

FIFTEEN-GUINEA CUP FOR A NOVELTY (see p. 733)

HOW TO RECOGNISE EUROPEAN STATIONS

Amateur Wireless And Electrics

Vol. V. No. 128.

SATURDAY, NOVEMBER 15, 1924

Price 3d

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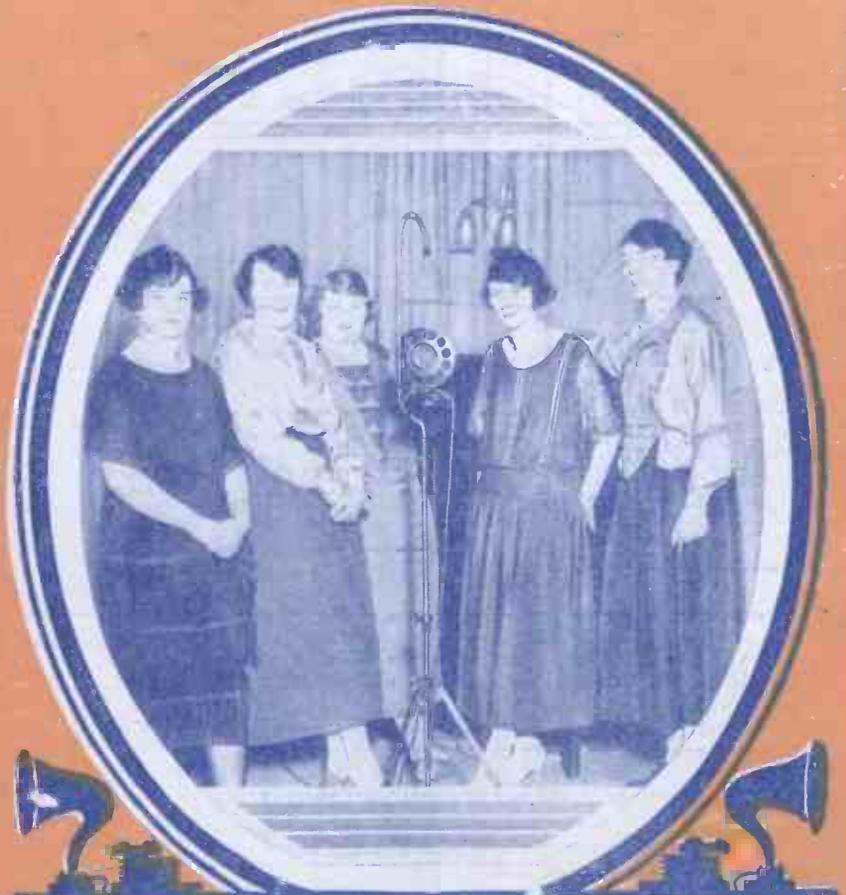
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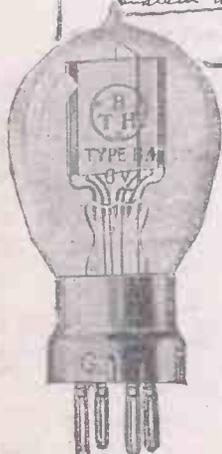
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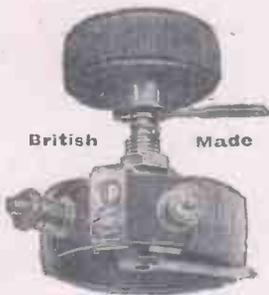
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Amateur Wireless

and Electrics

Vol. V. No. 128

November 15, 1924

EUROPE CALLING!

HOW YOU MAY RECOGNISE THE DIFFERENT STATIONS

MANY evenings are spent by amateurs in their search of long-distance telephony, and from the correspondence received by wireless journals it would appear that some difficulty is experienced in identifying in every instance the station successfully tuned in. It is true that many of the "foreigners" are somewhat lax in the repetition of their calls, but a number of them possess peculiarities which help the listener to establish their identities.

French Stations

There is little doubt that most amateurs recognise both the Eiffel Tower and Radio-Paris by their power and relatively high wavelengths, but for those who are not so sure it may be useful to give the exact wording of their respective calls.

FL, a military station, usually prefaces the opening of the programme by "Allô . . . Allô. Ici la Station Militaire Radio-téléphonique de Paris. Poste de la Tour Eiffel," whereas our friend "Radiola" is more brief and after a couple of cheery "Allôs" merely states: "Ici Radio-Paris. Poste de Clichy." Both L'Ecole Supérieure des Postes et Télégraphes and Le Petit Parisien give their names in *extenso* and repeat them at frequent intervals during the evening.

German Stations

Fewer listeners, probably, understand German, and for this reason rather more details are given.

Königswusterhausen (LP) is very conscientious, and the announcer repeats the name of the station at every opportunity. Phonetically transcribed, it reads thus: "Here Keunigz-voos-stir-housen," and concludes the performance at the end of the transmission with (again phonetically): "Veer mar-hen yetzt schloos. Owf veederheuren" (We are now closing down. To our next hearing). But in any case LP is not difficult to recognise, as, apart from the daily morning concert on 2,450 metres, most of the transmissions take place on Sunday before lunch.

Few of the German stations make use of the breezy "Hullo," most of them broadcasting a more pompous "Achtung" (pronounced Arhtoong) (Look out). It is, as a matter of fact, a similar warning to the one given by the German luggage porter when pushing his trolley through a station crowd. Following this threatening note, the stations usually add the name of their city; thus: "Achtung. Hier Frankfurt-am-Main." There are, however, exceptions. Hamburg, for instance, has a playful way of calling "Hier Norag," the latter word being an abbreviation of the numerous syllabled firm running the "show." Leipzig, for the same

of either giving the call signs in letters or of merely mentioning the name of the town. For the present, however, the useful information imparted by the announcers enables the amateur to establish the identity of the station picked up.

Common Languages

It should be borne in mind that the German language is also used in Austria and part of Switzerland, but the fact that the "Fatherland" stations conclude their evening's entertainment with their National Anthem, "Heil Dir im Siegerkranz," which is played to the same melody as our "God Save the King," clearly denotes that it is a German station.

Vienna's call: "Hallo, Rad-dee-o Veen" (Radio-Wien), stamps it right away.

You cannot expect the poor announcer of either Kbely (pronounced Kee-bell) or Komarov to repeat the word "Czecho-Slovakia" many times during the evening, but the calls are distinctive. Kbely announces that "Prague-Radio" is on the line, and Komarov lets you know that it is run by the "Radio-Journal of Prague." Speeches are made from both stations, not only in Czech but also in German, and on some occasions in Esperanto.

Brussels (SRB) transmits in French, and "Allô. Ici

Bruxelles Radio-Belgique" is regularly heard in this country.

Of the Swiss stations, Zurich only uses the German language, both Lausanne and Geneva lying in the French-speaking portion of the country. Zurich sends a call similar to the German stations and also states its wavelength, as it is still temporary. Lausanne mentions the name of the town, and Geneva styles itself "La Société Romande."

The new station at Madrid is now regularly heard here and the announcer often gives the call "Radio-Iberica, Madrid." Sometimes he gives the items of the programme in Spanish, French and English.

(Concluded in 3rd column of next page)



Which Is It?

raison, announces "Hier Mirag." As a rule, apart from their calls, the stations give their wavelengths. "Achtung. Hier Königsberg auf Welle (wavelength)." Hamburg also possesses the distinctive method of opening the concert with several strokes on a dinner-gong, so many "pongs" later indicating the number of minutes interval between two items. Munich does not, as a rule, mention the city in its call, but styles itself, after the preliminary warning, "Die Deutsche Stunde in Bayern" (the German broadcast in Bavaria). These long-winded calls will be necessarily abbreviated in the near future, and it is more than likely that the Germans may adopt the English method

AMAZING BEAM TRANSMISSION

ALTHOUGH they will not directly affect broadcast listeners, beam transmitters have such amazing possibilities that they are of interest to all wireless enthusiasts. The difference between broadcast and beam transmission is the difference between flood-light apparatus and a searchlight; both may have the same candle-power, but one will diffuse all the light over as large an area as possible, and the other will direct it in a narrow beam.

Broadcast and Beam Transmitters

So with broadcast and beam transmitters; both may use the same power, but the broadcast transmitter will send it out equally in all directions, while the beam transmitter will direct the waves over a comparatively small area. The aerial used with a beam transmitter has placed round it a number of wires that act in a similar way to the reflector in a searchlight, and, in fact, actually reflect the wireless waves and concentrate them in a narrow beam.

Small Power—Low Cost

From a practical point of view the greatest point of interest in beam transmission is the tremendous distances that

bola, whence they travel outwards in the form of a beam. Another type of aerial, which consists of grid placed parallel to one another, is shown by Fig. 2.

Some Results and Possibilities

Huge distances have already been

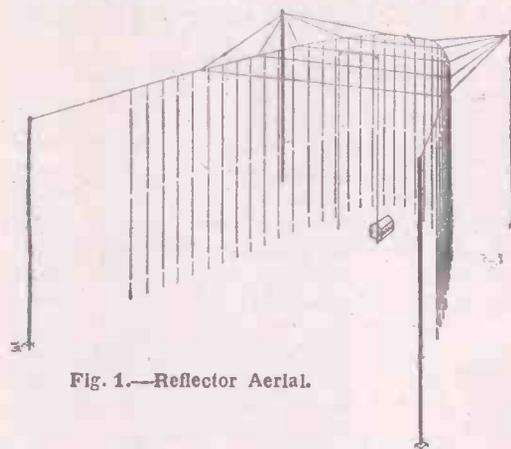


Fig. 1.—Reflector Aerial.

covered using low-power beam transmitters, as disclosed recently by Senatore Marconi during a lecture before the Royal Society of Arts. During tests between the Marconi station at Poldhu and the

case the power used was less than 250 watts.

Continuous Communication

Results such as these open up great possibilities for communication over long distances in the near future. It is to be hoped that beam transmission will solve the problem of continuous communication (both by night and day) between this country and the Dominions. D. S. R.

"EUROPE CALLING!" (continued from preceding page)

Rome (1 R O) cannot be mistaken. It is a new station anxious to receive reports as to reception, and the call "Stazione di Roma. Unione Radiofonica Italiana" is repeated after every interval.

There are now but few Dutch stations working, but Hilversum (N S F) is readily identified, as the announcements are fairly regularly given in both English and Dutch.

The various pointers given in this article, in conjunction with the fact that the amateur usually has some idea of the wavelength on which he is receiving a

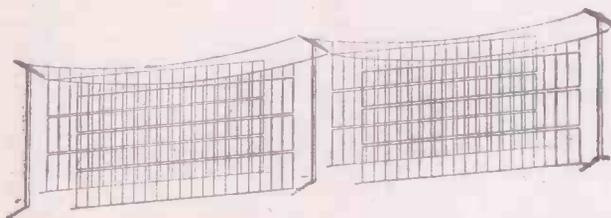


Fig. 2 (left).—Grid-type Aerial.

it is possible to cover with extremely low power. Low power means (as a rule) simpler and less apparatus, with a corresponding decrease in costs, both of maintenance and erection.

Thus for the first time world-wide wireless transmission is made possible at what is comparatively a very low figure. For this wonderful system of beam transmission the wireless world once again owes thanks to Senatore Marconi.

Types of Reflector Aerial

It has already been mentioned that a screen around the aerial reflects the waves and concentrates them in a beam. This is clearer from the diagram, Fig. 1, which shows one form of reflector aerial. The aerial proper consists of two vertical wires (rising from the hut) around which are placed a number of wires in the form of a parabola, the aerial wires being at the focus of the screen.

Wireless waves sent out from the aerial are reflected by the screening wires and concentrated at the opening of the para-

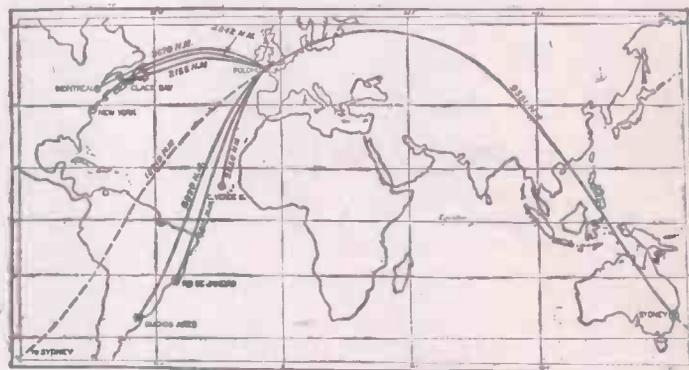


Fig. 3 (right).—Track of Short-wave Signals.

