therefore want users to know that it is due to the sacrifice of our retail distributors as well as ourselves that this new low price is made possible.

With high price no longer a reason for being without the LISSEN New Process Battery, your loud speaker reproduction will be better, volume bigger, and utterance clearer than ever before. The new price now places fine battery characteristics within the reach of all.

PREVIOUSLY 10/6



NOW 7/11

TO THE USER.—There is no substitute for a LISSEN New Process Battery. Ask for "LISSEN New Process" and see you get it. There is a LISSEN dealer close to you who will be glad to sell it to you; but if any difficulty send direct to factory; no postage charged, but please mention dealer's name and address, or can be sent C.O.D. Connect two batteries in series when more than 66 volts required.

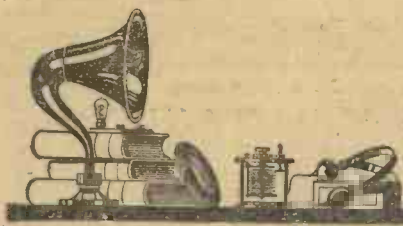
Rated at 60 volts this LISSEN New Process Battery goes considerably over. Its size is 9½ in. by 4½ in. IT IS PACKED FULL OF NEW ENERGY.

TO OUR RETAIL FRIENDS.—We were loth to lower the discount, but we think the new price is going to be justified. Full credits on existing stock have been made to stockists who obtained supplies direct from us, whose claims were in our hands by January 31st, 1927, for any LISSEN New Process Batteries in stock on January 18th which were invoiced in January. Since January 18th batteries have been invoiced to the trade at the new trade price.

BUY IT, Not Merely Because You Prefer British, But BECAUSE IT IS THE BEST MONEY'S WORTH
LISSEN LIMITED, 16-20, FRIARS LANE, RICHMOND, SURREY.

Managing Director: Thomas N. Cole.

L.244



OUR INFORMATION BUREAU



RULES.—Please write distinctly and keep to the point. We reply promptly by post. Please give all necessary details. Ask one question at a time to ensure a prompt reply, and please put sketches, layouts, diagrams, etc., on separate sheets containing your name and address. See special announcement below.

Transmitting and Receiving Licences.

Q.—If one obtains a transmitting permit, is it also necessary to obtain a receiving licence?—T. D. G. (Bedford).

A.—In such a case a separate receiving licence will be quite unnecessary, as the possession of a transmitting permit also entitles the owner to the use of receiving apparatus.—B.

Coil-winding Difficulty.

Q.—When winding coils of the honeycomb or duolateral type, what exactly constitutes a turn?—H. K. (Watford).

A.—One "turn" is completed when the wire has passed once completely round the coil, no matter what particular system of winding is being used.—J. F. J.

Filament Resistances.

Q.—At present I am using bright valves and a 6-volt accumulator, and my filament resistances each has a value of 7 ohms maximum. I wish to use valves taking .25 amp. each worked from a 2-volt accumulator, and want to know what filament resistances to use.—G. T. L. (Coventry).

A.—You can use the 2-volt valves without making any alteration to your set, as the present filament resistances will be quite suitable for the new valves.—B.

Fitting G.B. Terminals.

Q.—I have a straight detector and transformer-coupled L.F. set which has separate H.T. positive tappings for each valve. No provision is, however, made for the application of grid bias to the L.F. valve, and I should like to fit two G.B. terminals to the set.—E. P. (Essex).

A.—Fit the new terminals in any convenient position on the set, and disconnect the end of the transformer secondary which at present goes to the negative side of the filament circuit. Connect this end of the secondary instead to one of the new terminals, which will be G.B. negative, and join the other new terminal, G.B. positive, to the L.T. negative terminal.—J. F. J.

Charging Accumulators.

Q.—I intend to charge my accumulator at home, from the mains. How shall I know when the accumulator is sufficiently charged?—O. F. D. (Leicester).

A.—The battery should be charged until its voltage, measured with the charging current still passing, has risen to about 2.6 volts per cell. When the charging current is switched off, the voltage of the battery will soon drop to about 2.2 volts per cell. When it is thought that the accumulator is fully charged, the density of the acid should be measured with a hydrometer and should be about 1.2. As the charging process nears completion the cells will "gas," which means that great quantities of bubbles will rise to the surface of the acid, giving the electrolyte an almost milky appearance.—J. F. J.

Converting L.F. Coupling.

Q.—I have a set consisting of a detector valve followed by two transformer-coupled L.F. stages; and am desirous of using resistance coupling between the last two valves. Can you tell me how to make the required alteration?—R. P. A. (Enfield).

A.—You could, of course, merely substitute for the second transformer one of the complete resistance-capacity units now on the market. If, however, you wish to use separate components you can remove the second transformer from the set, and in the place of the transformer primary insert an anode resistance having a value from 50,000 to 100,000 ohms. Between the plate of the second valve and the grid of the third connect a .025-mfd. fixed condenser, and put a ½-megohm grid leak between the grid of the last valve and G.B. negative.—J. F. J.

When Asking Technical Queries—

PLEASE write briefly
and to the point

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

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

Grid Rectification.

Q.—I understand that the chief objection to the use of anode-bend rectification is that signals are not so strong as when the leaky grid condenser method is used. What accounts for the greater signal strength obtained with the latter method?—E. R. (S.E.S).

A.—When a grid condenser is used the incoming signals charge up the condenser, which cannot immediately return to its normal potential, as the electrons forming the charge cannot easily escape from the side of the condenser nearer the grid of the valve. Thus the effect of several incoming oscillations is cumulative, and the grid condenser becomes increasingly negative. This cumulative effect is entirely absent in the anode-bend method of rectification, and it is this effect which gives rise to the stronger signals when a grid condenser and leak are used.—B.

WIRELESS OVERSEAS

As many readers of AMATEUR WIRELESS undoubtedly have friends abroad who are interested in wireless, it may not be inappropriate to mention that copies of AMATEUR WIRELESS can be sent to them regularly every week at the following rates:—

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AMATEUR WIRELESS is the most up-to-date wireless weekly and would be a source of interest to any enthusiast overseas.

The "No-Aerial Three."

Q.—With reference to the receiver with the above title, which was described in "A.W." No. 236, I should like the following points made clear: (1) What is the full list of components required? (2) More particulars regarding the frame aerial would be appreciated. (3) What is the exact position of the valve platform?

A.—The list of components is as follows: Ebonite panel, 15 in. by 5 in. by ¼ in.; valve platform, 7 in. by 2 in. by ¼ in.; .0005 low-loss variable condenser (Ormond, Igranic, or other good make); .0003 Polar Junior variable condenser; .0003 fixed condenser with 2-megohm leak (Edison-Bell or Dubilier); 6-ohm rheostat (Ormond); low-frequency transformer (Burndept); resistance coupling unit (Radio Communication Co.); 2 6-in. brackets; 12 clix for valve sockets; break switch (for L.T. supply); 8 pillar-type terminals; supply of 16-gauge bare tinned-copper wire, single rubber covered flex and hank of frame aerial flex (silk covered); sundry screws. The frame aerial consists of two coils, one of 21 turns and the other of 5 turns, wound together on ebonite pieces. These are screwed to the back of the cabinet, and given a saw slit to take the wire. The mean dimensions of the frame coil are 12 in. by 9 in. The valve platform occupies a position in relation to the main panel as shown in Fig. 4, there being a 4-in. gap. The brackets are 6 in. long, and the platform 2 in. wide.—DUDLEY HISCOX.

Driving Dynamo by Water Power.

Q.—What power is required to drive a 12-volt dynamo for lighting a small bungalow? Is it practicable to drive this from a Pelton wheel, and, if so, what water pressure is necessary?—C. H. H. (Bristol).

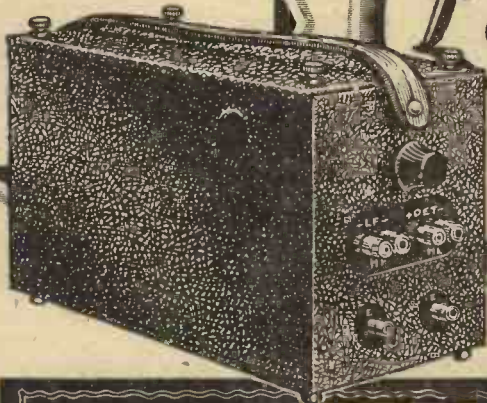
A.—The power required to drive any dynamo depends upon the watts output required—that is, volts x amperes, and not upon the voltage alone. To light even a small bungalow the equivalent of three 60-watt lamps is about the minimum allowance, say 200 watts as a margin. A 200-watt dynamo of normal efficiency will take close upon half brake horsepower to drive it, and this would be the smallest size of waterwheel to install. Whether a Pelton wheel is suitable or not depends largely upon the pressure or head of water, and nothing less than 50 to 60 lb. per square inch is very serviceable for water motors of this type—say 120 ft. fall. Low-fall turbines are, of course, obtainable, and if querist will communicate with Gilbert Gilkes and Co., of Canal Ironworks, Kendal, giving full details of his water supply, no doubt they will recommend a suitable type of motor and name a price. It may be noted, however, that direct lighting from water power is seldom satisfactory, owing to variations in pressure and speeds. The best thing to do, perhaps, is to put in a 12-volt car-lighting type of dynamo, with third brush regulation, and a 12-volt battery of accumulators. With the battery "floating" on the line, the voltage will be kept pretty constant, and the self-regulating properties of this type of dynamo will render it far less sensitive to speed variations than with a simple shunt-wound or compound-wound generator lighting the lamps direct.—A. H. AVERY.

	DRY BATTERIES 120 VOLTS	ACCUMULATORS 100 VOLTS	ELIMINATOR 120 VOLTS
1 ST YEAR UPKEEP	3 AT 25/- 3.15.0	4.10.0 1.1.0	8.5.0 5.0
2 ND	3.15.0	1.1.0	5.0
3 RD	3.15.0	1.1.0*	5.0
4 TH	3.15.0	4.10.0 1.1.0	5.0
5 TH	3.15.0	1.1.0	5.0
6 TH	3.15.0	1.1.0*	5.0
7 TH	3.15.0	4.10.0 1.1.0	5.0
8 TH	3.15.0	1.1.0	5.0
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"A.W." TESTS OF APPARATUS

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

McMichael H.F. Choke

MCMICHAEL & CO., LTD., of Wexham Road, Slough, Bucks, have sent us one of their high-frequency chokes. This consists of a barrel former having a number of slots cut into it. A fairly fine-gauge wire is wound in these slots, the windings being continuous from end to end.

The self-capacity of the windings is reduced to a low value not only by placing the windings in slots, but the ends of the ebonite former are tapered, so that the winding in the first slot has a mean diameter of approximately half of those in the seven central slots.

The ends of the windings are taken out to two soldering tags at the end of the former. Finally the former is mounted



McMichael H.F. Choke.

in an upright position on a small circular ebonite base, which can be screwed down to the baseboard of the receiver. A separate base is also available, so that the choke can be mounted longitudinally between clips.

We can recommend this component to our readers for use in sets, particularly for use in reception below a wavelength of 1,000 metres.

Service D.C. Mains Unit

SERVICE RADIO CO., LTD., of 67, Church Street, N.16, have submitted for test one of their Service H.T. units. This is intended for use on D.C. mains. It takes the form of a small wooden cabinet measuring 9 in. by 3½ in. by 6 in.

On the top of the cabinet is an ebonite panel, on which are mounted the various terminals and wander plugs. At the left of the panel are two terminals, one for the earth connection and the other for the earth terminal of the receiver. On the right-hand side there are three terminals marked H.T.+2, H.T.+1 and H.T.—.

On test in a five-valve receiver the unit gave very satisfactory results. The maximum voltage obtained when working off 240 volts mains was 120 volts. This reading was taken when a current of 15 milli-



Service D.C. Mains Unit

amps. was flowing. By far the most striking quality which this unit possessed, however, was the entire absence of those noises which are usually associated with mains supply; and we can recommend this unit to our readers.

Brunet Loud-speaker

FROM Pettigrew and Merriman, Ltd., of 122 and 124, Tooley Street, S.E.1, we have received one of their P.1 Brunet loud-speakers. This loud-speaker has a height of 16 in. and a flare of 8 in. It



Brunet Loud-speaker.

might be expected that with a speaker of these dimensions the volume output would be limited. However, on test satisfactory results were obtained. Reproduction of both speech and music was quite good, and the loud-speaker was capable of

handling a large amount of volume without distortion.