Elettra at Cape Verde (2,300 miles distant, see Fig. 3) strong signals were received without any interference from atmospheric. Poldhu radiated 9 kilowatts on a wavelength of 97 metres, and the reflector concentrated the energy towards Cape Verde. The receiver on the *Elettra* had two stages of H.F. amplification and an auto-heterodyne detecting valve, to which could be coupled two stages of L.F. magnification.

Short-wave Ranges

As far as long-range work is concerned, short waves used without reflector aeri- als have great possibilities. Only a week or so ago three amateurs in this country successfully communicated with New Zealand, a distance of 12,000 miles, on a waveband round about 90 metres. In each

transmission, should enable him to identify accurately the great majority of wireless telephony stations heard. It is only on the lower band of broadcasting wavelengths that some hesitation may occur, but if judgment is used and a record kept a rough glance at the "Broadcast Telephony" page will in every instance settle the matter. J. G. A.

Thinking that music might have a soothing effect on his patients, an Austrian dentist installed a receiver in his operating room. All went well until an ear-splitting crack in the phones caused both dentist and patient to jump, with the result that a drill went through the latter's cheek. After paying damages, the dentist threw the set away!

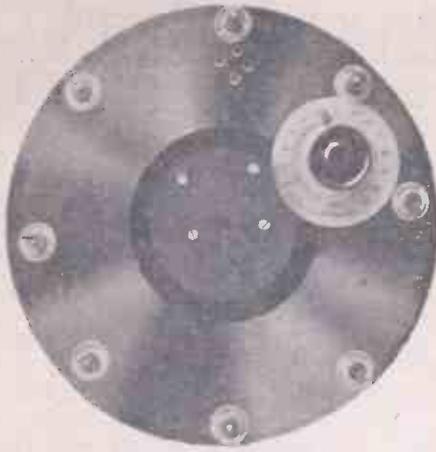


Fig. 1.—Front of L.F. Panel.

CLOCK CIRCUITS.—II

THE LOW-FREQUENCY AMPLIFIER

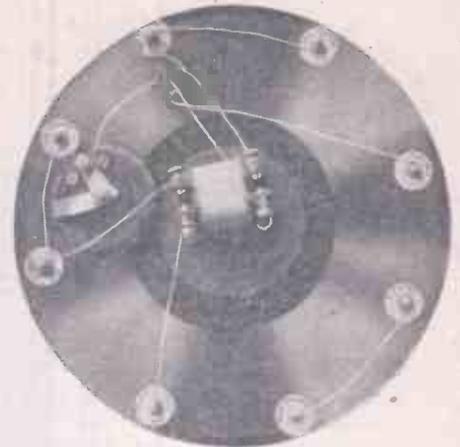


Fig. 2.—Back of L.F. Panel.

THE article in No. 121 described a new and novel system of wiring circuits, which was termed the "Clock Circuits" system. For the information of new readers it may be stated that the underlying principle of the idea is to imagine that the back of the panel—crystal, valve detector, L.F. amplifier or H.F. amplifier—has a clock face on the ebonite, and that the terminals, valves, condensers, etc., are arranged on the panel in positions corresponding to the hour figures of a clock. This gives twelve well-known positions or, with the centre, thirteen positions which could be standardised.

The low-frequency amplifier shown by the photographs Figs. 1 and 2 is so simple

to construct that no one need have the slightest hesitation in attempting the task. It is only necessary to get a 10-in. gramophone record and drill the necessary seventeen holes in the positions shown. The low-frequency transformer occupies the central position and the valve is between the L.T. positive and the transformer, whilst the rheostat is between the transformer and negative low-tension.

Arrange eight terminal tabs round the panel in the following order:

Low-tension positive, high-tension negative, phones, phones, high-tension positive, input, input and low-tension negative. The positions correspond to the hour positions of a clock, thus: Twelve o'clock, L.T. +;

1.30, H.T. -; 3, phones; 4.30, phones; 6, H.T. +; 7.30, input; 9, input; 10.30, L.T. +.

Start wiring from the transformer. First wire, inner primary to input; second wire, outer primary to other input, on to L.T. - and finish at rheostat; third wire, rheostat to filament leg of valve; fourth wire, inner secondary of transformer to valve filament, then to L.T. + and finish at H.T. -; fifth wire, plate leg of valve to phones; sixth wire, phones to H.T. +; seventh wire, outer secondary to grid.

This method of wiring simplifies matters, uses the minimum of wires, and with the exception of the wire from the plate to phones avoids crossing. F. W. E.

A STANDARD OF SIGNAL STRENGTH

THERE are, no doubt, many people who are constantly changing components in their sets or altering the wiring in the endeavour to obtain louder signals. The conditions under which these tests are made may be varied, but to arrive at any definite conclusions as to the relative merits of the new circuit, a factor which must remain absolutely constant is the received signal.

The usual practice for getting this constant seems to be that of tuning in the local broadcasting station. But a difficulty arises. Is this type of signal a constant? The music may be quiet or it may be a band with heavy brass, and last but not least the power may vary slightly. This latter remark also applies to the commercial high-power automatic stations.

The only alternative is to generate the required signals locally. This is a simple matter, the only requirements being a coil, buzzer, battery, switch and variable resistance. These should all be connected in series, as shown in the diagram.

Method of Operation

Close the switch and adjust the buzzer so that it gives a clear, moderately high note, free from irregularities in pitch or spluttering. When this is done, place the coil in relation to the set so that on donning the phones and switching on a faint yet clear signal is heard. Adjust the set to give maximum signal strength, and then increase the resistance in circuit with

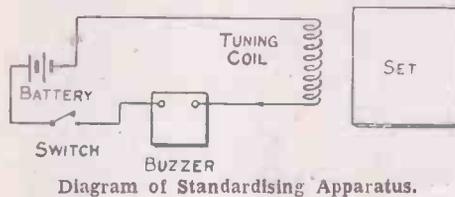


Diagram of Standardising Apparatus.

the buzzer until signals are very faint—in fact just audible. Any alteration to the set which improves the strength of reception is a step in the right direction. Be sure before making any further alterations that you have succeeded in obtaining the

greatest strength possible with the circuit under test.

Notes

On no account should any part of the buzzer circuit be touched during a test or the results will be rendered void.

The battery supplying the buzzer should be of such a type that reasonable runs do not cause any appreciable voltage drop, for this would tend to weaken the signals.

Audibility Tests

The ability of the human ear to detect accurately slight variations of signal strength is very doubtful. If, therefore, serious work is contemplated an audibility meter should be used. A. L. B.

To accommodate the aerial of the G.P.O. station at Rugby it has been found necessary to purchase a piece of land bigger than the total areas of Hyde Park, Kensington Gardens and St. James's Park.

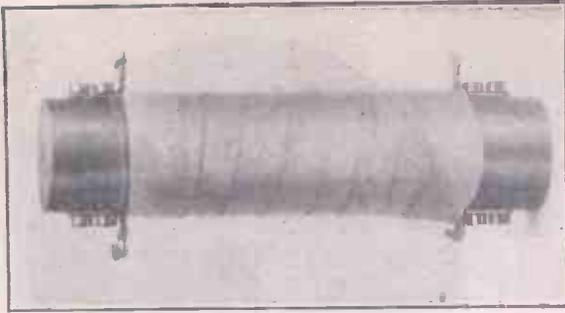


Fig. 26.—Aperiodic Transformer.

ANOTHER very useful little gadget to make up for the set is a holder for plugging in high-frequency transformers. This is shown in Fig. 25. It consists of a piece of $\frac{1}{4}$ -in. ebonite $2\frac{1}{2}$ in. square, upon which are mounted four correctly-spaced valve legs with a terminal connected to each. The ebonite is raised upon two small battens of wood, which keep the shanks of the terminals and valve legs and the wires connecting them from coming into contact with the surface of the panel when the holder is in use. If two of these holders are made up it becomes at once possible to use tuned transformers for coupling between the high-frequency valves, the .0003-microfarad variable condensers being used for tuning their secondaries. These holders are extremely useful, since they can be used also for valves when required, as well as for the plug-in crystal detector, if it is not convenient to place that in a valve holder.

As different makes of mushroom transformer vary in the way in which their pins are connected up to the windings, it is not advisable to mark the terminals IP, OP and so on. It will generally be found that the pins of the transformer are clearly marked, and the connections can thus be made correctly whatever type is in use. Plug-in transformers are not at all expensive to buy, but if it is desired to make them at home this can be done quite easily and cheaply by purchasing simply the formers and winding them with various quantities of No. 36 d.c.c. wire to suit the wavelength range required.

Aperiodic Transformer

Though it is by no means so efficient from the point of view of amplification with tuned transformers, there is very much to recommend the aperiodic transformer as a coupling for high-frequency valves. One of these made for the Thousand-circuit Board is shown in the photograph (Fig. 26). They are very easy to make provided that you are able to wind on thin resistance wire, a task which cannot be accomplished satisfactorily unless a lathe is available or some simple form of winding machine is rigged up. I have made quite a satisfactory job of them on several occasions by using a breast-drill fixed in a vice as a winder, a short piece of studding screwed into the end of the ebonite rod upon which the transformer is wound being fixed into the chuck.

THE THOUSAND-CIRCUIT BOARD.—VII

MAKING THE COMPONENTS (continued)

To make these transformers, obtain a piece of ebonite rod 1 in. in diameter and 4 in. in length. To either end screw on a pair of brass tags to serve as connections for the ends of the windings. In the centre of the rod drill and tap a 4 B.A. hole about 1 in. deep. This enables a piece of studding to be inserted for winding purposes, and it will also serve to take a fixing screw when the finished transformer is attached to a wooden stand about

transformers are untuned. For this reason they do not give the same degree of amplification as those wound with bare copper-wire. At the same time, they are much more stable—it is possible to use three or more stages of aperiodic H.F. amplification—and they do not bring in the same amount of mush as sharply-tuned coupled circuits. The finer the wire used the more aperiodic will the transformer be—that is to say, the wider will be the band of wavelengths covered efficiently by it. Probably the amateur constructor will find that No. 36 Eureka wire is about the finest that he can put on satisfactorily, for when we get above this we are dealing with wire so fragile that winding becomes a matter of the utmost difficulty.

It will, of course, be possible to make up other components of the set, such as the fixed condensers, the grid leaks, rheostats and the transformers. I do not recommend, however, that this should be done, for all these things are better purchased and the saving in making them up is not very great. There is far more in the design of a really efficient low-frequency transformer than one might think, and a good bought article will always give clearer and better reception than the best that can be made up in the home workshop.

J. H. R.

(To be continued)

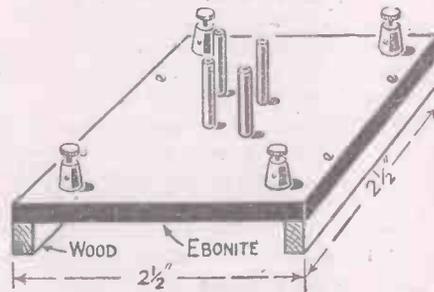


Fig. 25.—H.F. Transformer Holder.

$2\frac{1}{2}$ in. square. When a former 1 in. in diameter is used it is exceedingly easy to make a satisfactory aperiodic transformer, since the rule for winding them is simply one transformer turn per metre of wavelength for both primary and secondary.

As their name implies, the aperiodic

WIRELESS TRANSMISSION OF POWER

RECENT developments in directional transmission prove that it is now possible to concentrate wireless energy into a comparatively well-defined beam. This revives the much-debated question as to the feasibility of transmitting large powers across space by some similar means. The inherent difficulty lies in the fact that it is at present impossible to radiate any considerable amount of energy except by using low frequencies and correspondingly large wavelengths. On the other hand, it is only with very short waves, of the order of 100 metres and less, that the reflector methods of directional transmission have proved successful. No practical method of concentrating or focusing powerful waves of 20,000 metres and upwards is yet known.

One of the most interesting proposals in connection with this subject is due to the late Dr. Steinmetz. He suggested the use of a huge station transmitting energy of such a wavelength that the waves would encircle the earth, and return in phase with the outgoing energy, thus setting up a "stationary" wave system. If the absorption factor could be reduced to a small fraction of the emitted power, that would represent the only expenditure necessary to maintain the stationary-wave system in operation. Energy tapped off by intermediate receiving stations would, of course, be fed back into the stationary-wave circuit by the main transmitter, in much the same way as the ordinary cable pressure is maintained in a tramway service.

M. A. L.

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



The Brandes Family Series

BABY sits intently watching Young Bill tuning up the receiver. He finds it mighty hard not to take up a roving commission among the shining accessories. He wonders devoutly to him-

self why Brother Bill should find it necessary to become involved in a mass of tangled wire and mutter whole-heartedly to himself. But he knows just what it will mean to him. In a little while the *Table-Talker* will speak easily and naturally of the many phantasies of his youthful imagination. Fascinated by the burnished discs and metal of the "Matched Tone" Headphones, he will be able to place them on his tender head with their gentle comfort, and listen to the sweet bell-like notes. Ask your dealer for Brandes.

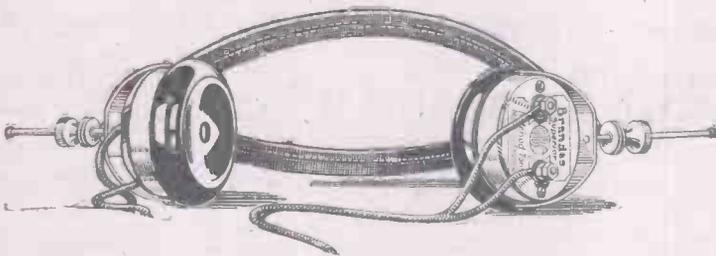


All Brandes products carry our official money-back guarantee, enabling you to return them within 10 days if dissatisfied. This practically constitutes a free trial.

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

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

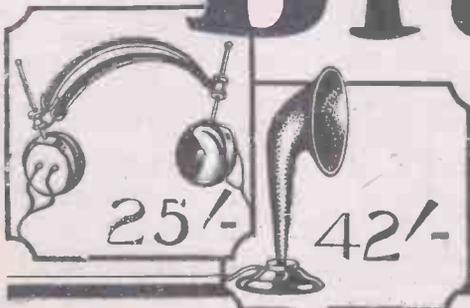
British Manufacture (B.B.C. stamped).



Brandes

Result of
16 Years
Experience

The name
to know in Radio



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COIL HOLDERS

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Polar 2-way, with Vernier ...	11/-
Polar 3-way, with Vernier ...	17/-
Polar-Junior, 2-way Cam Vernier	6/-
Polar-Junior, 3-way Cam Vernier	9/6
Polar Universal 2-way	10/6
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Goswell 2-way Panel Mounting 3/-	
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No. 2	2 for 2/6 (both with plug)
Coil Stand 2-way for Basket Coils	5/6
Universal 2-way for Basket Coils	5/11

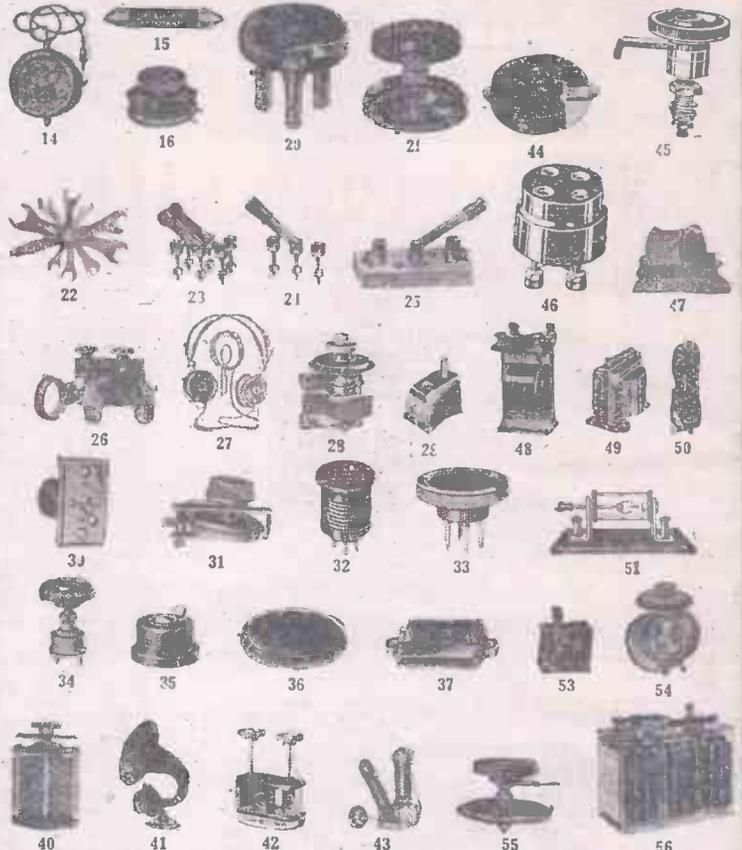
"BABY" COIL STANDS

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2-way on base	3/-
3-way on base (brass fittings) ..	4/9
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3-way do. (nickel fittings) ..	5/6
2-way Cam Vernier (high class) ..	5/9

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No. 48. Formo L.F. (open)	12/6
No. 49. Formo L.F. shrouded	18/-
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No. 51. Crystal Detector 1/3, 1/6, 1/9 Nickel	1/9, 2/-
No. 53. Coil plug 2 for 1/3	
No. 54. Variometer Ball Rotor... ..	5/11
No. 55. ONE HOLE fixing	1/6
No. 56. Accumulator, see list	



HEADPHONES

We can recommend these as being excellent Headphones, with a great reputation. G.R.C., 4,000 ohms resistance, each... £1 6 0
 B.T.H., 4,000 ohms resistance, each... £1 5 0
 Brandes Matched Tone, 4,000 ohms resistance, each... £1 5 0
 Brown Type A, 4,200 ohms resistance, each... £3 2 0
 Sterling, 4,000 ohms resistance, each... £1 5 0
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9 x 6	2/2	3/3
10 x 8	3/-	4/2
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12 x 9	4/3	5/6
12 x 12	5/6	7/6
14 x 10	5/6	7/6

Cut to Size, 3/16 in. at 3d. square inch.

STERLING SQUARE LAW with Vernier.

.001	30/-
.0005	25/6
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EDISON BELL

.0001 to .0005 Fixed	1/3
.002 to .006	2/-
.001	1/3
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Patent Valve Holder... 1/6
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H.F. Plug-in Transformers. Post 2d. each.

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.001, .002, .003, .004, .005, .006, Fixed	3/-
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Coils: 25, 5/-; 35, 5/-; 50, 5/2; 75, 5/6; 100, 7/-; 150, 7/10; 200, 8/8; 250, 9/-; 300, 9/5; 400, 10/3; 500, 10/6
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Radio Instruments	25/-
Igranic, Shrouded	21/-
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General Radio 83	14/11
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Raymond	10/-
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Ditto, 2nd Stage	22/6
Silvertone	21/-

FIBRE STRIP for COILS 1 in. wide, 12 ft., 1/-.

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Variable Grid Leak	2/6
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Lissenstat	7/6
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2-Way Switch	2/9
Series Parallel	3/9
T1 Transformers	30/-
T2, 25/-; T3, 16/6; Coils: 25, 4/10, 30, 35, 40, 4/10; 50, 5/-; 60, 5/4; 75, 5/4; 100, 6/9	

RHEOSTATS. Post 2d.

Ormond	2/-
Raymond	1/6
Do. with dial	2/-
Extra value do.	2/6
T.C.B. 6 ohms	4/-
Potentiometer T.C.B.	5/-
Burndept Dual	7/6

TRANSFORMERS (H.F.) Post 3d.

McMichael, 300/600	10/-
Ditto 1100/2000	10/-
Energo, 250/700	3/11
Ditto 900/2000	4/6
Raymond, 300/800	2/9

Others Stocked.

POLAR Post 6d.

.001 var. Condenser	10/6
.0005	10/6
.0003	10/6
Micrometer Condenser	5/6
Cam Vernier 2-way	7/-
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THORPE K4	17/6
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Marconi-Osram	R or R 5 V "
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Myers-Universal	
Xtraudion	
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DULL EMITTER 21/- each

B.T.H.	B.3
Ediswan	A.R.D.E.
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"J.B." ordinary type Standard Super Microdenser

.001 - 8/6 - 9/6 - 11/6	
.00075 - 8/- - 9/- - 11/-	
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.0003 - 5/9 - 6/9 - 8/9	
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Vernier 4/- - 4/6 -	

All Valves on post sent at Purchaser's risk.

25/- each	Type
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Ediswan	A.R.O.6
Marconi-Osram	D.E.3
Mullard	D.F.Ora

DULL EMITTER POWER VALVES

For use with A.R.D.E. and D.E.R. Valves

Marconi-Osram, Type D.E.6.2 2.5 volt, 25 amps. 25/-	
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For use with .06 Valves. B.T.H. Type B.6 35/-

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For use with bright Emitters

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ALL OUR CONDENSERS HAVE BEEN TESTED AND RECOMMENDED BY LEADING JOURNALS—UNSOLICITED.

—Exclusive design.
—Stout vanes.
—Extra insulation, very compact.
—Narrowest spacers (pressed aluminium).
—Centre rod cannot bend.
—Terminal connections, capacity guaranteed.
—Perfect efficiency.
—Handsome design.
—Takes up very little space in panel.
—Nickelled fittings.
—Beautifully made.
—New one-hole fixing method.
—Wonderful for portables.

UNSURPASSED FOR FINE TUNING.

Costs a trifle more, a few pence only, and is just what you want. Nice dial and knob included.



'DE LUXE' MODEL

AS SHOWN, WITH DIAL, KNOB AND BUSH.

.001	.....	7/3
.0005	.....	5/11
.0003	.....	5/4
.0002	.....	4/11

POST 6d. SET.

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

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Composed of two equal units of .00025 or .0003 mfd., operated by one Knob and Dial, thereby enabling you to tune two circuits by one turn of the dial. Can be used in series or parallel. Complete as shown with Knob and dial.

NEW MODEL

WITH VERNIER		WITHOUT VERNIER	
.001	.....	9/3	6/6
.0005	.....	7/3	5/3
.0003	.....	6/9	4/11
WITH EBONITE DIAL and TWO KNOBS.		Vernier, .00005 3/9	
Post 6d. Set.		With the knob and dial Post 6d. Set.	

SQUARE LAW

.0005	.....	7/11
.0003	.....	6/9
With Vernier.		10/11
.0005	.....	10/11
.0003	.....	9/11

Post 6d. Knob and Dial included.

LOUD SPEAKERS

Sterling "Dinkie" ... 30/-
Junior Amplion New-est Model ... 27/6
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Adjustable diaphragm detachable receivers, double leather-covered head-springs, long flexible cords, nickel-plated parts. Very comfortably fitting to the head.

Guard against inferior articles offered cheaply.

12/11 Post 6d. pair.

THORPE K4 VALVES (5-pin) for UN DYNE 17/6
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5-Pin Valve-holder 1/6
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ACCUMULATORS MADE BY WELL-KNOWN FIRM FOR ME.

2 v. 40 amps.	9/6.	Post 10/6
4 v. 40 amps.	16/6.	" 17/6
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4 v. 80 amps.	23/6.	" 24/6
6 v. 60 amps.	27/6.	" 29/-
6 v. 80 amps.	33/-.	" 34/6
6 v. 105 amps.	38/6.	" 40/6

TELEFUNKEN 4,000 ohms. HEADPHONES As light as a Feather 17/11

FRENCH THOMSON HOUSTON 4,000 ohms. **15/11** per pair

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Callers Only (These 3 Columns)
NO POST ORDERS FROM SAME

Dutch valves .06	12/6
"Metal" " .06	15/11
Phillips " .04	.....	15/11
Dutch Detector	.....	4/9
Dutch Hard	.....	5/-
Metal (French) "R"	.....	6/11
Phillips "R"	.....	7/6
Enclosed Detector	1/-
Large	1/3
Also Brass on Nickel	4/6
Ditto terminal end	1/6
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Set four whiskers (one gold)	2d.
Easi Fix cups 1d. and 1 1/2d.	1/3
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Hertzite Shaws genuine	1/-
Gold spearpoint whisker	3d.
Special whisker in Tube	6d.
Set of six Spanners	.....	1/4
Taps 0, 2, 4, 6 B.A. set 2/-	.....	2/11
Ditto with wrench	.....	1/4
Seven Twist Drills	.....	1/4
5 ohm Rheostat (extra)	.....	1/3
One Hole Fixing	.....	1/3
Ormond	.....	1/6
Ebonite Former	.....	1/10
Ditto and Dial	.....	1/10
Igranite, T.C.B., and all known makes.	

Good Coil Plugs from 4 1/2d.
Edison Bell Shaped 1/-
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Basket Adapters 8 1/2d.
Also at 1/- & 1/3
2-Way Coil Stands 2/6
With Extens. Handle 2/11
Also at 3/6, 4/-, 4/6
3-Way 4/3, 4/6, 5/-
Coswell Cam Vernier 9/-
Franco " " 12/6
Polar " " 11/-
Etc., etc.