The general finish and appearance of this loud-speaker are good. In the base, made of aluminium, an adjustable arm is provided for setting the speaker to its point of maximum sensitivity. The neck and the horn have a crystalline black finish. The flare can be removed by withdrawing two screws; it is necessary to see that these screws are tight, in order to prevent vibration of the horn.

We can recommend this loud-speaker for use where a small and efficient instrument is required.

Benjamin Valve Holder, Grid Leak and Condenser Unit

WE have received from the Benjamin Electric, Ltd., of Brantwood Works, Tariff Road, N.17, one of their



Benjamin Valve Holder Unit.

well-known valve holders, combined with a special type of grid leak and condenser. Attached to the grid and one of the filament terminals of this valve holder are two projecting pins. A Dubilier Micadon condenser with a grid-leak attachment clips on to the two projecting pins. This unit is thus connected up for use in the rectifying stage or in an amplifier following a tuned-anode or resistance coupling.

On test it was found that the insulation resistance of both the valve holder and grid condenser was infinity. The grid leak proved to have the stated resistance value of 2 megohms, and the condenser was found to have a capacity of .0003 microfarad, as stated.

This unit should be very useful for the experimenter, as the grid leak and condenser may be easily removed, and we can recommend it for general use.

"A.W." will solve your Wireless Problems

The illustration is of the 2/1 ampere Tungar, suitable for charging your radio or car batteries at home.

D.C. output 7.5 to 15 volts.

PRICE £5 0 0



Battery service assured

TIn order to keep your radio set at its best *all the time*, you must keep your battery fully charged always.

Charge your battery *at home* with the TUNGAR. It can be connected to any lampholder or wall socket (on A.C. supply only), and on the other to your radio or car battery. It requires no attention, is automatic in operation, and can be left on circuit continuously.

NO MOVING PARTS. NO CHEMICALS. NOTHING TO GO WRONG.

Ask your Supply Authority or Electrician about Tungars.

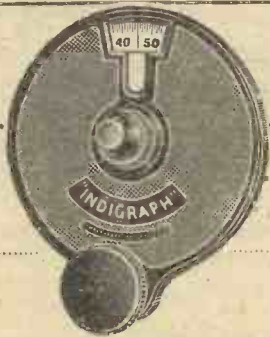
The British Thomson-Houston, Co., Ltd.,
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Branch Office Showrooms in all large towns.

The Tungar

FOR CHARGING BATTERIES ON ALTERNATING CURRENT SUPPLY

2586 A



Igranite "Indigraph" Vernier Knob and Dial.

A handsome slow-motion dial, which greatly facilitates fine tuning. Space is provided on the dial for recording tuning positions. Metal dial acts as shield against hand-capacity effects. Two scales of 0-100 reading in opposite directions.

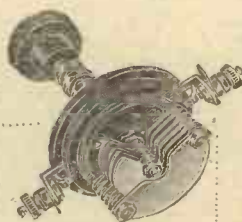
Price 7/6



Igranite Tone Control

A necessity in every loud-speaker receiver. Gives complete control of volume, and helps to remove the harshness so often experienced with loud signals. Also useful as a low-value grid leak and resistance capacity amplifier, where it will also act as a volume regulator.

With Indigraph Knob and Dial 6/6
With Plain Knob and Dial 5/6



Igranite Micro Condenser.

A miniature condenser particularly suitable for neutralising and for all circuits in which very small-capacity variations are needed. Ample spacing and insulation between knob and vanes prevents hand-capacity effects. Price, 5/6. Bracket for baseboard mounting, ed.

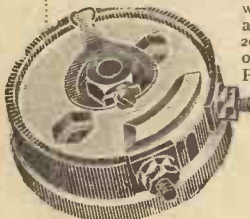


Igranite Centre Tapped "Xilos" Coils.

Actually contain two coils, which may be used separately or may be joined in series to form a single coil, from which a centre tapping can be taken. In five sizes for wavelengths from 110 to 3,500 metres. Prices from 7/- each.

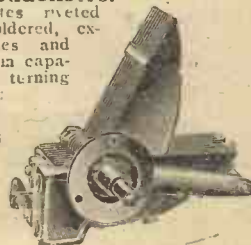
Igranite-Pacent "Pre Set" Resistor.

Has all the uses of a fixed resistor, and yet is almost as easily variable as a rheostat. Made with resistances of 6, 10, 20, 30 and 50 ohms. Price, 1/8 each.



Igranite-Pacent Straight Line Frequency Condensers.

Stout brass plates riveted together and soldered, extremely low losses and negligible minimum capacity. Smooth turning movement. Prices:
.00035 mfd. ... 14/6
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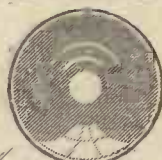


Send for IGRANITE CATALOGUE No. D 50.

IGRANITE ELECTRIC CO. LTD.
149, QUEEN VICTORIA STREET, LONDON
Works: BEDFORD

Advertisers Like to Know That—"You Saw it in "A.W."

RADIOGRAMS



It is probable that at this year's Boat Race a commentator will be able to follow behind the boats during the race. A portable transmitter would be fitted into a launch, and on a short wave the description would be broadcast. It would then be picked up at the Keston station and relayed through the main stations.

On the occasion of the dinner of the Worcestershire Association, to be held at the Hotel Victoria, London, on February 22, the Prime Minister's speech will be relayed to 2LO and 5XX.

Mr. Lloyd George's speech at the dinner of the Women's Advertising Club of London, which takes place at the Piccadilly Hotel on February 14, will be broadcast from 2LO and 5XX.

The B.B.C. have in preparation a special Empire Day programme to be relayed from the Albert Hall.

The little-known opera of Puccini, *Le Villi* (the witch dancers), is to be broadcast from Glasgow on February 10. The scene of this two-act opera is laid in the Black Forest. It will be relayed to London, Belfast and Scottish stations.

The Home Affairs Committee of Glasgow Chamber of Commerce has unanimously resolved to make representations to the B.B.C. in favour of the retention of the time signals in all programmes.

Demonstrations of transmissions to schools have recently been made before the education authorities of Edinburgh, Dumbarton, Dumfries and Fife. It is understood that they have aroused a wide interest in the potentialities of the loud-speaker in Scottish class-rooms.

Sir John Reith has stated that over a period of four years the Post Office has only been in receipt of one charge of vulgarity against the B.B.C. This, he added, was from a listener whose mental stability was apparently in question!

An Abraham Lincoln anniversary programme is being staged at Glasgow on February 12. The first part of the evening will include scenes from Drinkwater's play *Abraham Lincoln*, and the name part will be taken by Mr. William J. Rea, who fulfilled that rôle in the London production of the play.

Dr. Le Sieur Weir, surgeon in the liner *Voltaire*, has received a £20 cheque for wireless diagnosis and treatment of a patient suffering from appendicitis. The patient was a member of the crew of the

British cargo steamer *Speaker*, whose captain broadcast an appeal to any ship carrying a doctor. Dr. Weir, in a series of messages across the Equator, wirelessly his advice.

According to a message from Teheran, a general local and foreign wireless service was established there recently for the first time.

The recent decision in France to allow sermons to be broadcast on Sundays has led to a special ruling by the Cardinal Archbishop of Paris, who announces that the general authorisation given by the ecclesiastical authorities to preachers of sermons does not extend to sermons which are to be broadcast.

Mr. Alec Young, president of the Rotary Club in London, has had an interesting experience of the success of wireless telephoning beyond New York. Recently he was called up by Judge Chamberlain, who

AN INTERESTING
ANNOUNCEMENT
APPEARS ON
PAGE 250

spoke for the Rotarians and citizens of Boston, Mass., and sent greetings and goodwill to the London Rotarians.

To eliminate interference with radio reception, the New Zealand Post and Telegraph Department has issued regulations restricting or prohibiting the use of certain types of receiver. The regulations provide that the direct coupling of the valves to the aerial shall not be effected except in the case of certain approved sets for which special permission has been given, and in the design of which special and effective provision has been made to prevent radiation or to reduce it to a negligible quantity.

Miss Phyllis Neilson Terry will take part in a performance of *Trilby* from 2LO and 5XX on February 23. The programme on that evening also includes a repeat broadcast by Mr. R. A. Roberts of his "Dick Turpin" sketch.

Kemback, Fifeshire, is the location of the new P.O. Transatlantic receiving station, and work is beginning immediately. The station will be connected by cable with Cupar Post Office.

Tests were recently carried out at Daventry with the object of increasing the depth of modulation. Many listeners have reported on improved reception, and the range of the station is now 120 miles, instead of 100 miles, without loss of signal strength.

Although but little is heard of the development of broadcasting in Finland, this little republic now possesses at Helsingfors a new 5 kw. station working on a wavelength of 375 m. The capital programmes are regularly relayed to the following 200 watt transmitters: Jyväskylä (297 m.), Oulu-Uleaborg (233 m.), Björnsberg (254.2 m.), Tammerfors (368 m.), Jakobstad (275 m.) and Lahti (318 m.). It is in Lahti that plans are being considered for the erection of a high-power station to serve the whole of Finland. The Helsingfors call is now: *Uuncio! Uuncio! Radio-Helsinki*.

In commemoration of the centenary of the death of the Italian physicist Alessandro Volta on March 5, 1827, a wireless exhibition is to be held from May to October this year, at Como, his native town. The committee, under the patronage of H.M. the King of Italy, has nominated Signor Mussolini and Senatore Marconi joint hon. presidents. By the same opportunity it is proposed to hold an International Telegraphy and Telephony Congress during the coming summer.

From January 1, 1927, the share of the income derived from the sale of listeners' licences to be allotted to the Prague Broadcasting Company has been reduced from 50 to 40 per cent. In view of the increased revenue collected by the Czechoslovak Posts and Telegraphs, this department is undertaking the reconstruction and development of the entire broadcasting system, and will lay the necessary land-lines for the inter-linking of the different transmitters to permit a simultaneous transmission of the Prague and Bruenn programmes throughout the country.

According to reports received from Washington (U.S.A.), should an increase in the number of new stations continue at the same rate as hitherto, there will be 1,000 broadcasters on the air in the United States by the end of 1927. Already 671 stations send out, at least, one programme daily; 159 new stations have been licensed since July 1, 1926. It is computed that on January 1 last the number of receiving sets in actual use was 6,500,000, and the invisible nightly audience is estimated at 26,000,000 listeners.

As a reply to rumours in Scotland, it is officially announced by the B.B.C. that the abandonment of the broadcasting station at Aberdeen is not contemplated. On the contrary, at stations such as Aberdeen ample talent and organisation is to be retained to reflect adequately local character and local artistic aspirations.

A new

DRAGON AMPLION LOUD SPEAKER

at a popular price



*With solid
oak flare*

Type AR 656

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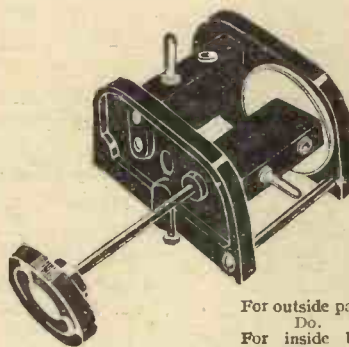
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Advertisers Appreciate Mention of "A.W." with Your Order

DONT EXPERIMENT -USE LOTUS COMPONENTS

No more fading away of volume, no more breaking of valves and disturbing microphonic noises once you have fitted your set with the "Lotus" Coil Holder and Valve Holder.

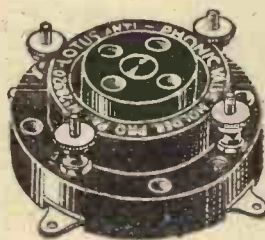


"LOTUS" VERNIER COIL HOLDERS

are actuated by three sets of enclosed precision machine-cut gears, which reduce the speed by eight times. The Moving Block holds the heaviest coil securely in position and cannot possibly fall.

PRICES.

For outside panel mounting—2-way	7/-
Do. do. 3-way	10/6
For inside baseboard mounting, with 6-in. handle—2-way	8/-
Do. do. 3-way	12/6



"LOTUS" BUOYANCY VALVE HOLDER

See how the unique and original springs and the valve sockets are locked together by a mechanical process to make a definite and permanent connection, and you will understand how they absorb shock and eliminate all microphonic noises. Made with terminals and without, and also with a Grid Leak enclosed in the Bakelite base, which eliminates unnecessary wiring and soldering.

PRICES.

Combination Grid Leak and Terminal Valve Holder	3/9
Terminal Valve Holder	2/6
Valve Holder without Terminals	2/3

You can get these carefully designed and well-finished Components from all Radio Dealers.