Coil Plug on Stand ... 1/-
Ditto, Swivel Movement 1/3
Coil Plug and Clips 6 1/2d.
Microstat 2/6
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Fibre Strip (for Coils) 3 feet 2 1/2d.
D.C.C. Wire, per 1/2 lb.—
18 g... 9d. 20 g... 9d.
22 g... 10d. 24 g... 1/-
26 g... 1/1. 28 g... 1/3
30 g... 1/6. Etc., etc.

Solder per stick 2d.
Shellac 5d.
Nickel Pillar Terminals 2d.
Nickel Contact Studs 2 for 1d.
Nickel Switch Arm 1/- (one hole fixing)
Loading Coil and Plug 8d.
Gamages Permalite 1/-
Condenser Bushes ... 6d.
Strong Valve Template 4d.
Egg Insulators 1d.
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Thick Rubber Lead-in per yard 2d., 3d.
Ribbon Aerial 100 ft. 1/10
Panels Drilled
Radio Press Envelopes
Raymond Fixed Condensers .001, .001 to .0005, 10d.
.002, .003, .004 1/-
.006 1/3; .01 1/9; .02 1/9
Polar Micrometer Condenser 5/6
W.O. or Pillar Terminals 1d.
Small Pillar 4 for 3 1/2d.
'Phone 4 B.A. 1d.
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Valve Sockets 4 for 3d. (Above with Nut Washer)
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Spring Washers... 4 a 1d.
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Pin Screws 2 for 1d.
Spade Tags 5 a 1d.
Spring Pillar Terminals 2 1/2d.
Nuts, 2, 4, 5, 6 B.A. doz. 2d.
Washers (Brass) 12 a 1d.
Porcelain D.P.D.T. 1/7-
Porcelain S.P.D.T. 1/3
Min. Panel D.P.D.T. 1/-
Min. Panel S.P.D.T. 10 1/2d.

EBONITE, 3/16-in. CALLERS' PRICES.

6 x 6	1/4
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8 x 6	1/10
9 x 6	2/-
10 x 8	3/-
12 x 6	3/-
12 x 9	4/3
12 x 12	5/6
14 x 10	5/6

CUT TO SIZE, 1/2 sq. in.
WE STOCK 1/2-in. EBONITE.

SHAW'S HERTZITE BEATS ALL OTHER "ITES" 1/-

BASKET COILS

Duplex Waxless (5) ...	1/8
1,200/2,000 metres	
Waxless Set of 5	2/11
25, 35, 50, 75, 100	
D.C.C. Chelmsford 1/-,	1/3
Enamelled Do.	1/-, 1/2
Waxed (6) 200/3,600	1/8
Ditto (7) 150/3,600	1/10
Waxless (2) St 100	1/-
Ditto (2) Unidyne	1/-
(For Broadcasting only)	
D.C.C. Coil for Chelmsford complete with adapter	2/3
(to use with 650 variometer)	

Our Wonderful H.T. BATTERIES NO POST ORDERS

60 v. "	7/6
30 v. "	4/6
60 v. B.B.C.	9/6
36 v. B.B.C.	5/6
9 v. B.B.C.	2/6

VARIOMETERS

Wonderful Value
Special 250/600 1/6
Extra with Clips 2/6
Ebonite 3/9, 4/6, 5/11
About 16 various Designs
No Rubbish

'Phone Cords (6 feet) 1/5
Nugraving 7 1/2d.
Good Knobs 2d. and 3d.
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18g. Sq. Tin Copper 15 feet 5d.
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Rubber Lead in, 30 feet 1/3
7/22 Copper Aerial, 100 feet 1/10 1/2
Extra Heavy Aerial 100 ft. 2/- & 2/3
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H.T.C. in Stock 1/6, 1/9
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Empire Tape, 1/2 in., 2 yds. 1d.
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Connecticut Switches 1/4
1,000 ohm Bobbins... 1/3
2,000 ohm Bobbins... 1/8
Sorbo Rubber Ear Capspr. 2 1/2d.
Adhesive Tape Roll 1/4
Basket Coils
Waxless ST100 (2) ... 1/0
Waxless (5) 200/2,000, set 1/8
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Chelmsford No. 8 Tandeo 1/-, 1/6
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1 Complete with Adapter 2/3 (To use with variometer.)
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Electron Aerial 1/3 1/2
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Legless Valve Holders 1/3
Soldering Irons 6 1/2d., 8d.

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'PHONE GERRARD 4637

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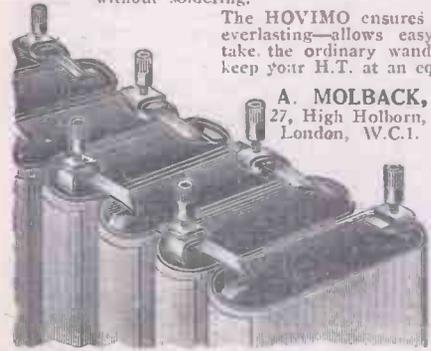
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On Your Wavelength!

Crystal versus Valve

I HAVE been trying some experiments recently with a crystal as rectifier in a multi-valve set. The reason why I did so is that I am not really at all satisfied with valve rectification for the reception of broadcasting. By this I mean the grid-condenser and leak method, which is now almost universally used. It is just the presence of that condenser that is apt to mess things up a bit and to make your reception not so absolutely clear as it ought to be. Of course if you use the older method of detection which works on the plate curve of the valve you will get clearer results, but this seems to be a waste of good material, for when the valve is used in this way without reaction it is not a great deal more sensitive than a crystal. If you stick in reaction and use it a good deal you must get a certain falling off in quality.

The crystal is in theory a much more nearly perfect rectifier than the valve. The only thing about it is that it is not particularly sensitive unless it is dealing with a fairly strong signal. By using one or more stages of H.F. amplification in front of it and getting them well away from oscillation you can deliver a nice fat voltage to the crystal, which then works splendidly. As the result of various trials I have come to the conclusion that if you want to make a multi-valve set give its clearest and most undistorted reproduction of music the best tip is to do away with the rectifier altogether, substituting for it a good crystal detector. Any reader who cares to experiment on these lines will, I am sure, come to the same conclusion, especially if he uses his set to work a loud-speaker and likes to have full volume of sound.

A Problem to be Solved

I was talking only the other day to an enthusiastic friend who is working hard in an attempt to solve the problem of the elimination of atmospherics. He tells me that he is very hopeful of the results, and that already he is able to get rid to a very great extent of the cracklings and splutterings that so frequently make Transatlantic work impossible. If he does manage to achieve his end he ought to be a rich man, and he will jolly well deserve his success. The best tip that I know so far as the amateur is concerned is this: Keep a length of flex or bell wire by you with a couple of small insulators at each end. Rig up attachments on the picture-rail or near the ceiling of the biggest room available and sling the wire from corner to corner. Tune in on the big aerial, and when you have got your tuning

as sharp as you can, turn over to the small one. You will be surprised to find what a difference this makes as regards interference. Your strength, of course, suffers, though not nearly so badly as you would imagine; as atmospherics are suppressed much more than the signal you want, the total effect is that a considerable improvement is effected. I often use this tip for picking up the American stations on bad nights, and it is remarkable how often it succeeds. Personally I much prefer the bell wire to the frame aerial, with which I have never been able to do much good.

Beam Wireless

Senator Marconi announces that as the result of a further long series of experiments he has now been able to overcome one of the great difficulties met with in wireless transmission on the beam system. This was that previously it was found to give really good results only at night time. He is now able to use the beam transmitter almost equally well in the daylight, and he prophesies that within a very short time the first great station using this method will be in operation. There is no doubt, I think, that for commercial purposes the beam method will oust all other systems within a few years. At the present time all commercial messages must be broadcast, which means that about ninety-nine per cent. of the power used is wasted, since you are driving your message out with equal strength in every direction. It means, too, that there can be no secrecy except by the use of codes. But perhaps the most important point is that it leads to a terrible amount of jamming.

I do not know whether you have ever tuned up to the neighbourhood of 12,000 metres, but if you have you will realise what jamming can be. On a fairly wide waveband on that part of the scale you get the impression that every station in the world must be transmitting at once. It is most difficult to pick out a weak signal and to tune it to readable strength to the exclusion of others. How operators ever manage to read accurately and quickly on these wavelengths is something of a mystery to me. Things are far worse up there than they are on the shipping band, and that is pretty bad.

The Licence Question

The P.M.G. states, I see, that there appear to be very few wireless defaulters and that nearly everybody who should have done so has duly renewed his receiving licence. When you consider what we get for the money in the shape of our present broadcasting service you must, I think, agree that ten shillings a year is a

jolly good investment, working out as it does just under a third of a penny a night, or if you use your set for two hours each evening on the average you may calculate that your entertainment costs run to rather more than six hours for a penny. Even if you take into account the cost of battery recharging and of valve replacements you will not find, I think, that you spend much over a penny an hour by listening to broadcasting. Can you find any other form of entertainment which costs so little?

Licences have now very nearly reached the million mark, and it is quite certain that aeriels will run into seven figures in this country before Christmas. This means that there are roughly seven times as many listeners as there were just over a year ago. But the most remarkable thing is that if you take the whole population of the country—men, women and children—one in every forty-five owns a wireless set. But some people I see do not like the idea of licences at all. There is apparently to be a test case, and what the result of it will be no one can say. One thing is quite certain, that if we do not have licences there can be no revenue for the B.B.C., and without a revenue we cannot have any broadcasting. They tried the experiment in America of getting broadcasting done in the form of a private enterprise by many big manufacturing concerns. The result is that, though there are a few really good stations over there, the programmes as a whole cannot compare with our own, and they are pretty well convinced now that some kind of licence will be necessary if things are to continue.

The Amateurs

The New Zealand amateurs seem to have come into prominence with a sudden swoop. Last winter a certain well-known wireless engineer predicted in my hearing that it was impossible for the amateurs of England and New Zealand to exchange two-way communication with the small power that they were likely to use, but this year I think that he will have to admit that nothing is impossible for the amateur transmitter. 2 O D and 2 N M have carried out successful two-way working with Z 4 A G, and several British amateurs report reception of New Zealand stations—notably 6 T M and 2 W J. My Belfast correspondent received 4 A A and 4 A G on two valves in broad daylight!

Why?

There is a general impression that the amateur experimenter contributes no new knowledge to wireless and that all he does is to improve his own knowledge, so that

On Your Wavelength! (continued)

sooner or later he is able to enter wireless professionally. Such a belief is to be deplored, for it is a well-known fact that the amateur has at least opened the eyes of the community to the fact that the use of a power sufficient only to light three ordinary domestic electric lamps enables them to bridge the world!

That he has not contributed to the transmission of music or the like cannot perhaps be denied, but at the time that broadcasting commenced he was discouraged from exploring this field which had already been examined by those who were interested. In any case, it seems a pity to attempt to decry the very useful work of the amateur. Men who love their work for the work's sake are an asset to the community, and the amateur experimenter is surely entitled to the few laurels which come his way.

Another Success

5 Q V reports that he has received Z 4 A K, who was calling a French station, and that on Sunday, November 2, he heard I C M P (America) calling "C Q G U, I C M P will QRX on 100 metres to 125 metres." He replied on 114 metres, and was surprised to get a prompt answer, "QRK? UR sigs QSA. FB louder here than 2 F N—5 Q V GU I C M P." Transmission was carried on for twenty-five minutes, but with the arrival of the sun the test ended. I C M P was received with a two-valve Reinartz receiver on about 90 metres.

Frightfulness

I have a neighbour—of course you have heard that before—but this neighbour has a wireless set. It came into existence by a slow painful process and it has been painful ever since. To be short, I might say that the set is perfectly horrible. He must have raked over all the town for the cheapest transformers he could find, and, combining these with a delightful lack of knowledge, built the monstrosity which now disturbs my slumbers, both daylight and nocturnal. There are four L.F. valves, and of grid bias he has not heard. At times he submits us to Rome on the loud-speaker; going "all out" at 9.30 pip emma and the result—well, the relaying of K D K A last winter was a gem compared to it. I hope that his H.T. will one day find a short cut across his filaments and thus once more give us peace. He has only one redeeming feature: he does not believe in direct action; in other words, he does not use reaction. But possibly this is only because he does not know how.

A Problem

The most pressing wireless problem just now of the majority of listeners is to find some means of separating 5 X X from Radio-Paris. This is a pretty difficult

business in some parts of the country, for both transmissions are powerful and they jam one another effectively.

With a big set, separation can be accomplished, though with a considerable loss of signal strength, by using a frame aerial, but with a small receiver matters are rather more difficult. A double-circuit tuner should be tried, worked with the loosest possible coupling. In single-valve sets one can do a good deal by dispensing with the reaction coil coupled to the A.T.I. or C.C.I. and placing in its stead a variometer in the plate circuit. On the whole, though, I think it is better to employ some kind of wave trap for the purpose. I must admit, though, that no circuit that I have tried so far enables me to get rid completely of 5 X X when Radio-Paris is coming in. The best that one can do is to reduce Chelmsford to something so faint that he does not spoil Radio-Paris.

Aerial Height

I mentioned recently in these notes that the height of an aerial was a factor of the utmost importance in reception. During last week I have had a striking illustration of what height really does mean. A friend who had been complaining that his crystal and two note-magnifier set was giving poor results on 2 L O was advised to try the effect of adding a 15-ft. top mast to the pole which supported the free end of his aerial, thus raising the height from 20 to 35 ft.

The result was absolutely magical. Reception strength is quite double what it was, and other stations besides London can be obtained under favourable conditions. The crystal detector responds very badly to weak impulses, but if you increase their strength the efficiency of the detector goes up as the square. Thus, for example, if you make incoming impulses three times as strong, the detector is not three but nine times as efficient as it was. Always make use of all the height that you can get for your aerial, remembering that in nearly all cases every foot will make an enormous amount of difference.

A New One Bagged

I picked up the other night a station that I have not managed to get hold of before. This was Königsberg, in East Prussia. His strength was not great and he suffered considerably from fading at times. Still I did manage to get him on the loud-speaker with a fair volume of sound. Of the other German stations, Frankfurt and Breslau come in best so far as I am concerned. Hamburg has most annoyingly selected practically the same wavelength as Radio Iberica, with the result that they are apt to jam each other if the two are working at the same time. Luckily the Spanish station goes

on until pretty late and can be picked up on most evenings without interference after Hamburg has closed down. Things are pretty crowded in the neighbourhood of 400 metres during our own broadcast hours, and Hamburg, Newcastle and Radio Iberica take a bit of separating.

French Broadcasting

It seems a great pity that French broadcasting should have concentrated itself mainly in Paris. Crystal users in France, unless they live quite near the capital, have very little to listen to. In fact I have seen it stated in a French paper that in the provinces wireless is a hobby for the rich only, since several valves are necessary in order to obtain results. This applies mainly to the middle of the country, for on the borders there is a fairly good supply of wireless transmissions from foreign stations. Inhabitants of Northern France have the Belgian, Dutch, Danish and German stations to help things out, to say nothing of our own. On the east side Switzerland, Germany and Italy help, whilst in the south there are the Spanish stations to be heard.

A Hearty Laugh

Whatever happens in the way of weather reports or elections, I've had one hour's hearty laugh over the ether. There's hardly much need to ask the cause, because most of us would say the same—"John Henry." From the moment I heard him sawing up that table for the microphone on his studio night I foresaw trouble and the whelk-barrow, and he had both—at least, he didn't get the whelk-barrow because Blossom came along just in time. That orchestra of his ought to have been put on a gramophone record as a test of sobriety. You see the idea: if a man could recognise the tune, dismissed with a caution; if not, forty days and the rest! Anyhow, we would all like another dose, please.

Programme Music

We all like the pieces with a story to them—at least, I'm afraid I do. I love to sit and wait for the part where the broom breaks in two and brings too much water, or the Mephistophelian gentleman in red or black, whichever colour scheme you fancy, sits on the tombstone, etc. The most modern example is Vaughan Williams' Suite "The Wasps." In the play the chorus represent wasps, who give their opinion with the freedom for which they are famed. In the suite there is a march of the old men and a march of the kitchen utensils. According to a well-known critic there is still a lingering tradition that the composer searched all the Cambridge kitchen armed with a tuning-fork to find a frying-pan in E flat.

THERMION.

A COMPACT CRYSTAL SET

A RECEIVER WITH NOVEL TUNING ARRANGEMENTS

VARIOMETER tuning of a somewhat unorthodox type is incorporated in the crystal set described below. From the photographs it will be seen that the Igranite honeycomb coil is mounted to form the stator of the tuning variometer, while the rotor is of the ordinary ball-wound type fixed so as to be rotatable near to the coil; the maximum and minimum wavelengths to which the set can be tuned can therefore be varied at will by changing the plug-in coil—a point of especial value when the set is required for use on different aerials.

The whole set complete with headphones is mounted in a hard-wood box of the dimensions given in Fig. 1. The receiving portion of the set may, however, be constructed separately, as it merely drops into the small compartment on the right-hand side of the case.

A piece of matt-finished ebonite measur-

those who have never previously had experience with this type of winding, but if the following instructions are carefully carried out no difficulty should be found.

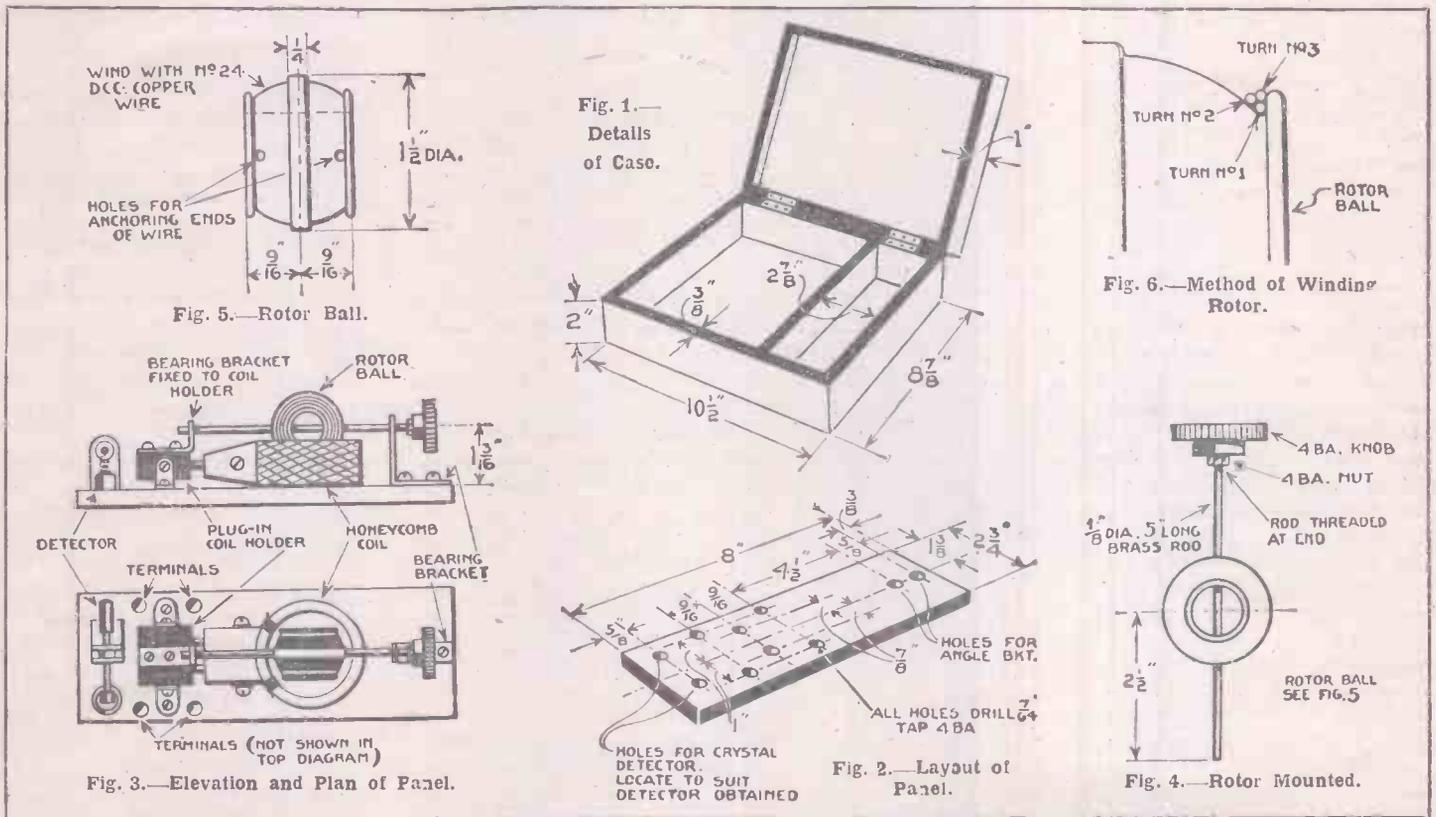
The rotor ball itself, as will be seen from Fig. 5, measures $1\frac{1}{2}$ in. in diameter by $1\frac{1}{8}$ in. deep, and is provided with ridges at each side in order to prevent the wire from slipping off; a small hole should be drilled just on the inner side of each of these ridges as shown in Fig. 5 in order to anchor the beginning and end of the winding. Pass the end of some No. 24 d.c.c. copper wire through one of the anchoring holes in the ball and solder to it a 5-in. length of miniature silk-covered flexible wire, making a small blob of solder at the joint in order to prevent withdrawal of the wire. Now wind on two complete turns of the No. 24 wire and then at the point where the third turn should have started mount the wire up



The Complete Receiver.

Winding the second half of the ball is carried out in an exactly similar fashion to the first; when finished the wire is cut and soldered to the end temporarily held by the drawing-pin, a coat of shellac varnish given in order to hold the wire securely in position.

Excepting the two flexible leads from



ing 8 in. by 3 in. by $\frac{1}{4}$ in. thick and drilled to the particulars shown in Fig. 2 forms the base, to which is attached the detector, plug-in coil holder, terminals and rotor-spindle bearing brackets, as indicated in Fig. 3.

Fig. 4 shows the rotor and rotor spindle assembly. The pile winding of the rotor ball may seem somewhat of a problem to

over the top of the first and second turns as indicated in Fig. 6, making the first "pile wound" turn. The subsequent turns are then put on in the order shown in Fig. 7 until the first half of the rotor is completely filled. At this point the wire should be cut and the winding prevented from coming undone by fixing with a small drawing pin.

the variometer rotor, all connections between parts are made by means of strip brass interposed between the components and the top of the panel; this is in order that no nuts, screw-heads, etc., shall be required underneath; the ebonite when placed in position in the containing box is, of course, in contact with the wood.

(Continued at foot of next page)

MAKING THE MOST OF THE AERIAL

I HAVE received several visits lately from slightly diffident individuals, who have noticed my aerial and wish, as novices, to obtain some practical information on the subject of the stations they have just erected or propose to erect.

The majority of us possess within ourselves a natural inertia that prompts us in all but essentials to take the line of least resistance, and many recent innovations in the world of wireless have seemed to indicate that the outdoor aerial is a luxury rather than a necessity, and that its place can be more conveniently and more readily be taken by frame-aerials or the system of "wired wireless."

Except, however, under the most exceptional circumstances, that may embrace contiguity to a broadcasting station and the possession of a highly sensitive multi-valve set, the results from the adoption of either of these methods are bound to be of a disappointing nature. It is rare, moreover, that the advocates of these substitutes for the aerial proper allude to the inherent disadvantages of the systems they describe.

Utmost Efficiency

For the ordinary individual who desires the utmost efficiency, but whose outlay is determined by financial reasons, there is not at present anything to equal the outside aerial, and yet, oddly enough, the majority of novices hurry over its erection

with but scant ceremony in order to get down to the "really interesting part." This is utterly wrong, and sufficient emphasis cannot be given to the fact that the installation of any receiving station, however modest, should be started, continued and completed with the utmost regard for the aerial.

It is manifestly impossible in widely divergent circumstances to dogmatise on a subject that is liable to limitations of position or to insist on the maintenance of an aerial that shall in all respects come up to the P.M.G. standard, but it is infinitely better to sacrifice length rather than height; a twin aerial is normally more efficient than a single wire only for wavelengths above 600 metres.

If the materials are bought in the cheapest market an efficient twin aerial can be constructed at a very moderate cost. Bamboo spreaders are strong and possess the additional merit of lightness. They should be bought at an upholsterer's shop, and although the price varies, they can be bought for as little as 1s. 6d. each. I find that the best way of mounting the spreader is to bore a hole in each end of the bamboo and pass the aerial wire through, as this method admits of further adjustment.

Get the far end up as high as you possibly can up to the limit of the 100 ft.—and then get it a little bit higher!

Carefully survey every place and position before final decision, because you may be

definitely sure that your enjoyment is to be made or marred largely by the efficiency or otherwise of your aerial. Beware of all short cuts, and sweat at it till you are satisfied, having, as a last resort, constituted yourself a virulently hostile critic.