LOTUS COMPONENTS

GARNETT, WHITELEY & CO., LTD.
LOTUS WORKS, BROADGREEN RD., LIVERPOOL



"Old Superstitions Die Hard"

SIR,—Your contributor in No. 242 starts his article by decrying the long aerial for reception of the shorter waves, and states that the short-roofed aerial gives better selectivity with no appreciable loss in range or signal strength. This is a very misleading and not very accurate statement. The whole question of aerial dimensions is bound up with the question of what type of coupling is employed between the aerial and the grid of the first valve. Most modern circuits use the so-called aperiodic coupling with the grid circuit, and here it is far better to have a long and high aerial and fewer turns than to use a short aerial with possibly more turns in the aerial circuit.

For the reception of even such short waves as 30 to 50 metres a big aerial will give better signal strength than a small one. The only case where there is truth in J. H. R.'s statement is where the aerial is connected direct to the grid end of the grid circuit. I would therefore advise your readers to use the full 100 feet allowed by the Post Office and to make the aerial as high and efficient as possible.

I doubt if there is anything to be gained by shunting an H.T. accumulator by a .01 mfd. condenser, which I should say would offer an impedance greater than the H.T. accumulator itself. On this point, however, I am open to correction. F. G. S. (Birmingham).

Threshold Howling

SIR,—Your correspondent B. R. B. (Sudbury), in his letter on "Threshold Howling," makes a most interesting suggestion in regard to the cause of that puzzling and annoying fault which is common in many receivers, and asks for opinions upon the theory which he presents.

I have found this rather peculiar form of low-frequency oscillation to be the bugbear of many sensitive sets, and usually the more sensitive the receiver, the more prone is it to howl when on the threshold of oscillation.

The theory presented seems to contain no flaw, yet I think it correct to dispute it on practical grounds. Though I have never found this liability to howl present in a set to which I am accustomed, and only in those which have just been wired up and are in need of a little practical experimenting, on various occasions I have cured the trouble by altering the value of the grid leak. I cannot see how this fact can be fitted in to the theory suggested, unless the whole matter is far more critical

than I can think possible, and it is found that rate of (almost instantaneous) increase of anode current is appreciably affected by the value of the grid-circuit resistance. May I also query whether the back E.M.F. caused by the transformer would be sufficient to alter the period of breaking into oscillation, even at the most critical threshold point?

I very much doubt whether the back E.M.F., which, of course, must exist, is high enough to alter the electronic flow. If it is high enough, then the effect must be present in every receiver, and would be a thing to contend with in every DX set and even in moderately efficient broadcast sets. From practical experience with sets of all types, I can state that the effect is only noticeable in about 2 per cent. of the receivers which pass under my notice.

And if that small fraction were fitted with efficient variable grid leaks (as every set should be fitted) I am positive that I could cure the trouble.—K. U. (London).

Are Multi-valve Sets Worth While?

SIR,—I am interested in the correspondence that has appeared in your columns under the above heading, and feel I should like to congratulate A. A. R. and C. R. W. upon having obtained a quality of reproduction from distant and foreign stations comparable with that of 2 L.O.

I have in my time tried out a fair number of multi-valve receivers, and with some of them I have succeeded in bringing in some twenty or so Continental transmissions at good loud-speaker strength whilst 2 L.O. was at work. I certainly cannot claim, however, that the quality of such reception was ever in the same class as that obtainable on my "local" receiver.

Situated some four miles from 2 L.O., the latter consists of "permanent" crystal rectification followed by three stages of resistance coupling, with, of course, suitable valves, H.T. and G.B.

The quality of reproduction given by this simple straight set is, I think, good. To know that equally good reproduction can be obtained from foreign stations with super-hets and multi-valve neutrodynes is, to say the least of it, most encouraging.—G. C. C. (London, N.W.).

SIR,—After listening recently to a demonstration of a new commercially-built seven-valve superhonic-heterodyne receiver, the writer was constrained to ask himself the question: Are super-sensitive

receivers really of much value when entertainment is the object in view? In fairness to the designers and makers of the instrument mentioned, it must be said that its performance as regards range and selectivity was absolutely amazing; yet after careful consideration the writer came to the definite conclusion that, for personal use, he would not consider it worth the price of a good three-valver.

The reason for this is simple. Not once during the demonstration, which included reception of a number of British and Continental stations, was speech or music any real pleasure to listen to. In the first place most of the stations received were heterodyned, and even this wonderful instrument, aided by the directional properties of a frame aerial, failed to eliminate this interference. Reception from the local station was unpleasant, because the enormous amplification caused severe overloading, while in another way the extreme sensitiveness defeated its own ends. Reception of the few distant stations which were free from heterodynes was spoilt by a powerful background noise.

It appears that much the same applies to every ultra-sensitive, multi-valve receiver, and until some method of overcoming these defects is discovered it seems that owners of sets of this type are likely to become very dissatisfied after the novelty has worn off.

Contrast with this the results attainable with a good three-valve set at a fraction of the cost.

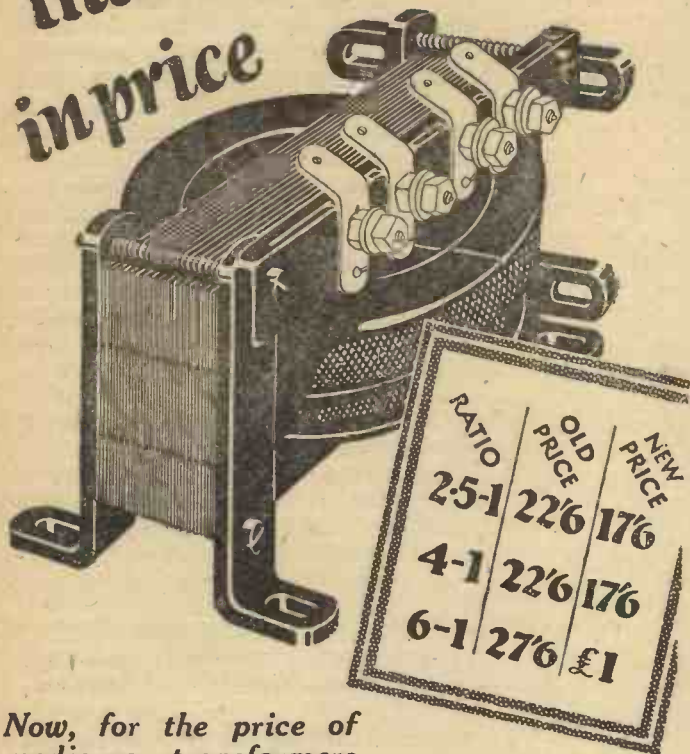
Would not the average amateur obtain far more satisfaction from improving the L.F. end of his receiver before attempting the more difficult task of applying several stages of tuned H.F. or supersonic-frequency amplification to unsatisfactory detectors and note-magnifiers?—J. H. S. F. (London, S.W.).

The Klagenfurt (Austria) relay station is to be officially opened on February 12 next, and to celebrate the occasion Vienna will relay to this transmitter a complete performance of Gounod's *Faust* as performed at the Royal Opera House. A special cable has been laid to feed the Klagenfurt station, and the system is being developed to include both Innsbruck and the proposed station at Salzburg. A new land-line connects Munich and Vienna, and attempts are to be made to relay the Vienna programmes to Berlin, Hamburg, and other German centres.

A contract has been concluded for an additional radio broadcasting station in the Colon Opera House, Buenos Aires, at an estimated expenditure of 100,000 dollars (£20,000). The station, which is to be built by a United States company, is to be in operation by May, 1927, in time for the next opera season.

It is rumoured that the B.B.C. authorities are seeking a suitable site for a broadcasting station to be situated in North Wales.

The famous PYE LF transformers reduced in price



Now, for the price of mediocre transformers you can get the best on the market.—PYE.

PYE & CO. were the first wireless engineers to publish a Frequency-Efficiency curve certified by the National Physical Laboratory. Curves of other transformers have been published since, but still the Pye curve is unrivalled.

Many of the most reputable manufacturers have adopted Pye Transformers as standard in their receiving sets. Several Government Departments also use them. Could stronger proof of their efficiency be given?

Compare the Pye Transformers against any other high-class transformer, and you will not find its equal for true amplification, purity of reproduction, and all round merit.

W. G. PYE & CO.,
Granta Works, Montague Road,
CAMBRIDGE.

POINTS OF SUPERIORITY

1. Amplification is uniform on high and low notes, thus eliminating distortion.
2. Parasitic noises are entirely absent.
3. Can be fixed to panel in horizontal or vertical position.
(See illustration above.)
4. Not susceptible to burning out. Voltages up to 300 can be used continuously with perfect safety.
5. Each Transformer is tested by actual measurement of amplification and a guarantee given with each.



**Dubilier Mansbridge
Condensers**

Wherever a large capacity condenser is needed in your set, see that you make it a Dubilier Mansbridge.

No other condenser in the world has behind it the combined experiences of Dubilier and of Mansbridge.

Do not be misled by low prices: it is eminently worth your while to pay the small amount extra asked for Dubilier Mansbridge Condensers in order to be certain of securing such unfailing service as only they can give.

0.01 mf. to 0.1 mf.	2/6 each
0.125 mf. to 0.2 mf.	2/8 each
0.25 mf. to 0.3 mf.	3/- each
0.4 mf. ...	3/3 each
0.5 mf. ...	3/6 each
1.0 mf. ...	4/- each
2.0 mf. ...	5/- each
3.0 mf. ...	8/- each

and other capacities to order.

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ADVERT. OF THE DUBILIER CONDENSER CO. (1925),
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M.C. 237

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



Plantations and Panels.

1. The panel is born . . . way back in a Pacific Island tree.

IT is a far cry from Malay to your Wireless Set in Manchester or Mitcham or Maidenhead or wherever you may live in England. Yet way back in a Malay rubber plantation is the tree from whence came the ebonite panel upon which your components are mounted.

This is how they do it. First, an incision is made in the bark of the tree. Then a little cup is placed in position at the point of the tap. Into this flows the latex, the fluid which, in time, becomes rubber.

Only the pick of this rubber is selected for the manufacture of Radion and Resiston Panels. From the day the Native gathers the latex to the moment the lustrous Panel leaves the Radion factory, almost finical care has been taken to ensure the absolute purity of the rubber. The native, would, indeed, be surprised if he could see what strength and what beauty had been given to the milky fluid he once knew.

You, too, will be surprised when first you see a Radion Panel. Such strength! Such a smooth even surface! Such exquisite colouring! Such superb finish! It is only a Radion or Resiston Panel which will give so aristocratic an appearance to your Set. Such a high standard of efficiency too. Ask your Dealer.

Radion and Resiston Panels come in 17 stock sizes, from 7 in. x 6 in. at 3/6 in. Black to 12 in. x 14 in. at 16/- in Mahoganyite.

RESISTON
PANELS

"24 hours Cut Panel Service"

Advt. American Hard Rubber Co. (Brit.) 132 Fore St. E.C.
G.A. 7881

"THE SIMPLEST BROADCAST WAVEMETER" (continued from page 249)

to allow it to lie flat. The simplest way of mounting it is to use fine wood screws, putting them through the holes in the lugs.

Next fix the coil holder close to the rear edge of the panel and follow this by placing near the buzzer a single dry cell. That seen in the photograph was taken from a No. 125 Ever-ready flashlamp re-fill. A simple way of fastening the cell to the baseboard is to cut a narrow strip from an old tin and to fasten this down with screws so as to make a strap over the cell.

The wiring is quite simple. Connect the fine wire contact of the buzzer to the positive terminal of the cell. The other con-

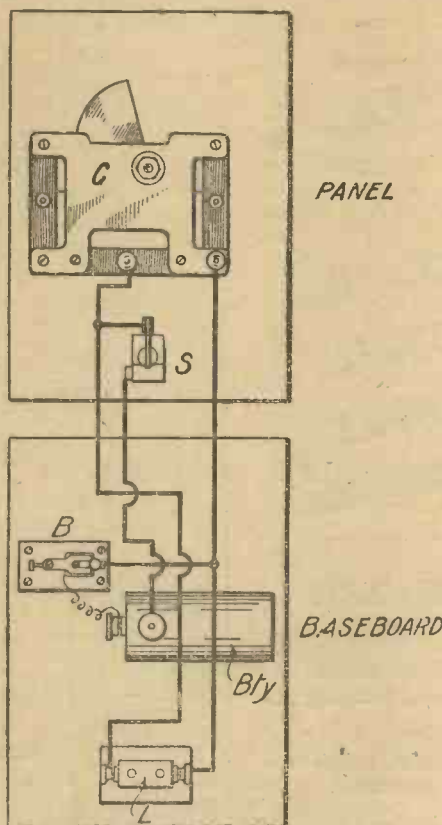


Fig. 3.—Wiring of Wavemeter.

tact of the buzzer is a small screw in the upright pillar which supports the arm. Connect this to the moving plates of the variable condenser. Connect these plates also to the plug of the coil holder. Join one contact of the switch to the negative pole of the battery and the other to the fixed plates of the variable condenser. When you have connected these plates also to the socket of the coil holder the job is finished.