I know that experts say that your earth lead should be as short as possible, but this dictum should not be construed as in any way restricting the aerial. Get the best possible earth connection; but you can, within limits of great elasticity, ignore the length if you have provided yourself with an efficient aerial.

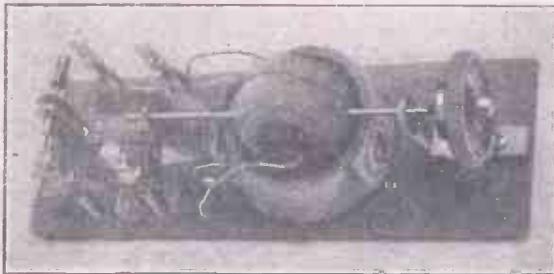
Relative Earth Efficiencies

It is as well to try, if you are in a position to do so, the relative efficiencies of more than one earth, and this is easily done.

A length of gas-piping sunk about three feet in the ground will, if the ground be kept moist, provide you with a good earth.

Don't forget the value of the soldered joint, and if you can't solder, be bold enough to suggest that an expert member of the Wireless Association or Club you have joined—for, of course, you must join an institution of that kind—give a practical demonstration of soldering in all its forms. You may feel quite sure that you are not the only member who does not know how to do it, although others may not possess the moral courage to admit it.

WALTER MEADE.



View of Panel.]

A COMPACT CRYSTAL SET

(Continued from preceding page)

The circuit diagram of the set is shown by Fig. 8.

Operation

To use the receiver, plug in a No. 35 coil if the aerial connected is of the full 100-ft. length, or a No. 50 coil for a small indoor aerial. The No. 50 coil may, however, be successfully employed for both types by connecting a fixed condenser of .0003-microfarad capacity between the lead-in and the set when using the larger aerial.

R. W. N.

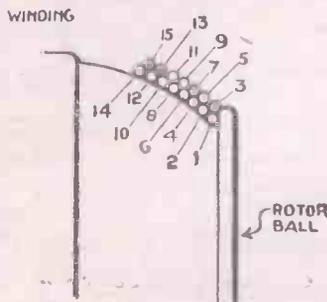


Fig. 7.—Further Details of Rotor Winding.

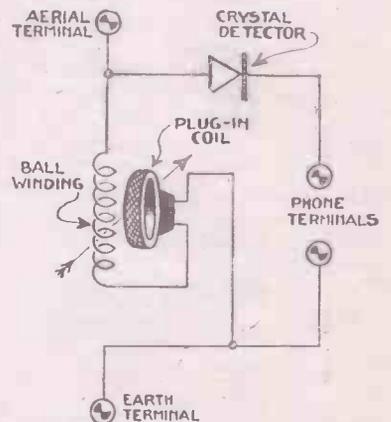
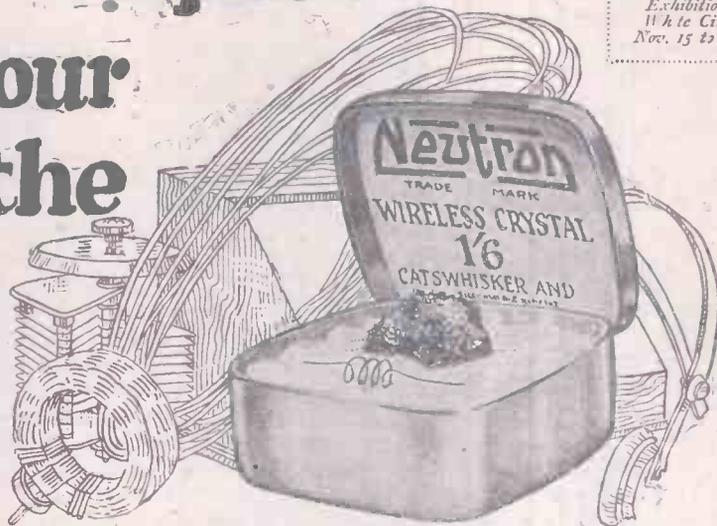


Fig. 8.—Diagram of Connections.

Figs. 1 to 6 are shown on the preceding page.

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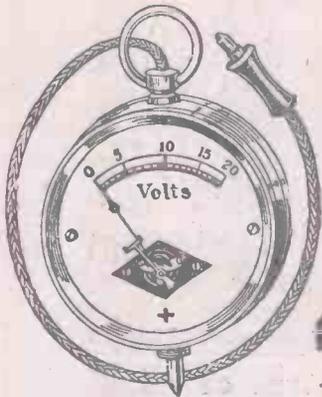
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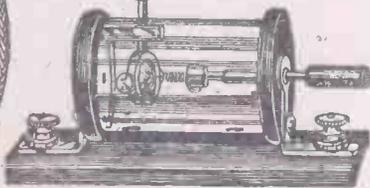
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VOLTMETERS

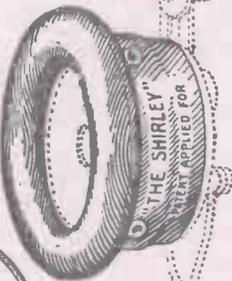
Dead-beat Type. Very reliable. Readings, 0-3, 0-6, 0-12, 0-15, 0-20 volts. Price each **5/-** Post 6d.



"GAMAGE" SUPER Crystal Detector

The striking points about this New Detector are the *Revolving Crystal* and the *Silver Cat's Whisker*. All brass parts lacquered. Complete with a piece of Gamages famous "Permanite" Crystal. Price for Panel Mounting ... **4/6**

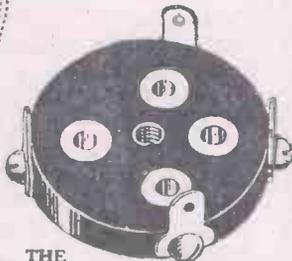
Price for Table Panel Mounting ... **5/6** Post 4d. on each Type.



EAR PADS

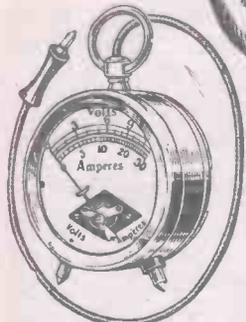
(Pneumatic)

Ensure maximum comfort with a pair of these Rubber Ear Pads made to fit all Standard Receivers. Price per Pair ... **4/-** Post 6d.



THE "Gamage" Under Panel VALVE SOCKET

Striking Points: Anticapacity; positive protection from burning out valves by incorrect fitting. Gamage Price ... **10d.** Post 3d. each.



Watch Type COMBINED DEAD-BEAT Volt-Ammeter

In Nickelled Brass Case. Readings, 0-20 volts; 0-30 amps. In the usual high standard of quality ... Price **7/6** Post 6d.

Write for a Copy of our New Fully Illustrated **WIRELESS CATALOGUE**

Everything you want for your Set at a Distinct Saving in Price. We will send you a Copy Post Free on Application.

A. W. GAMAGE, Ltd., HOLBORN, LONDON, E.C.1
Also at Benetfinks, Cheapside, E.C.2.



INSULATED HOOKS

Well made and nicely finished. Ideal for Indoor Aerials. Size, 2 ins. over all. These hooks come under the usual Gamage Guarantee of Quality. Send for a sample lot to-day. Price per dozen ... **1/6** Post 3d.

Orders by Post receive skilled attention by a **SPECIALLY TRAINED STAFF.**

VALVES repaired Quick!

THE advantage of sending your valve for repair to a valve manufacturer is that only a valve manufacturer can retain the valve characteristics when re-filamenting. Radions Ltd. are the pioneers of valve repairs, and still lead for good work, low price and QUICKNESS. Before sending your valve, consult this.

PRICE LIST.

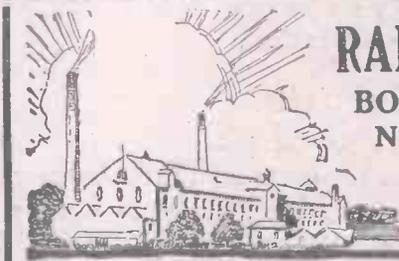
No extra charge for New Glass or New Cap — or for both if needed

Radion Mullard Dutch Marconi Cosser	R type—4 volts—6 amps. Postage on these valves is usually about 3d.	B.T.H. Ediswan French Phillips Moorhead
	Post 6/6 extra.	

Dull Emitters converted into Bright Emitters, with filaments as below:—			
B.T.H. B5	4 1/2 volts	.25 amps	15/-
B.T.H. B4	6 volts	.6 amps	17/6
B.T.H. B3	4 1/2 volts	.6 amps	6/6
Mar D.E.3	4 1/2 volts	.25 amps	6/6
Mullard D.F.	4 1/2 volts	.6 amps	6/6

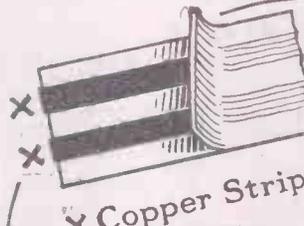
Power Amplifiers			
Mar L.S.2	6 volts	1.5 amps	17/6
" L.S.3	4 1/2 volts	.65 amps	11/3
Mullard P.A.2	5.5 volts	.85 amps	13/-

Other Types—prices and particulars on application.



RADIONS Ltd.
BOLLINGTON
Near Macclesfield

We make the new **RADION** Low Consumption Valve Price 10/- Uses only a third of usual current.



INVISIBLE

Wire for Indoor Aerials and Wireless Extensions

Can be run throughout the house without showing. Consists of TWO COPPER STRIPS held between Two Paper Tapes. Can be run and fixed anywhere by using Glue or Paste. Being Invisible it is very suitable for Secret Wiring. When fixed to four sides of a room it becomes a Directional Aerial, giving excellent results.

PRICE:

In 100-ft. Coils, Postage Paid, 5/-

SMITH & HAMMOND
5, Savoy St., Strand, London, W.C.2



A Natural Galena Crystal of special selectivity

Price **1/6** In glass-topped box

Each piece is selected, tested and guaranteed, also contains a good quality non-corrosive spearpoint catswhisker.



L.M. MICHAEL LTD

IN CONJUNCTION WITH B. HESKETH LTD
RADIO CORNER, 179 STRAND, LONDON, W.C.2.

Radiola Receivers

Radiola II
(Two-valve)



BOTH these sets employ a special, easily tuned reflex circuit, which is equivalent, in effect, to an extra valve. Both are fitted with B.T.H. B.5 (0.06 amps.) valves, which consume so little current that standard dry cells can be used quite successfully for filament lighting.

Radiola I (Valve Crystal) Receiver

This is the ideal set for Head Telephone reception over distances up to 100 miles. Two crystals, with change-over switch are provided.

	PRICE	£ s. d.
with enclosed H.T. battery and B.5 valve		9 15 0
B.T.H. Headphones (4,000 ohms.)		1 5 0

Radiola II (2-valve) Receiver

The power of three valves is secured by the use of a dual amplification circuit. Under average conditions this set will receive all B.B.C. Stations.

	PRICE	£ s. d.
with enclosed H.T. and L.T. dry batteries and two B.5 valves		19 15 0
B.T.H. Headphones (4,000 ohms.)		1 5 0

Radiola I
(Valve-crystal)

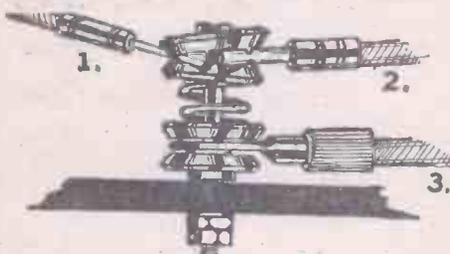


The British Thomson-Houston Co Ltd
Wholesale only
Works: Coventry. Office: Crown House, Aldwych, W.C.2



2224A

HAYES "SAFETY SET" TERMINALS (Pat. App. for)



These terminals take any number of 'phones, automatically disconnect when pulled or jerked and INSURE phones and Set against damage. **ABSOLUTE CONTACT.** Any shape and size pin Nos. 1 and 2 or spade terminal No. 3 can be used. **NO SPECIAL 'PHONE ENDS** required. **DOUBLE** terminals (as illustrated) for 'phone adaptors and panels. **SINGLE** (with top plates only) for all instruments **CONNECTION COMBINATIONS INNUMERABLE**

PRICES: Single, suitable for A. and E., 3d. each. Dozen lots, 2/10½.
" Double, suitable for 'Phones, 4d. each. Dozen lots, 3/10½.
Packing and Postage up to 4—2d. Dozen lots, 4d.