The next thing to do is to get the buzzer tuned to a high thin note. Quite likely the buzzer will not work when you first switch on. If it fails to do so when the panel is rapped with the knuckles, adjust the contact screw and the relative positions of the armature and magnet poles.

The first rough calibration of the instrument is quite a simple business. Tune in

a station of known wavelength towards the upper end of the broadcast waveband as sharply as you can with the receiving set, then place the wavemeter a yard or so away from the set with its coil "face-to-face" with the A.T.I., and switch on. Turn the dial of the variable condenser until the note of the buzzer is heard loudly in the phones or loud-speaker.

You will probably find that it is heard fairly strongly over quite a number of degrees. Either move the instrument farther away, or turn it so as to increase the angle between its inductance and the A.T.I. When the coupling between the two is loose enough the tuning of the wavemeter will be quite sharp. It is here that so many people fail when using a buzzer wavemeter; they will couple it too closely to a receiving set, with the result that it is impossible to obtain anything like close readings. The note of the buzzer should be only just comfortably audible at the point of sharpest tuning. Having done this, note carefully the condenser scale reading. Now tune in another station on a considerably lower wavelength and again take the reading with the meter. On a piece of squared paper mark off a vertical scale corresponding to condenser degrees, and a horizontal scale corresponding to wavelengths from 250 to 500 metres, if you are using a square-law condenser in the meter, or frequencies from 120 kilocycles to 60 kilocycles (remember that the frequency decreases as you increase the capacity of the condenser) if you are using an SLI condenser. At the intersection of the two lines corresponding to the condenser setting and the wavelength (or frequency) of the first station make a dot. Make another dot to mark the tuning of the second station. Draw a straight line joining the two, and produce it in both directions. Below about 25 degrees the settings shown by the chart may be inaccurate.

Should you desire to make your wavemeter direct-reading, obtain a piece of 1/8-in. white erinoid or ivorine 5 in. wide by 3 in. deep. Draw a straight line with Indian ink right across this 1/2 in. from the bottom, bisect this line, and make a punch mark at its mid-point. Using this point as centre, draw a semi-circle with a radius of just under 5 in., and another one 1/2 in. inside it. From sheet metal cut out a pointer, drilling at one end of it a hole which will just pass over the spindle of the condenser and filing the other end quite fine.

Pin the pointer to the under-side of the edge of your dial so that it just coincides with the zero mark. Set the dial so that the moving plates are right out of mesh when the nought on the scale coincides with the left-hand portion of the horizontal line. From your calibration chart you can now mark out a scale of wavelengths or frequencies, using the graduated dial of the condenser to obtain the correct settings and making the marks at the places indicated by the pointer. R. W. H.

SCIENTIFIC SUPPLY STORES

126, Newington Causeway, LONDON, S.E.1
(Phone: HOP 4177),
and 291, Edgware Road, W.2.

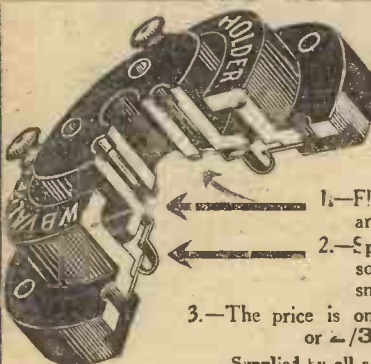


No. 554.—Curved Horn
on-take Gramo-
phone Attachments,
Height 14" .. 22/6
No. 631.—For use with
Amplion Juniors, etc.
Gives 20% increase in
volume and purity.
Height 15" .. 9/6
No. 397.—Large
"Western" type.
Height 25", Flare 15" .. 1/9
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type. Height 19",
Flare 14" .. 9/6
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etc., 1/6.



SCIENTIFIC
NON-METALLIC
HORNS GIVE
FAITHFUL
REPRODUCTION

9" CONES, as
demonstrated at
Science Museum,
Kens. 2/6 post free



W.B. ANTI-PHONIC LOSS VALVE HOLDER

Cut open for your inspection

Notice that—

- 1.—Floating springs and valve sockets are riveted and soldered.
- 2.—Springs are at right angles to valve sockets, avoiding side strain and snapping.
- 3.—The price is only 2/- each without terminals, or 2/3 each with terminals.

Supplied by all good electrical dealers from stock.

In case of difficulty write to the makers:

WHITELEY, BOND-HAM & CO., Ltd.,
Duke Street, Mansfield, Notts.

Amsterdam First Prize Winner Approves Lewcos Screened Coils



Mr. R. Waldo Emerson, winner of
the first prize in the Amsterdam
Wireless Exhibition.

Mr. Emerson writes:—

Dear Sirs,

I have now finished experimenting with
an All-British Six which I made, and decided
to use your Split Secondary Transformers,
and no doubt you would be pleased to hear
the result.

Using S.T. valves throughout I am able
to get Leipzig free from London on an out-
door aerial one mile from London, and using
the telephone as a capacity aerial I have been
able to receive Cardiff, with a slight trace
of London in the background.

The set remained perfectly stable over the
entire waveband, and I can honestly say the
coils have given every satisfaction.

Yours faithfully,

(Signed) R. WALDO EMERSON.

Comparative tests prove that LEWCOS
Screened Coils and Transformers have a
lower H.F. Resistance within their screens
than any other coil on the market.

Use LEWCOS Screened Coils in your set.
Obtainable from all wireless dealers. Full
particulars and prices sent on request to:—

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**LONDON ELECTRIC WIRE
COMPANY & SMITHS, LTD.**

Playhouse Yard, Golden Lane, London, E.C.1

LEWCOS

Screened Coils

J. H. Reyner

B.Sc. (Hons.) A.M.I.E.E.

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and exclusively to the
"WIRELESS MAGAZINE"
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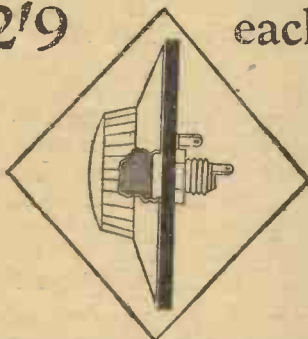
BENJAMIN

Self-contained Rheostat

THIS DIAL—only 2½" in diameter—encloses the resistance windings and moving parts. All that appears behind the panel is the lock-nut and soldering tags. This means space saved, neater panel layout and easier wiring. The dial, made of genuine Bakelite, is marked 0 to 100. A nickel-plated pointer checks adjustment. One hole fixing. Three resistances: 6, 15, and 30 ohms.

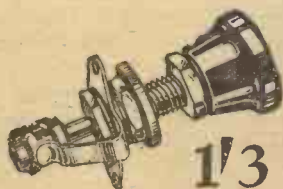
2/9

each



The winding's inside the dial.

Battery switch



Neat and efficient. Nickel-plated parts and Bakelite knob. Can't get out of order.

It's off when it's in.

THE BENJAMIN ELECTRIC LTD.,
Brantwood Works, Taff Road,
Tottenham, N.17.

BROADCAST TELEPHONY

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), 361.4 m. 1-2 p.m., con.; 3.15-4 p.m., transmission to schools; 3.30-5.45, con. (Sun.); 4.15 p.m., con.; 5.15-5.55, children; 6 p.m., dance music; 6.30 p.m., time sig., news, music, talk; 8-10 p.m., music; 9.0, time sig., news, talk, special feature. Dance music daily (exc. Sundays) from 10.30 until midnight.
Aberdeen (2BL), 500 m. **Belfast** (2BL), 306.1 m. **Birmingham** (5IT), 326.1 m. **Bournemouth** (6BM), 491.8 m. **Cardiff** (5WA), 353 m. **Glasgow** (5SC), 405.4 m. **Manchester** (2ZY), 384.6 m. **Newcastle** (5NO), 312.5 m. Much the same as London times.
Bradford (2LS), 252.1 m. **Dundee** (2DE), 294 m. **Edinburgh** (2EH), 288.5 m. **Hull** (6KH), 294 m. **Leeds** (2LS), 277.8 m. **Liverpool** (6LV), 297 m. **Nottingham** (5NG), 275.2 m. **Plymouth** (5PY), 400 m. **Sheffield** (6FL), 272.7 m. **Stoke-on-Trent** (6ST), 294 m. **Swansea** (5SX), 294 m. **Daventry** (25 kw.), high-power station, 1,600 m. Special weather report, 10.30 a.m. and 10.25 p.m. (weekdays), 9.10 p.m. (Sun.); 11.0 a.m., light music (exc. Sat. and Sun.); relays 2LO from 1 p.m. onwards. Time sig.: 10.30 a.m., 4.0, and 10.0 p.m.

IRISH FREE STATE.

Dublin (2RN), 319.1 m. Daily, 7.25 p.m. Sundays, 8.30 p.m. until 10.30 p.m. Frequently relays sporting matches on Sundays, 3.0-5.30 p.m.
Cork (under construction), 400 m.

CONTINENT

Unless otherwise stated, all times are p.m. (G.M.T.).

AUSTRIA.

Vienna (Radio Wien), 517.2 m. (5 kw.) and 577 m. 7, con.; 9.30, dance (Wed., Sat.).
Graz, 357.1 m. (750 w.). Relays Vienna. Also own con. (Wed.), 7.10.
Klagenfurt, 272.7 m. (750 w.). Relays Vienna.
Innsbruck, 294.1 m. (750 w.). Testing.

BELGIUM.

Brussels, 508.5 m. (1.5 kw.). 5.0, orch. (Tues., Thurs., Sat. only), news; 8.0, lec., con., news. Relay: Antwerp, 265.5 m. (100 w.).

CZECHO-SLOVAKIA.

Prague, 348.9 m. (5 kw.). Con., 7.0 (daily).
Brunn, 441.2 m. (3 kw.). 6.0, con. (daily).
Kozlce, 300 m. (2 kw.). Relays Prague.
Bratislava, 263.2 m. (500 w.). Relays Prague.
Kbely, 1,110 m. (500 w.). 6.45, lec. (daily).

DENMARK.

***Copenhagen**, 337 m. (700 w.). Sundays: 9.0 a.m., sacred service; 3.0, con.; 7.0, con. Weekdays: 7.0, lec., con., news; dance to 11.0 (Thurs., Sat.).
 *Relayed by Sorø (1,150 m.).

ESTHONIA.

Reval, 440 m. (2½ kw.). 5.0, con. (daily).

FINLAND.

Helsingfors, 375 m. (5 kw.).

GRAND DUCHY OF LUXEMBURG.

Radio Luxembourg, 1,200 m. (250 w.). Con.: 2.0 (Sun.), 9.0 (Tues.).

FRANCE.

Eiffel Tower, 2,650 m. (8 kw.). 6.40 a.m., weather (exc. Sun.); 11.0 a.m., markets (exc. Sun. and Mon.); 11.20 a.m., time sig., weather; 6.0, talk, con., news; 7.0 and 11.10, weather; 9.0, con. (daily). Relays PTT, Paris, Sat., 9.10-11.0, and weekday afternoons. Testing on 50 kw.

Radio-Paris (CFR), 1,750 m. (about 3 kw.). Sundays: 12.0, sacred service; 12.45, con., news; 4.30, Stock Ex., con.; 8.15, news, con. or dance. Weekdays: 10.30 a.m., news, con.; 12.30, con., markets, weather, news; 4.30, markets, con.; 8.0, time sig., news, con. or dance. Testing on 30 kw.

L'Ecole Sup. des Postes et Télégraphes (PTT), Paris, 458 m. (5 kw.). 3.0, lectures (relay of Sorbonne University); 8.30, lec. (almost daily); 9.0, con. (daily).

Le Petit Parisien, 340.9 m. (500 w.). 9.15, con. (Tues., Thurs., Sat., Sun.).

Radio L.L. (Paris), 350 m. (250 w.). Con. (Mon., Wed., Fri.), 9.30.

Biarritz (Côte d'Argent), 200 m. 6.0, con. (Mon., Wed., Fri.).

Radio Vitus (Paris), 308 m. 9.0, con. (Wed., Fri., Sun.).

Lille, 1,300-1,500 m. Testing.

Radio-Toulouse, 389.6 m. (3 kw.). 5.30, news (exc. Sun.); 8.45, con.; 9.25, dance (daily).

Radio-Lyon, 291.3 m. (1.5 kw.). 8.20, con. (daily); 4.0 (Sun.).

Strasbourg (8GF), 222.2 m. (1½ kw.). 9.0, con. (Tues., Fri.); 9.30-12.0, dance (Sat.).

Strasbourg (Military Stn.), 200.1 m. (15 kw.). Con., 9.0 (Wed.). Testing on var. wl.

Radio Agen, 297 m. (250 w.). 8.30, con. (Tues., Fri.).

***Lyon-la-Doua**, 475 m. (1 kw.). Own con., 8.0 (Mon., Wed., Sat.).

***Marseilles**, 309 m. (500 w.).

***Toulouse**, 245 m. (500 w.).

*Relays of PTT, Paris.

Montpellier, 252.1 m. (1 kw.). 8.45 (Wed., Fri.).

Beziers, 180 m. (150 w.). 9.0 (weekdays only).

Juan-les-Pins (Radio LL), 230 m. (300 w.). 9.0, con., news.

Angers (Radio Anjou), 275.2 m. (250 w.). Daily: 8.30, news, lec., con.

Bordeaux (Radio Sud-ouest), 238 m. (1 kw.). 7.25, con. (Thurs.).

Bordeaux (Lafayette), 419.5 m. (1½ kw.). Con., 5.0, 9.0 (weekdays), 2.30 (Sun.). Relays PTT, Paris, 8.30 (Sat.).

Mont de Marsan, 500 m. (500 w.). Con., 8.30 (daily, exc. Sun. and Wed.).

Algiers (N. Afr.) (PTT), 310 m. (2 kw.). 7.0-10.0, daily.

Carthage (Tunis), 1,850 m. (5 kw.). 6.30, con., dance.

Casablanca (Morocco), 306.4 m. (3 kw.). 8.30, con. (daily); 10.0, dance (irr.).

GERMANY.

Berlin, on 483.9 and 566 m. 8.0 a.m., sacred con. (Sun.); 11.55 a.m., time sig., news, weather; 5.30, orch.; 7.30, con., weather, news, time sig., dance music until 11.30 (daily, exc. Tues.). Relayed on 1,300 m. by Königswusterhausen (1,300 m.) and Stettin (252.1 m.).

Königswusterhausen (LP), 1,300 m. (12 kw.). 10.30-11.50 a.m., con. (Sun.); 2.0, lec. (daily); 7.30, relay of Berlin (Vox Haus) con. (daily).

2,525 m. (5 kw.), Wolff's Büro Press Service: 5.45 a.m. to 7.10. 2,900 m., Telegraphen Union: 7.30 a.m. to 6.45, news. 4,000 m., 6.0 a.m. to 8.0, news.

Breslau, 322.6 m. (4 kw.). 11.0 a.m., con. (daily), Divine service (Sun.); 4.0, con.; 6.0, lec.; 7.30, con. Relay: Gleiwitz, 250 m.

Frankfurt-on-Main, 428.6 m. (4 kw.). 5.0 to 5.15 a.m. (exc. Sun.), physical exercises; 7.30 a.m., sacred con. (Sun.); 3.0, con. (Sun.); 3.30, con.; 7.0, lec., con., weather. Dance: relays Berlin. Relay: Cassel, 272.7 m.

Hamburg, 394.7 m. (4 kw.). Relayed by Bremen (400 m.), Hanover (297 m.), Kiel (254.2 m.). Sundays: 7.25 a.m., time sig., weather, news; 8.15 a.m., sacred con.; 12.15, con.; 5.0, con.; 7.0, con. Weekdays: 6.0 a.m.,

time sig., weather, news; 11.55 a.m., Nauen time sig., news; 1.0, weather, con.; 8.0, con., dance.

Königsberg, 329.7 m. (4 kw.). 8.0 a.m., sacred con. (Sun.); 7.0, con. or opera, weather, news, dance (irr.). Relay: Danzig, 272.7 m.

Langenberg (Rhineland), 468.8 m. (25 kw.). Relays Elberfeld, Muenster, Dortmund, Cologne (Studio).

Leipzig, 365.8 m. (4 kw.). Relayed by Dresden (294.1 m.). 7.0 a.m., sacred con. (Sun.); 7.15, con. or opera, weather, news, dance music.

Munich, 335.7 m. (1½ kw.). Relayed by Nuremberg (303 m.). 10.30 a.m., lec., con. (Sun.); 3.0, orch. (Sun.); 3.30, con. (weekdays); 5.30, con. (weekdays); 6.15, lec., con.

Muenster, 241.9 m. (1.5 kw.). Relayed by Dortmund (283 m.). 8.0 a.m., Divine service; 11.0 a.m., news (Sun.); 6.40, news, weather, time sig., lec., con.

Norddeich (KAV), 1,800 m. 11.0 and 3 a.m., weather and news.

Stuttgart, 379.7 m. (4 kw.). 10.30 a.m., con. (Sun.); 3.30, con. (weekdays); 4.0, con. (Sun.); 5.30, time sig., news, lec., con. (daily); 8.15, time sig., late con. or cabaret. Relay: Freiburg, 577 m. (1½ kw.).

HOLLAND.

Hilversum (HDO), 1,050 m. (5 kw.). Sun-days: 10.0 a.m., sacred service; 2.10, con.; 4.40, church service; 7.40, weather, news, con. Weekdays: 4.30, con.; 7.50, news, con.

Scheveningen-Haven, 1,950 m. (2½ kw.). Irr. throughout day.

HUNGARY.

Buda-Pesth (Csepel), 555.6 m. (3 kw.). 7.0, con. or opera; dance nightly.

ICELAND.

Reykjavik, 333.3 m. (700 w.). Con., 7.30.

ITALY.

Rome (IRO), 449 m. (3 kw.). 9.30 a.m., sacred con.; 4.30, relay of orch. from Hotel di Russia; 4.55, news, Stock Ex., jazz band; 7.30, news, weather, con.; 9.15, late news. Milan, 315.8 m. (1 kw.). 8.0-11.0, con. Naples, 333.3 m. (1½ kw.). 8.0-11.0, con.

JUGO-SLAVIA.

Zagreb (Agram), 310 m. (500 w.). 7.15, con.

LATVIA.

Riga, 480 m. (5 kw.). Con. daily, 7.0. Testing on 15 kw. (1,500 m.).

LITHUANIA.

Kovno, 2,000 m. (15 kw.). 6 p.m. (daily).

NORWAY.

Oslo, 461.5 m. (1.5 kw.). 6.15, news, time, lec., con.; 9.0, time, weather, news, dance.

Bergen, 370.4 m. (1 kw.). 6.30, news, con.

*Fredriksstad, 436 m.

*Porsgrund, 504 m. (1½ kw.).

*Hamar, 566 m.

*Relays Oslo.

POLAND.

Warsaw, 400 m. (2 kw.). 7.30, con.

Warsaw (High Power), 980 m. (10 kw.). 7.30, con.

Posen, 270.9 m. (4 kw.). Testing.

Lemberg, 247.9 m. Under construction.

RUSSIA.

Moscow (RDW), 1,460 m. (15 kw.). 4.55, news and con.; 10.0, chimes from Kremlin.

(Popoff Station), 1,010 m. (2 kw.). 6.0, con. (Tues., Thurs., Fri.).

Radio Peredacha, 420 m. (6 kw.).

Trades Union Council Station, 460 m. (2 kw.). 5.0, con. (Mon., Wed.).

Leningrad, 1,165 m. (10 kw.). 5.0.

SPAIN.

Madrid (EAJ7), 373 m. (1.5 kw.). Con. daily. Closes 1 a.m. (daily).

Madrid (EAJ4), 340 m. (2½ kw.). Con.

Madrid (Radio-Madrilena) (EAJ12). Testing on 303.310 m. (2½ kw.).

Barcelona (EAJ1), 325 m. (1½ kw.). 6.0-11.0 (daily).

Barcelona (Radio Catalana) (EAJ13), 460 m. (1 kw.). 7.0-11.0, con., weather, news.

Bilbao (EAJ9), 436 m. (500 w.). 7.0, con.

Bilbao (Radio Vizcaya) (EAJ11), 418 m. (500 w.). 8.0-12.0, con. (daily).

Cadiz (EAJ3), 344.8 m. (550 w.). 7.0-9.0, con., news. Tests daily (exc. Sun.), midnight.

Cartagena (EAJ15), 335 m. (500 w.). 8.30-10.0, con. (daily).

Seville (EAJ5), 357 m. (500 w.). 9.0, con., news, weather. Close down 11.0.

Seville (EAJ17), 300 m. (500 w.). 7.0-10.0, con. (daily).

San Sebastian (EAJ8), 346 m. (1.5 kw.). 5.0-7.0, 9.0-11.0 (daily).

Salamanca (EAJ22), 405 m. (1 kw.). 5.0 and 9.0, con. (daily). Closes down 11.0.

SWEDEN.

Stockholm (SASA), 454.5 m. (1½ kw.). 10.0 a.m., sacred service (Sun.); 5.0, sacred service; 6.0, lec.; 8.15, news, con., weather.

Dance (Sat., Sun.), 8.45.

Relays.—Boden (SASE), 1,200 m.; Eskilstuna, 250 m.; Falun (SMZK), 400 m.; Gothenburg (SASB), 416.7 m.; Gefle, 204.1 m.; Joenkoeping (SMZD), 201.3 m.; Kalmar (SMSN), 254.2 m.; Karlsborg (SAJ), 1,365 m.; Karlserona (SMSM), 196 m.; Kristinehamn (SMTY), 202.7 m.; Karlstad (SMXG), 220 m.; Linkoeping, 500 m.; Malmo (SASC), 260.9 m.; Norrkoepping (SMVV), 275.2 m.; Orebro, 218 m.; Ostersund, 720 m.; Saefle (SMTS), 252.1 m.; Sundsvall (SASD), 545.6 m. (1 kw.); Trollhattan (SMXQ), 277.8 m.; Uddevalla, 294.1 m.; Umea, 229 m.; Upsala, 315 m.; Varberg, 297 m.

SWITZERLAND.

Lausanne (HB2), 850 m. (1½ kw.). 7.0.

Zurich, 494 m. (500 w.). 10.0 a.m., con. (Sun.); 4.0, con. (exc. Sun.); 7.15, lec., con., dance (Fri.).

Geneva (HB1), 760 m. (2 kw.). 7.15, con. (weekdays). No transmission on Sun.

Berne, 411 m. (1.5 kw.). 9.30 a.m., organ music (exc. Sat.); 3.0, 7.30, con.

Basle, 1,100 m. (1½ kw.). Con. daily, 7.30.

THE KENNETT ACCUMULATOR

It is, of course, generally known that all accumulator batteries, whatever their size, are necessarily composed of 2-volt unit cells; but perhaps it is not sufficiently appreciated how convenient it is to be able to make up a battery to any required voltage simply by the assembly of these units. With this idea in mind H. Kennett, of 11, Liverpool Road, Islington, London, N., has put on the market a series of uniform 2-volt cells which, though absolutely complete in themselves, very readily lend themselves to block assembly either by fastening them together permanently or by the use of coupling connections. The cells are of excellent design and workmanship throughout, the plates being well supported, with ample space below, and the terminals are of ebonite, with anti-corrosion devices.

The Reval (Esthonia) broadcasting station has resumed its transmissions between 4 and 7 p.m. daily, on a wavelength of 440 m. with a power of some 2½ kilowatts.



bright & dull emitter valves

There are two windings on this one Rheostat—one of a 6-ohm resistance with a continuation on to a 30-ohm strip winding. This has been specially made to meet the demand for a thoroughly reliable Rheostat covering needs of both bright and dull emitter valves. The resistance wire is wound on hard fibre strip under great tension and is immune from damage. The popular one-hole fixing method is provided and the terminals are conveniently placed. Contact arm has a smooth silky action. All metal parts nickel plated. Complete with ebonite combined knob and dial.