If unable to obtain from your dealer, write enclosing P.O. or stamps to

W. J. HAYES (Dept. C), 29, Manor Lane Terrace, Lee, S.E.13
TRADERS INVITED.

FAMA DUTCH VALVES

USUAL TRADE DISCOUNTS

Amplifiers, Fil. 4-volt Anode, 30 to 100 volt	..	Retail Prices	each 4/8
Detectors, .. 4-volt Anode, 30 to 60 volt	..		each 4/11
Dull Emitters, 0.06 amps. Fil. 1.6-volt Anode, 20 to 100 volt	..		each 12/-
Sidpc (Continental) L.F. Transformers	..		each 9/6
Best Continental Adjustable Diaphragm Headphones	..	pair	11/6

Please remit Postage.

BISHOPSGATE ELECTRIC SUPPLY (1924) CO.,
180, Bishopsgate, London, E.C.2.

Phone: Central 7361.

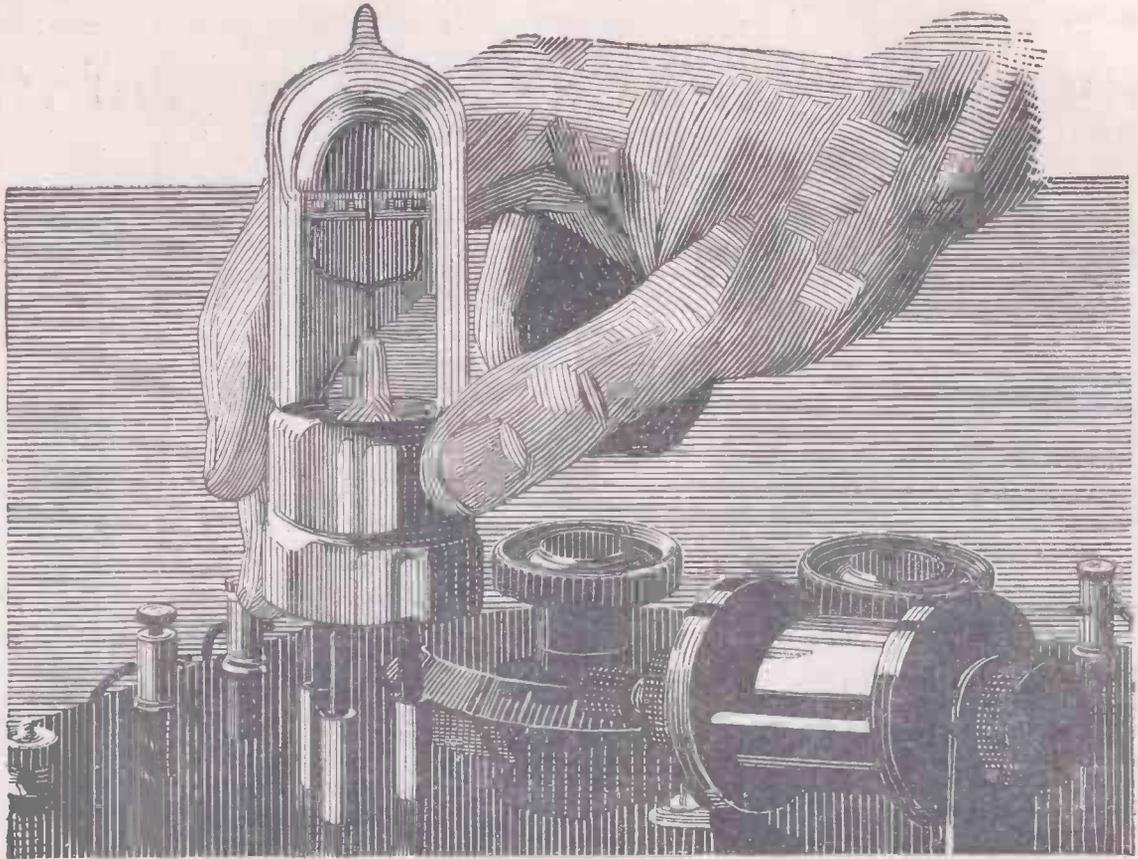
WIRELESS CONSTRUCTORS OF GREAT BRITAIN!

WE INTRODUCE TO YOU OUR 1925 EDITION
50-PAGE ILLUSTRATED CATALOGUE

The most comprehensive retail wireless component catalogue yet published —backed by a smart postal delivery service and a firm whose whole energies are devoted to supplying the Home Constructor.

IT'S YOURS FOR THE ASKING

SEND A P.C. NOW TO
THE BRIGHTON RADIO STORES
163, WESTERN ROAD, BRIGHTON



*The Sovereign Remedy for
a lifeless Set*

NUMBERS of wireless enthusiasts have never experienced the finer delight of logging distant Broadcasting Stations. They still think that it requires some kind of "professional skill." They have not yet realised that the fault probably lies in their Valves and the lack of a little patience in learning the capabilities of the Receiver, and how to tune it.

Both of these points are capable of easy remedy. If your Set is lifeless, it is quite likely that you are using the wrong kind of Valves.

While, obviously, loss of efficiency

in a Valve may not seriously affect the reception from near-by Stations, yet, when you are dealing with the extremely faint oscillations generated by a Station hundreds of miles away, you cannot afford to take chances.

The first and still the only standard Valve for long distance reception is the Cossor P.2—the Valve with the red top. By using one of these as a high frequency amplifier and a P.1 as the Detector, you are assured of a perfect combination of Valves definitely worked out to function on the weakest and most delicate of signals.

COSSOR BRIGHT EMITTERS	
P1. For Detector and L.F. use	12/6
P2. (with red top) for H.F. use	12/6
WUNCELL DULL EMITTERS	
W1. For Detector and L.F. use	21/-
W2. (with red top) for H.F. use	21/-



SHORT-WAVE WORK IS THE THING!

A second article explaining the operation of the short-wave set described in the last issue.

ON the broadcast wavelength, if the set has been made up and the coil wound as described, there is little danger of getting the valves into a state of self-oscillation. The grid tuning condenser should be advanced a few degrees at a time, and the reaction condenser slowly advanced at the same time until a signal is heard or a slight rushing noise gives warning that the set is oscillating. The reaction condenser should always be turned back to zero before the grid tuning condenser is moved until the operator has become used to the set.

On a good aerial this set should bring in the whole of the B.B.C. stations very well indeed, and a very large number of British and Continental amateurs should also be heard. On the first night the set was tried over twenty amateurs, some of them French and Dutch and one Italian, were heard and logged in an hour and a half. All the B.B.C. stations, including relays, German, French and Spanish stations below 800 metres have been heard.

Low Wavelengths

On the lower wavelengths it may be found difficult to get the set to oscillate for the reception of C.W. signals. In this case completely disconnecting the earth connection should be tried. This may not be very efficient, because signals, though they come in, are faint, and the distance range of the set is seriously affected. In default of a proper counterpoise, which is the ideal earth arrangement to use for short-wave reception on this set, a few feet of wire, insulated like an aerial and fixed beneath the aerial, should be tried. It should be as close to the ground as the convenience of users of the garden will allow. The near end should be brought in, with the usual precautions, to the earth terminal of the set. As an alternative a small condenser could be inserted in the aerial lead. This should be of three plates with an overlap of about $1\frac{3}{8}$ in. The spacing can be made with ordinary condenser spacing washers held together with 4 B.A. screws or rod.

The German station POZ has been heard many times without either aerial or earth.

Calibrating the coils may present some difficulties. The No. 1 coil will be fairly easy, because most of the broadcasting stations can be heard and identified. If a point fairly high up on the condenser scale is fixed and another fairly low down, and the two are plotted on squared paper against condenser degrees along the foot

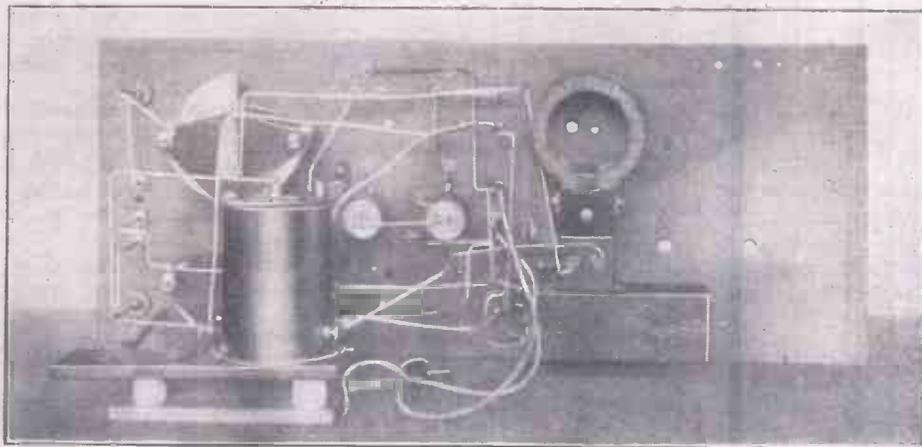
programme on the "harmonics" of at least two stations on No. 2 coil, provided there is an efficient aerial, which may be considered as essential.

All the coils were calibrated, in default of a really reliable heterodyne meter, with quite sufficient accuracy by the simple expedient of plotting all the harmonics of a

powerful station sending high-speed C.W. The station had to be found first of all on its right wavelength on a big set, and the wavelength tested with a buzzer wavemeter. After that it was a simple matter to follow his harmonics down to the sixteenth. Once the grid portion of any coil is calibrated properly it becomes a very reliable wavemeter, for there is no change in wave-

length when reaction coupling is increased, as there is in sets employing magnetic (coil) reaction coupling. Also the wavelength is not affected by using the set on a different aerial.

5 Y M



View of Back of Panel of Short-wave Receiver.

and wavelength up the side, a line joining the two points should give a perfect calibration chart of the coil, provided a square-law tuning condenser is used. It will usually be possible to hear and enjoy the

A CHRISTMAS COMPETITION FOR ALL

A FIRST PRIZE OF THREE GUINEAS AND OTHER PRIZES OF HALF A GUINEA IN A SIMPLE COMPETITION OPEN TO ALL

WE invite every reader to send us by first post on Monday, December 1, 1924, an interesting letter, of from 250 to 400 words, on "My Ideal Wireless Christmas."

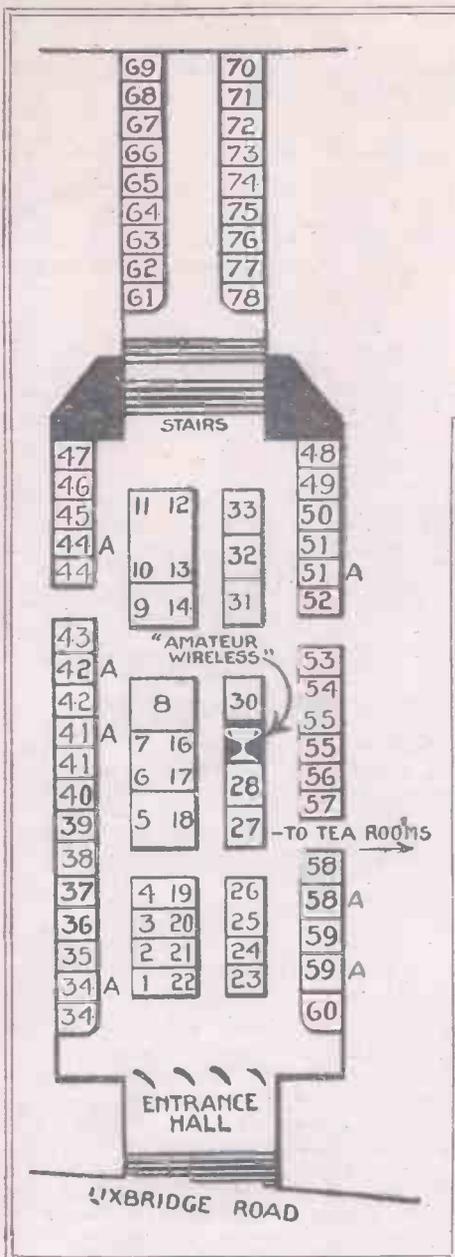
To the writer of the letter adjudged by the Editor to be the most interesting, a prize of Three Guineas will be awarded, and to the writers of any other letters published 10/6 will be paid.

Rules.—The Editor's decision will be final; letters must be written on one side of the paper only; the copyright of all letters published will be ours; all letters must be received not later than first post on Monday, December 1, 1924. No correspondence regarding the competition can be entered into.

Envelopes must be addressed :—Competition, The Editor, "Amateur Wireless," La Belle Sauvage, London, E.C.4.