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BARGAIN MARCONI 1-VALVE AND CRYSTAL DET. SETS. In closed case. Straight from the factory. Contain ebonite panel, nickel fittings, detector, valve-holder, L. and S. wave switch, double spade tuning, two 200/4,000-metre H.F. chokes, T.C.C. condenser, Intervalve Transf. Terminal and plug sockets. All new and perfect, with wiring diagram and Osram valve. List price, £7. Sale, complete and tested on aerial, 27/6.

SALE CLEARANCE LOUD SPEAKERS. Violina, 6 guin. Cabinet model, with Viola receiver and cord, 25/-. Western Electric Table Talkers, 35s. model, 2,000 ohms, 17/6; T.M.C. Loud Speakers, 2,000 ohms, 12/8; Texas Cone, bronzed, 40/-; Sterling Magnavox, 65/-; Amphone, 22/8 and 32/6.

RELAYS. Weston, 20/-; G.P.O., 40/-; Magnetic Relays, 10/-; Dixon Distant Control Fila. Switches, auto. on and off, in pol. case, 15/-.

WAVEMETER SALE. Reduced prices W.D. Service meters, calibrated to N.P.L. standard. Short Wave "Forward," cost £10, 40/100 metres, 35/-; Broadcast Townsend, 35/-; No. 57L "Townsend," 280/1,600 metres, 50/-; L.R. Townsend, 120/4,000 metres, £4; Long R. "Forward," 75/3,000 metres, £4 10/-; Pauls, 100/3,000, £4. Heterodynes, Brown's and Mark II., with calib. valve, 90/3,000 metres, £5, or 150/3,000 metres, £4 10/-. Ondia Wavemeter prices reduced to £3 10/- for 60/4,000 metres. Bought from the Admiralty. Gambrell and Het. Wavemeters; neat, need completion. Last few at 10/- each. Post, 1/-.

MARCONI L.F. AMPLIFIERS. 2-valve, in mahogany case, 32/6; 3-valve Portable Frame Type, 40/-; Western Electric, 1-valve, 40/-; Sterling, 2 v., 55/-; Magnavox, 2 v. power, £3 15/-.

VALVES. Low Loss Osram "C," 5/-; Microsix and C.A.C. D.E. valves, 7/6; Transmitting Valves, 10-watt Short Wave, 12/6; Osram A.T. 40, 15/-; 30-watt S., 25/-; Cunningham, 17/6.

AEROPLANE AERIALS. 110 ft. 7-strand hard-drawn H.C. Copper on bobbins to run freely. Sale price, 1/3; post, 3d. Efesca Aeroflex Aerials, 49/100, 1/3. Navy 7/23 Enam. Superflex Aerials, 3/100 ft.; Electronic Aerial, 100 ft., 1/3; 500 1/2-oz. reels, 28 gauge S.C.C. Wire, makes two Broadcast Coils, 4d. each. Wire—New 22 gauge cotton-enamel covered, 1/8 lb., cut price. Twin Flexible Cord, 2/6 doz. yds. 3/36 Silk-covered Flex, 12 yds., 9d. Flex rubbered, 1/- doz. yds., 100-yd. coils, cheap, 6/6.

PHONE CORDS. Brown's Head, Double, new, 1/6; Lightweight, 1/3. Single Cords, 6 ft., with solo plug each end, 9d. Twin L.T. Battery Cords, with spade ends, 1/-.

LOUD-SPEAKER EXTERNAL WIRE. 6/- 100 yds. Transformer Iron Wire, 1/3 lb. Stampings, 6d. doz.

TAPPED FRAME AERIALS. 10/-. Indoor Wire, 1/100 ft. Duconette Indoor Aerial, 2/8. Ducon, 10/-.

EARTH MATS. Galv. Wave Plate, with Electron Wire riveted on, 2/6; post, 9d. Copper Mesh Earth for short waves, 5/6 each. Earth Spikes, 1/3.

INSULATORS. The R.A.F. Light Weight Aerial Insulators, brass ring and screwed tension stem. Millions in use. 10,000 in stock; 1/6 a dozen. Transmitting Insulators, 1/6. Hanley Porcelain Lead-in Tubes. Straight or drip-proof ends, 6d. and 8d. each. Egg or Shell or China reels, 1d., or 10d. per doz. Bullerix Bell Aerial, 1/-; large, 1/3.

MICA SHEETS. Best Ruby Mica for Condensers, .002, 2 by 2 by .002 thick, 1/- per doz.

INTERVALVE IRONCLAD TRANSFORMERS. Ratio 5 to 1, Type E, 3 to 1. Latest at reduced price of 7/6.

2,000 MAGNETS FROM GOVERNMENT LAB., for experimenters, 4 in. Bar Steel, 9d.; 10 in. ditto, 1/-; Horse Shoe, 1/-; Magnet Needles, Agate centres, 8d., post extra. Pivot Pillars, 6d.

SLATE PANELS. Polished face, 1/2 in. thick, 5/6 per sq. ft.; 3/4 in. thick, 6/6 per sq. ft. Plain Slate Bars for Power Rheostats, 10d. each.

SWITCHES. Lucas panel 3-lever flush, 1/3, quarter price. Plugs and Jacks, 2/7 pair; 4-pin plug and socket, with switch, 4/6. Earth Aerial, 1/-.

Arresters, 8d.

G.P.O. PORTABLE TELEPHONE SETS. Mag. ringing, Hand Comb.—Phone, Microphone, Receiver, Condenser, Magneto—Bell, Transformer, etc., leather case. Worth £4 each. Price to clear, 22/6.

TWIN DOUGLAS PETROL ENGINES FOR ELECTRIC COUPLED GENERATION. In good running order. To clear, £12. Dynamos in stock.

E. BOX PANELS. A.C. Ammeter H.W., Quick-break Rotary Switch, 4-pin Plug, with four 6-ft. lengths of coloured H.T. flex. Cost 45s. Price to clear, 14/6 each. Post, 9d.

PRECISION INSTRUMENTS. Finest stock in London. Mov. Coils to 500 m/a, etc., 20/-; 3-range Milliammeters, 37/6; 2-range Voltmeters, 6/120, 11/6; 0-30 volts, 10/2; 120 volts, 20/-; 600 volts, 55/-; 0-1,000 volts, £3; 1,500 volts, £4 10/-; 2,500 volts, £6; Sg. Mov. Coil Siemens Cell Testers, 15/-; 250 m/a or 500 m/a Thermo Meters, 15/-.

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SUB-RELAY STATIONS OF THE SWEDISH BROADCASTING SYSTEM

IN Sweden most of the broadcast entertainments are provided by Stockholm and relayed to a large number of smaller stations, but such cities as Boden, Gothenberg, Malmo and Sundsvall frequently put out their own local concerts; to a certain degree, although dependent on the capital for the bulk of the programmes, they must be considered main transmitters.

Strictly speaking, Stockholm supplies a complete service only to the following fifteen relay stations: Eskilstuna, Falun, Gäddede, Jonköping, Kalmar, Karlsborg, Karlskrona, Karlstad, Kristinehamn, Linköping, Norrköping, Örebro, Östersund, Saeffle and Umea. These vary in power from 250 watts to 10 kilowatts in the case of Karlsborg, which until Motala is on the air, is for the present the "5 XX" of the system. To these should be added, as already explained, the four main stations mentioned in the first paragraph of this article.

By arrangement with local clubs, however, smaller transmitters have also been erected in other out-of-the-way districts, where they act as *sub-relays* to the provincial main stations, and receive the capital programmes in this roundabout manner. Such stations are Boras (250 w.) on 230.8 m., Trollhättan (250 w.) 277.8 m., Uddevalla (250 w.) 294.1 m., Varberg (250 w.) 297 m., which are linked up with Gothenberg, Halmstad (250 w.) 215.8 m. and Helsingborg (250 w.) 299 m. taking their concerts from Malmo and Hudiksvall (250 w.) 272.7 m., which relays Sundsvall. Considerable use is made of the telephone land lines, and by their aid the greater portion of the country is adequately covered.

To the Swedish Broadcasting Company (Svenska Radiotjänst) this large number of small transmitters is not an unmixed blessing, as considerable difficulty is encountered in allotting suitable wavelengths in view of the limited broadcast band. A plan has now been put forward by which it may be found possible to operate several of the smaller relays on a common wavelength. Practical tests will shortly be undertaken to ascertain whether the scheme is a workable one.

J. G. A.

A MARCONIPHONE GIFT

A CIRCUIT booklet which has been issued by the Marconiphone Co., Ltd., of 210, 212, Tottenham Court Road, W.1, will be sent free to readers who write to the above address and mention AMATEUR WIRELESS. In addition to circuits ranging from a simple crystal arrangement to an elaborate "super-het," there are photographs of experimental "hookups" accompanying each diagram. Full lists of components required and constructional details of each receiver are also given for the benefit of constructors.

WIRELESS ORGANISATIONS ADVISORY COMMITTEE

A MEETING of the Wireless Organisations Advisory Committee was held at Savoy Hill on January 31, with Captain Ian Fraser, C.B.E., M.P., in the chair.

It was agreed that the members of the committee should prepare, through the machinery of the organisations which they represent, analytical reports based on the views of listeners regarding the composition of broadcast programmes, these to be submitted to the next meeting of the committee. The committee unanimously agreed that the only means of ensuring a broadcasting service which was satisfactory to all listeners was that provided by an alternative programme scheme.

Captain Eekersley attended and gave technical evidence upon the progress of the B.B.C.'s future plans to meet this end. Further discussion on alternative programmes was deferred until the next meeting, when members of the committee will have had time to consider the evidence heard.

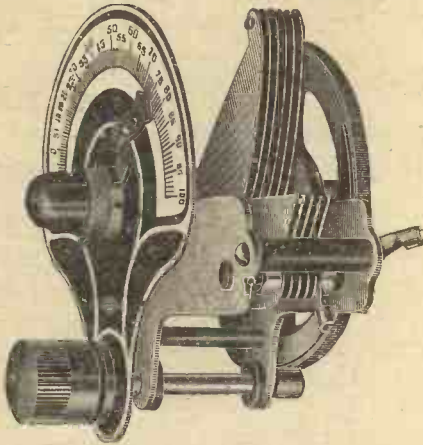
Dates for future meetings were considered, and it was decided that the committee should meet on the last Monday in every month, but that an additional meeting should be called for February 14.

Owing to adverse economic conditions, radio equipment is not selling well in Brazil at present. Importers are not only curtailing orders, but in some instances countermanding them. Complaint is made of the large amount of obsolete material still being offered at so heavy a discount as seriously to interfere with the importation of the latest apparatus.

The Japanese Wireless Telegraphy Company has placed a contract with a German firm for the installation of a super-power W.T. station in Japan. The contract stipulates that the transmitter shall be brought into operation in 1928. As a power of 550-600 kilowatts aerial energy is contemplated, it is expected that by means of this station direct communication will be made possible with Great Britain and the Continent of Europe.

Now that the Dutch Scheveningen-Haven wireless telephony station has been officially taken over by the authorities, weather and market reports are broadcast throughout the day by arrangement with the Amsterdam Vaz Diaz Press Agency on a wavelength of 1,950 metres, with a power of 2½ kilowatts in the aerial. It is this station which later may be used by manufacturers and other business men in Holland for a publicity service. By arrangement with the Vaz Diaz Agency simple receiving apparatus made for the sole reception of the Scheveningen transmissions can be hired from the organisers. The station announces itself as *Scheveningen Haven op 1,950 meter-Persbureau Vaz Diaz*.

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Prices: .0005 mfd. 17/-, .0003 mfd. 16/-, .0002 mfd. 15/6
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LONDON W.1.

Silvertown

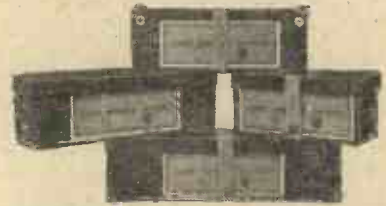
WIRELESS ACCESSORIES

Quality guaranteed by over 50 years electrical manufacturing experience.

SILVERTOWN WIRELESS ACCESSORIES

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Condensers (All Types).
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(Dry Cells)

No. 1720	15 volt, 9 1/2" x 2 1/2" x 2 1/2" high	3/8
No. 1721	30 " 6 1/2" x 2 1/2" x 3 1/2" "	7/6
No. 1722	50 " 10 1/2" x 2 1/2" x 3 1/2" "	10/-
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No. 1724	100 " 10 1/2" x 5" x 3 1/2" "	21/-

The 15-volt Battery forms one unit, but the larger batteries can be tapped every 4 1/2 volts, and are provided with two "wander" plugs to each.

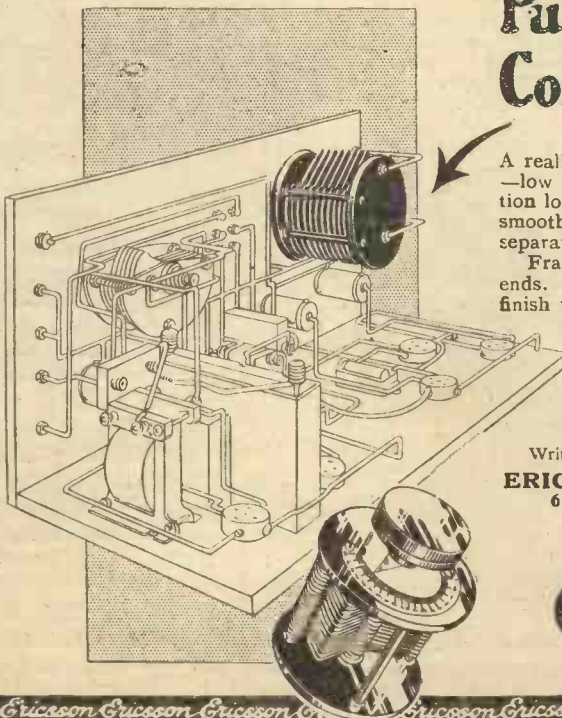
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106, Cannon Street, London, E.C.4.
Works: Silvertown, E.16.

Belfast; Birmingham; Bristol; Cardiff; Dublin;
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A really high-grade piece of radio engineering—low in losses, high in efficiency. Absorption losses negligible and the movement silky smooth in operation. Accurate tuning and separation.

Frame and plates very sturdy. Ebonite ends. Highest quality scientific instrument finish throughout.

PRICES:

Plain	Vernier
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Write to-day for fully illustrated informative lists.

ERICSSON TELEPHONES LTD.,
67-73 Kingsway, London, W.C.2.

Ericsson
TESTED
CONDENSERS.

CHIEF EVENTS OF THE WEEK

SUNDAY, FEBRUARY 13	
London	Light Orchestral Concert.
Manchester	Masterpieces of Wagner.
MONDAY	
London	<i>Paul Jones</i> . A comic opera in three acts.
Aberdeen	Concert by the Insch Choral Union.
Birmingham.	Radio Fantasy—"Old Memories."
Cardiff	Welsh Celebration of St. Valentine's Day.
Glasgow	<i>For France</i> . An episode of the Franco-Prussian War.
Manchester	An hour's entertainment by the Huddersfield Concert Party.
TUESDAY	
London	<i>The Fog</i> . Short play by Martin Husingtree.
Belfast	<i>By Virtue of a Broadcast</i> . By Frank H. Shaw.
Cardiff	Scenes from the life of Oliver Goldsmith.
Glasgow	Rutherglen programme.
Manchester	<i>Whitemail</i> . A one act comedy by Robert H. Blackmore.
WEDNESDAY	
London	Programme by the Chief Engineer.
Aberdeen	<i>Guy Weatherby's Dilemma</i> . Comedy by Hilda P. K. Chamberlain.
Belfast	"Saint Saens." By the Station Orchestra.
Glasgow	<i>The Merchant of Venice</i> . Act II, Scene II.
Manchester	Popular Suites and Ballets.
THURSDAY	
London	B.B.C. National Concert, relayed from Royal Albert Hall.
Belfast	"The Two Bobs." Entertainers.
Glasgow	Edward German Anniversary Programme.
FRIDAY	
London	Concert for Schoolchildren, arranged by the People's Concert Society in co-operation with the B.B.C.
Birmingham	W. W. Allen in character studies from the works of Charles Dickens.

Bournemouth "The Two Bobs." Entertainers.
Glasgow Edward German Anniversary programme.

London Community singing from the
Royal Albert Hall.
Bournemouth Revue.
Cardiff *The Rest House*. A Radio Satire
by Andrew Harding.
Manchester "Vaudeville."

RADIO ASSOCIATION

THE annual meeting of the Radio Association will be held at the Hotel Cecil on Friday, February 17, starting at 3.30 p.m. The Hon. J. M. Kenworthy, M.P., will deliver the presidential address. The meeting will be followed by a lecture, at 4.45 p.m., on "Broadcasting and Television," by Professor Fournier d'Albe, D.Sc., F.R.A., etc. The lecture will be open to the public.

From Geneva, recently, the League of Nations broadcast its first bulletin on the influenza epidemic now raging in Europe.

A wireless installation of a six-valve receiving set, with four loud-speakers and fifty headphones, has been provided for Mercer's Hospital, Dublin, due to the generosity of tradesmen and the labourers employed at the St. James's Gate Brewery. This is the second Dublin hospital to be fitted up to give the patients the great boon of wireless entertainment, which often helps, in the opinion of the medical men, towards their more speedy recovery.

AERIAL FIXED CONDENSERS

IT is sometimes advisable to insert a low-capacity fixed condenser in the aerial lead to coil and variable condenser. There is no need for an expensively-made piece of apparatus; indeed, the following will function satisfactorily in quite a number of situations where a low-capacity condenser is required:

Obtain two short lengths of thin brass or copper tube, say 2 in. long, one tube being $\frac{3}{8}$ in. larger inside diameter than the other is on its outside diameter. To the inside of the smaller and the outside of the larger solder a short length of stout copper wire for connections.

Wrap the smaller tube with a few turns of clean white paper that has been baked in paraffin-wax and carefully drained. The thickness of paper on the tube should be such as to make it a tight fit when driven into the larger tube.

Make the larger tube hot, and drive the wrapped tube as tightly as possible into it, then place the entire article in a dish of paraffin-wax in a hot oven. Remove when the wax is melted, and allow all to become cold: dig the condenser out when the wax is set, trim off the spare wax, and you have a serviceable condenser ready for use.

M. P.

BATTERIES IN ENCLOSED RECEIVERS

NOWADAYS batteries are often enclosed in the cabinet containing the receiver. When this is done, the batteries—which, it should be remembered, are large masses of earthed conducting material—should not be placed close to components or directly underneath them.

This applies particularly to tuned circuits, as the proximity of a large earthed object will have much the same effect as is experienced if, for instance, the hand is placed close to a coil or condenser.

R. H. B.

SEPARATE H.T. BATTERIES FOR SEPARATE TAPPINGS

WHEN different H.T. tapplings are taken from a battery, parts of it will be subjected to a heavier drain than others, and the current taken from those parts which are common to all tapplings may, in a set containing several valves, be so heavy as to cause very rapid exhaustion.

There is, of course, no reason why separate batteries, with a common negative connection, should not be used for the various tapplings. As the drain on each battery is less severe, this method will give a longer total life from the batteries than if they were used one at a time.

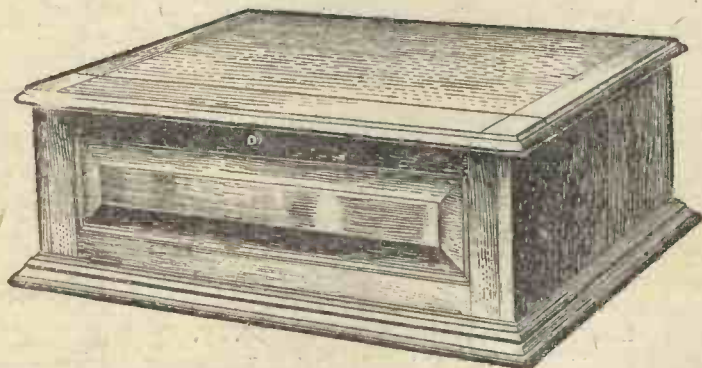
R. H. B.

CAXTON WIRELESS CABINETS

THOUSANDS OF SATISFIED CUSTOMERS.

All Polished with new enamel that gives a glass hard surface that cannot be soiled or scratched. Ebonite or Radion Panels Supplied and Perfectly Fitted at low extra cost. SENT FREE—Catalogue of Standard Wireless Cabinets in various sizes and woods.

Elstree "Solodyne"



Specially designed for this famous Radio Press Circuit. All details and dimensions conform to their specification, enabling constructors to follow the layout without difficulty.

PRICES:

Light Fumed Oak 61/- Dark or Jacobean Oak 65/- Real Mahogany 68/-

Prices include either "full front" with handsome solid raised panel, as illustrated, or beaded doors, allowing ample space for tuning controls, etc. Glass panelled doors can also be supplied at 3/- extra.

CASH WITH ORDER. CARRIAGE PAID U.K. PROMPT DELIVERY.

Packing Case 5/- extra repaid if Case returned within 14 days Carriage paid to Works.

CAXTON WOOD TURNERY CO., MARKET HARBOROUGH.

WORTH WRITING FOR

THE General Electric Co., Ltd., of Magnet House, Kingsway, W.C.2, have issued a useful 32-page catalogue of Gecophone wireless components. All are well designed and of special interest to constructors.

J. J. Eastick and Sons, who are the makers of the well-known Eelex terminals and kindred accessories, have sent us a well-illustrated pamphlet dealing with their products.

When writing for Catalogues or Kindred Trade Publications you will be sure of prompt attention if you mention "Amateur Wireless."

The Fuller Accumulator Co. (1926), Ltd., of Chadwell Heath, Essex, have issued a descriptive leaflet on their 20-volt accumulator units.

A. F. Bulgin and Co., of 9-11, Cursitor Street, E.C.4, have sent us a catalogue of Deckorem radio products, containing many novel and useful radio gadgets.

Brown Bros., Ltd., of Great Eastern Street, E.C.2, have sent us their catalogue (No. 231) of radio receiving sets and components. All the products of the leading manufacturers are illustrated and described. This is for traders only.

An interesting booklet, issued on behalf of the Telegraph Condenser Co., Ltd., of Wales Farm Road, W.3, called "How to Build Your Own H.T. Battery Eliminator," has been sent to us for review. The first part of the booklet is devoted to a description, by a well-known technician, of how a battery eliminator works. Then follows useful information on how to build successful eliminators for both D.C. and A.C. mains. Any reader who would like a copy should write to the address given, enclose three penny stamps, and mention AMATEUR WIRELESS.

The Puradyne L.F. transformer is the subject of a pamphlet received from the Puradyne Manufacturing Co., of 27, Elgin Road, Seven Kings, Essex.

Interesting details of Shortpath valves are contained in an informative booklet issued by the Benjamin Electric, Ltd., of Brantwood Works, Tottenham, N.17. Benjamin wireless components are dealt with in another booklet issued by the same company.

WE are informed by the Carrington Manufacturing Co., Ltd., that owing to a large increase in business, due to the great demand for "Camco" cabinets, they have acquired larger works at Croydon. Their vans will deliver in the London area daily, and their new address will be "Camco" Works, Sanderstead Road, South Croydon.

UNIQUE Parts BOOKLET

Inaugurating Revolutionary Methods favourable to Battery Users

TUNGSTONE
Pure Lead Grid
Accumulator

Entirely of British Origin and Workmanship.

PRICE LIST OF TUNGSTONE

INTERCHANGEABLE AND STANDARDISED PLATES AND PARTS

of any Tungstone Battery, which can be fitted by Unskilled Labour. Any Parts or Plates can be kept in stock against emergencies, entirely eliminating vexatious delays and minimizing maintenance costs.

FOR THE FIRST TIME IN THE WORLD'S HISTORY of Accumulator Manufacture, Tungstone as a result of its Original Design and Principles of manufacture can issue a definite Price List of all of its Component Parts which are perfectly Standardised and Interchangeable one with another. *Complete Accessibility is the original keynote of Construction.*

NO OTHER ACCUMULATOR MAKER IN THE WORLD

has ever been in the position to issue a definite priced Parts List because their make of complete Batteries or Unit 2 Volt Cells are designed, manufactured and assembled on antiquated methods whereby the principles of Interchangeable and Standardised Component Parts could never be practised. For example, Plates and Wood Separators in 2 Volt Cells are (*except in Tungstone*) one indivisible whole. If one plate goes wrong the lot is destroyed.

IMPOSSIBLE TO TAKE PLACE IN TUNGSTONE

Further serious and certain disadvantage is that all 2 volt cells (*except in Tungstone*) are cemented together into one completed and undividable Battery so that the breakdown of one cell destroys the whole Battery.

IMPOSSIBLE TO TAKE PLACE IN TUNGSTONE

ALL PARTS EXCEPT PLATES ARE ACID PROOF, UNOXIDIZIBLE AND INDESTRUCTIBLE. WILL OUTLIVE MANY SETS OF PLATES. COPY OF THIS BOOKLET SENT POST FREE ON APPLICATION TO: T.A.53

TUNGSTONE ACCUMULATOR CO., LTD., St Bride's House, Salisbury Square, London, E.C.4.

It is officially stated that no part of the B.B.C.'s work is more generally appreciated nowadays than their religious operations. The Sunday evening epilogue evokes more detailed appreciative comment than the most ambitious and expensive symphony concert.

In less than a month approximately 220 blind persons in Glasgow and the West of Scotland have availed themselves of the privilege of obtaining free wireless licences.

Mr. C. W. Goyder, of Mill Hill, has added to his long-distance records by exchanging morse messages with the whaler *Sir James Clark Ross*, now about 250 miles within the Antarctic circle. This latest achievement affords a further proof of the superiority of the short waves for long-distance work on low power.

"Amateur Wireless and Electrics." Price Threepence. Published on Thursdays and bearing the date of Saturday immediately following. Post free to any part of the world: 3 months, 4s. 6d.; 6 months, 8s. 9d.; 12 months, 17s. 6d. Postal Orders, Post Office Orders, or Cheques should be made payable to Bernard Jones Publications.

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.

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10/6 NOW

This highly efficient 2-Valve Loud Speaker set is the finest wireless value ever offered. It gives a volume and quality of tone unattained by any instrument of a similar price and is the essence of simplicity. Fitted with coils covering all the British wave-lengths, including Davenport.

THE CABINET is of beautifully polished Oak, & all components are of the highest quality. Full Emitter Valves with patent valve holders, &c.; H.T. Battery, 2-volt accumulator and complete Aerial Outfit. **LOUD SPEAKER** of exclusive design with unique magnetic system and improved mica diaphragm. Price **£7:17:6**

TERMS: Our Bargain Price is for deferred payments. Send 10/6 now, & complete purchase in 14 monthly payments of 10/6. If you wish to pay cash, 5 per cent discount is allowed. **Catalogue Post Free.** Up-to-date Crystal & Valve sets at keenest prices. **J. G. Graves Ltd. Sheffield**

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THE "ALLWOODORN"

Polished Aluminium casting & Oak or Mahogany horn. Takes all gramophone attachments.
Put Lissenz on this and you have the cheapest and best



Price 27/-

The finest combination of wood and metal on the market.

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2-VALVE AMPLIFIER, 35/-

1-Valve Amplifier, 20/-, as new; Valves, D.E. 06, 7/-; Heaters, 8/6 pair; new 4-Volt Accumulator, 13/-; new 6-Volt H.T., guaranteed, 7/-; 2-Valve All-Station Set, £4. *Approval willingly. Write for Free Bargain List.*

A. TAYLOR 57, Studley Road, Stockwell, London.

STANDARD WET (Leclanche Type) H.T. BATTERIES.

This source of H.T. supply is absolutely ideal, being simple to fix, cheap and silent in operation. The cells consist of containing Jar, Zinc and Sac element in a solution of sal ammoniac.

Send 1d. stamp for full particulars.

<p>No. 1. Sac for 7 milli-amps. price per doz. 1/6</p> <p>ditto with terminals " " " 2/3</p> <p>Jar (waxed) " " " 1/3</p> <p>Packets of 24 rubber rings for insulating " " " 6d. (state if No. 1 or No. 2 Sac). Carr. extra.</p>	<p>No. 2. Sac for 15 milli-amps. price per doz. 3/-</p> <p>ditto with terminals " " " 3/9</p> <p>Zincs " " " 1/-</p>
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WET H.T. BATTERY Co., 23, Coldharbour Lane, Camberwell Green, S.E.5. Phone: **Brix. 2539.**

MORE RADIOGRAMS

A BIG appeal is being launched by the managers of the various Glasgow hospitals for the provision of wireless installations for the benefit of the patients. It is stated that a ward of twenty-four beds can be equipped for approximately £50, which sum would provide entertainment for four hundred patients every year, as the average duration of a patient's stay in hospital is twenty days. Within a few days of the appeal being made £170 had been received in contributions and £200 promised.

Upon the question of political and controversial broadcasting, Mr. D. Cleghorn Thomson, the Northern Area Director of the B.B.C., claims that with its introduction listeners could hear the protagonists direct and make up their own minds, where formerly they had to accept the dictated and partial version of others.

It is stated that in the middle of February the Berlin and Vienna Post Offices will begin the regular transmission of pictures by wireless. The system to be adopted is that of the Telefunken, which was thoroughly tested six months ago, and from the technical point of view proved to be thoroughly satisfactory. It has been decided to start a regular service between Berlin and Vienna.

Part of a surplus from performances by Hawick Amateur Operatic Society has been handed over to Hawick Fever Hospital for a wireless installation. The sum given to the hospital was £60.

Igranic Neutro-Sonic Seven.—A meeting of the Kensington Radio Society was held at 136, Holland Park Avenue, on Thursday, January 13, at 8.30 p.m., when Mr. Alford, of the Igranic Electric Co., Ltd., gave a demonstration with the Igranic Neutro-Sonic Seven Receiver. He first gave a brief and interesting history of super-heterodyne receivers from their first introduction into this country from America. The meeting was interested to hear that with one of these super-sensitive receivers it was possible to hear the German warships communicating with one another in harbour.

"Germany's New Powerful Broadcast Station" is illustrated and described in an interesting article on the Langenberg station in Rhineland in this week's "English and Amateur Mechanics" (3d.), on sale at all newsagents. Other interesting items include: "Making an Ingle-nook in an Existing Room," "Something New in Metal Cutting Tools," "An Easily-constructed Drilling Machine," "Making a Reflecting Optical Lantern," "Passe-partout Picture Framing," "Wireless Notes for the Amateur," Recent Inventions and Innovations, Technical Notes and News, Correspondence, Queries, Replies, Technical Advice Bureau, etc., etc.

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

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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 Publishers 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.

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NOTICE.—If you are requiring anything Electrical, such as Dynamos, Motors, Switchboards, Cut Outs, Regulators, Batteries, Meters, Wireless Material, Generating Sets, etc., etc., it will save you pounds by dealing with us direct. We hold the greatest Government Surplus and Bankruptcy Stocks in the Country. Every article guaranteed. Please write your requirements.—T. W. Thompson & Co., Government Surplus Depot, 30/43, London Street, S.E.10. Telephone 1230 Greenwich.

H. T. P. GIBBS, MEMBER R.A.C.2., AND A.M.I.E.E. brass and Porcelain Patents and Trade Marks.—61-62, Chancery Lane, London, W.C.2. Phone: Holborn 1625.

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Waxed, 1/6 doz.	Special, 1/- doz.	High Capacity 1/6 doz.

Sacs supplied with terminal tops, 9d. d-z. extra; Special large double size sac, 3/- doz. For Wet H.T. Batteries, post free on 3 doz. and over. Packed in special carton with division for each cell. This can be used as a container for battery when made up. Send 6d. for sample complete unit, particulars and instructions. All parts stocked for building the latest type Loudspeaker with the Seamless Moulded Cone.

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Phone: London Wall 2292. (N. Bank.)

A BOON AND 'FREE GIFT

THE "HEAR-EASY" RUBBER HEADPHONE PADS. Light, soft and comfy. Shut out noises; are a boon to Crystal and DX listeners. List, 2/- pair. 5,000 offered at 6d. per pair; all brand new C.A.C. surplus stock.

One pair **FREE** to any BLIND licence holder for 2d. stamps for post. **TO HOSPITALS**, for doz. lots, one pair **FREE** for each pair ordered.

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St. Paul's an. Backfriars Str. Phone: City 0592.

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British made (round or square) Leclanche Glass Jars 2 1/2 x 1 1/2, for wet H.T. Units. Waxed 1/3 doz., plain 1/- doz., zincs 1/- doz., Grade 1 sacs 1/6 doz., Grade 2 sacs 1/3 doz. Special Non-Solder and non-corrosive Plug-Socket Connector and zinc combined. Box design. Each cell a tapered unit, 2 1/2 doz. Large sacs 3/- doz., Acid proof varnish 6d. jar (Black). Casing and Packing extra.

Send 1d. Stamp for instructions and List.

Ask us about the "Unique" Voltmeter.

Eton Glass Battery Co., Dept. A, 46, St. Mary's Rd., Leyton, E.1

TRADE MARK

FINEST QUALITY RADIO COMPONENTS

REGISTERED

Each one is Perfect.

R.D. 40 Perm. Detector .. 2/-

Also in Red Mottled (R.D. 40A) .. 3/-

Shield for same .. 6d.

Of all high class Radio Dealers or Sole Makers.



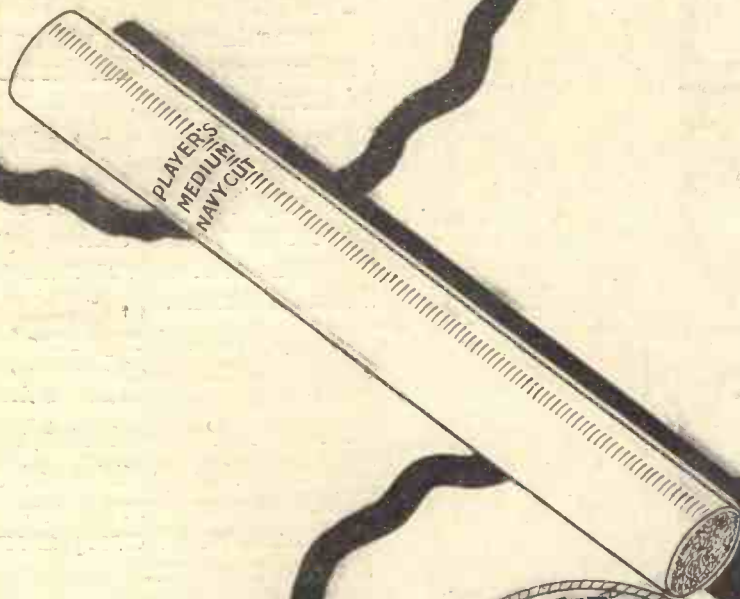
JEWEL PEN Co., Ltd.
Radio Dept. 45 21/22, Gt. Sutton Street, E.C.1.

Amateur Wireless

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Available until Saturday.
February 19th, 1927.

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*"Quality
First"
Guaranteed*



10 for 6^d
20 for 11¹/₂^d

50 for 2/5
100 for 4/8



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There's more than strength in the wonderful P.M. Filament there's proved lasting merit and good music



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THE P.M.1 H.F. 0.1 amp. 14/-
 THE P.M.1 L.F. 0.1 amp. 14/-
 THE P.M.2 (Power) 0.15 amp. 18/6

For 4-volt accumulator or 3 dry cells

THE P.M.3 (General Purpose) 0.1 amp. 14/-
 THE P.M.4 (Power) 0.1 amp. 18/6

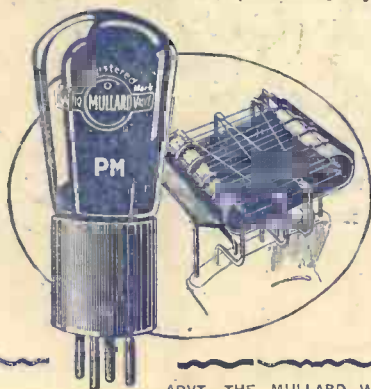
For 6-volt accumulator or 4 dry cells

THE P.M.5x (General Purpose) 0.1 amp. 14/-
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 THE P.M.6 (Power) 0.1 amp. 18/6

Super power valves for last L.F. stage

THE P.M.254 (4 volts, 0.25 amp) 22/6
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Sectional view of P.M.5x showing generous proportions of P.M. Filament



THE strength of the wonderful P.M. Filament is unrivalled.

More than a year ago it was demonstrated that after a 1000 hours' life this amazing filament could be tied in knots and support four Mullard P.M. Valves without breaking.

Then the test report of the National Physical Laboratory established conclusively the consistent high service, generous value and long life to be secured from valves with the Mullard P.M. Filament.

This published report of an official Government Laboratory test was distributed to the radio public for the first time in valve history.

The superior qualities of the Mullard P.M. Filament are many. They claim the attention of every man who owns a radio receiver.

From the moment Mullard P.M. Valves are inserted into your receiver, they bring renewed pleasure to your radio. Music in all its natural beauty is reproduced with life-like truth. Call in at your nearest radio dealer to-day and obtain full particulars of Mullard P.M. Valves with the wonderful P.M. Filament.

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