WHITE CITY EXHIBITION

A Guide to the Exhibits at the British Wireless Exhibition and Radio Convention, November 15 to 29.



Stand 4. Victoria Electrical Co., Ltd., Chapel Street, Manchester.

Variable condensers of all descriptions and good finish form the exhibits of interest on this stand. Victoria sets and components, including Victoria rheostats and engraved terminals, will also be shown.

Stands 5 and 18. New Times Sales Co., 61, Leather Lane, E.C.

Stands 6, 7, 16 and 17. Oldham and Sons, Ltd., Denton, near Manchester.

Examples of all those types of accumulators that are of service to the wireless enthusiast are on show here. Accumulators in both glass and celluloid cases are shown.

Stand 8. The New London Electron Works, Ltd., E.14.

Electron wire is the chief exhibit on this stand, and by means of a doll's house the simplicity of using this wire is amply demonstrated.

Stands 9 and 14. Igranic Electric Co., Ltd., Queen Victoria Street, E.C.4.

An attractive feature of this stand is the installation of a No. 84 B coil-winding machine, by which honeycomb coils are produced. Coils, high-frequency transformers, variometers and many other components are being shown, as well as two completely-dressed windows, in which are a complete range of components on view.

Stands 10, 11, 12 and 13. Pettigrew and Merri-man, Ltd., 122-124, Tooley Street, S.E.1.

Loud-speakers, phones, square-law condensers, valves, crystals and other components of various makes will be exhibited on this stand. The Newey snap terminal is of special interest, since it allows many components to be connected together in a minimum of time.

Stand 19. Sel-Ezi Wireless Supply Co., 6, Greek Street, W.1.

On this stand will be found an extended range of components, including anti-capacity handles, H.T. batteries, grid leaks, coil plugs and holders, crystal detectors and low-frequency transformers. A feature of special interest is

a range of Erla fixed condensers, in which no moulded ebonite casing material is employed.

Stand 20. The India Rubber, Gutta Percha and Telegraph Works Co., Ltd., Silvertown, E.16.

A large range of wireless accessories will be displayed on this stand, including the well-known Silvertown variable condensers and low-frequency transformers. The new Silvervox loud-speaker will be an exhibit of special interest.



This useful device, made by the Jeb Trading Co., can be used for testing batteries and valve-socket connections.

Stand 21. Tungstalite, Ltd., 47, Farringdon Road, E.C.1.

This firm is showing the well-known Tungstalite crystal (blue label), Airmax coils, Tungstalite high-tension batteries and complete crystal receiving sets.

Stands 1 and 22. Fellows Magneto Co., Ltd., Cumberland Avenue, Park Royal.

Two-, three- and five-valve sets will be on view on these stands, together with coils, crystal sets and the well-known Fellows phones. A new super one-valve set will be exhibited, together with a one-valve amplifier and a new model three-valve Super Grand.

For All Visitors to Note!

ORGANISERS.—Radio Exhibitions and Wireless Conventions (A.B. Dale and E. Schofield), Wellington Chambers, 46, Cannon St., E.C.4.

DATES.—Saturday, November 15, to Saturday, November 29, inclusive.

TIMES.—11 a.m. to 10 p.m. daily.

ADMISSION.—1s., including tax.

DEMONSTRATIONS.—There will be demonstrations of receiving apparatus at many stands, but loud-speakers will not

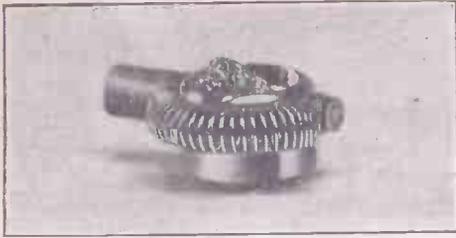
be used for this purpose. A special installation will be created for the reception of broadcasting. "Silent cabinets" will be provided for testing sets.

EXHIBITS.—Only goods of British manufacture will be shown.

NOVELTIES AND INVENTIONS COMPETITION.—"Amateur Wireless" is offering a prize of a 15-guinea silver cup for the best amateur novelty or invention. Full particulars are given on p. 733. The closing date is November

17. Gold and silver medals will also be given for the second and third prizes.

HOW TO GET TO THE WHITE CITY—(Uxbridge Road Entrance). Trains.—Metropolitan and Central London Rlys. to Shepherd's Bush; Metropolitan and L.N.W. Rlys. to Uxbridge Road (the latter from Earl's Court and Willesden). Trams.—L.U.T. from Hanwell, Southall, Hayes and Uxbridge; L.C.C. from Hammersmith, Willesden, Clapham Junction, Tooting, etc. Buses.—Nos. 11, 12, 12b, 17, 17b, 32, 49, 49a and 88.



By using this Perfection holder crystals can be changed easily and quickly.

Stand 23. Seagull, Ltd., 21, Spital Square, Bishopsgate, E.1.

An extended range of complete receivers, loud-speakers and accessories is on view on this stand. A three-valve receiver, complete with batteries, coils, dull-emitter valves and a loud-speaker, should be specially noted.

Stand 24. Wireless Service, 91, New Bond Street, W.1.

Stand 25 and 26. City Accumulator Co., 10, Rangoon Street, E.C.3.

A novel point about this stand will be that it contains a sound-proof demonstration room. Uni-valve, Duo-valve and reflex receivers will be much in evidence, together with the new C.A.C. portable receiver. Components of every description will be shown.

Stand 27. Penton Engineering Co., 15, Cromer Street, Gray's Inn Road, W.C.1.

Ball-and-socket coil holders, filament rheostats, standard coil holders, knife switches and basket coil holders will comprise the chief exhibits on this stand. The Penton low-consumption valve is of special interest, while standard Penton R-type valves will also be shown.

Stand 28. Neutron, Ltd., Sicilian House, Sicilian Avenue, Southampton Row, W.C.2.

Stand 29. "Amateur Wireless" and "The Amateur Mechanic," La. Belle Sauvage, E.C.4.

Entries for the AMATEUR-WIRELESS Novelties and Inventions Competition (for full particulars see panel in next column) will, it is hoped, be the most interesting feature of the Exhibition. There are no restrictions as to the form that entries may take, and everybody, from the newest enthusiast to the experienced experimenter, stands an equal chance of winning the 15-guinea cup offered as first prize—and a prize to be proud of, too!

Be sure to visit the AMATEUR WIRELESS stand and see what amateurs can do!

Stand 30. The Telegraph Condenser Co., Ltd., West Park Works, Mortlake Road, Kew Gardens, Surrey.

On this stand will be shown a complete range of the well-known T.C.C. condensers for reception and for transmission. A large transmitting condenser tested to 30,000 volts will be on view.

Stand 31. A. K. U. Co., 33, Orchard Street, W.

Stand 32. J. V. Mulholland, 4, Blenheim Street, New Bond Street, W.1.

A complete stock of Gambrell Efficiency apparatus, including the well-known neodyne condensers, coils, tuners, wavemeters, valve sets and high-frequency amplifiers, is on show. Valves, loud-speakers and a new type of unit system will be worth notice.

Stand 33. Fuller's United Electric Works, Ltd., Chadwell Heath, Essex.

A comprehensive range of the well-known Sparta wireless accessories will be shown on this stand, including ironclad intervalve and telephone transformers, various types of Sparta filament resistances and potentiometers, coil holders, condensers, chokes, switches, insulators and batteries. The Little Sparta loud-speaker will also be on view, together with samples of ebonite in panel, rod, tube and moulding.

Stand 34. Stella Products, 31-37, Wybert Street, N.W.1.

On this stand will be found the well-known Stella and Wembley phones and loud-speakers. An alternating-current rectifier will also be shown; this enables those who have alternating-current supplies in their homes to charge their own accumulators.

Stand 36. F. Yates and Son, Ltd., 144, Church Street, Kensington, W.8.

Accumulators suitable for wireless work are

A FIFTEEN-GUINEA CUP FOR A WIRELESS NOVELTY!

WITH a view to encouraging the amateur wireless inventor, "Amateur Wireless" is offering a 15-guinea silver cup for competition in connection with the White City Wireless Exhibition. —Any amateur may send his novelty or invention to the Exhibition, and indeed is invited to do so.

The inventions must reach the Exhibition not later than Monday, November 17. Each package must be labelled "Amateur Wireless Inventions," and should be sent, carriage paid, to "Amateur Wireless" Inventions, The Wireless Exhibition, White City, Uxbridge Road, London, W.12, and not to the Editorial offices. When the Exhibition is over it will be returned carriage forward.

These competition inventions will be on view from November 20 to November 29, and must reach the Exhibition not later than Monday, November 17. Neither "Amateur Wireless" nor the Exhibition authorities will be responsible for any loss or damage, but it is needless to say that every possible care will be taken.

All entries will be judged by the technical staff of "Amateur Wireless," together with any specially qualified experts they may care to invite to assist them. The awards will be announced on Tuesday, November 25, at the Exhibition, and, if possible, will be published in the issue of "Amateur Wireless" on sale on Thursday, November 27; failing that, in the issue published one week later.

In addition to the silver cup as first prize, there will be a gold medal as a second prize, and a silver medal as a third.

Let every ingenious reader of "Amateur Wireless" get right down to the job straight away, and see that his invention reaches the Exhibition not later than Monday, Nov. 17. There is no time to lose!

of special interest on this stand. Wireless components, including the well-known F.Y.S. intervalve transformers and square-law condensers, will also be on view.

Stand 37. F. H. Middleton, 13, Manette Street, Charing Cross Road, W.1.

Midite, the "dependable" crystal, will be the chief exhibit on this stand, but the Perfection

crystal holder is also of special interest. A holder of this type will be given to every purchaser of a tube of Midite.

Stand 39. Harding, Holland and Fry, Ltd., 27, Garlick Hill, E.C.4.

The largest and most uniform natural crystal yet extracted from the earth will be one of the chief exhibits on this stand. This giant crystal weighs over 6 lbs., or approximately 14 lb., and has a sensitivity of at least 99.5 per cent. Phones, loud-speakers, crystals and complete crystal sets are also shown.

Stand 40. The Jeb Trading Co., 49a, Avenue Road, Acton, W.3.

Battery testers, brass spade terminals, wander plugs, Mego catwhiskers and Jebite crystal will be the chief exhibits on this stand. Of special interest is the C.W. battery link for making up high-tension units with ordinary pocket-lamp batteries.

Stand 41. The Formo Co. (Arthur Preen and Co., Ltd.), Crown Works, Cricklewood.

Formo shrouded transformers and Formo-ronor variable condensers will be the chief exhibits on this stand. The compact and shrouded transformers and the original condensers shown should attract much attention.

Stand 42A. Burwood Electrical Supplies Co. (1924), 41, Great Queen Street, W.C.2.

Square-law condensers, valve holders, panel switches, valve legs, dull-emitter valves and terminal adaptors are among the chief exhibits. The Jay Gee crystal-valve set, complete with all accessories, is worthy of special notice.

Stand 43. Precision Screw Co., Ltd., Macdonald Works, Walthamstow, E.17.

Variable condensers, vernier condensers, switch arms, coil plugs, crystal detectors and Colpak terminals are shown on this stand. Various brass parts and crystal detectors are also exhibited. The Colvern vernier condenser is of especial interest.

Stand 44. The Portable Utilites Co., Ltd., 8, Fisher Street, W.C.1.

The new Gravity crystal detector will be of special interest. It is claimed that this detector is able to withstand the effect of jars and shakes better than the ordinary catwhisker contact. Frame aeriols and the well-known Eureka L.F. transformers are also shown.

Stand 47. Bullen, 38, Holywell Lane, Great Eastern Street, E.C.2.

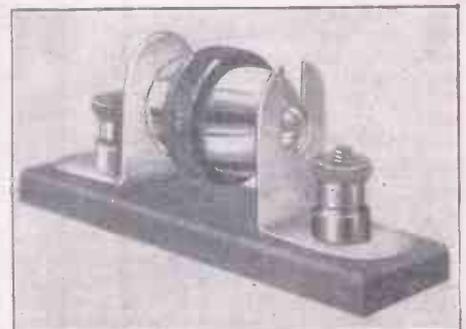
Stand 48. Lighting Supplies Co., 4-5, Finsbury Pavement, E.C., and The Ecco Radio Co., Princess Street, St. John's Wood, N.W.

Finston fixed and square-law condensers and variometers, Sedion basket coils and crystals will be on view on this stand. Well-known makes of phones, components and complete sets will be exhibited by the Ecco Radio Co., of Princess Street, St. John's Wood, N.W., who are sharing the stand.

Stand 49. Hart Collins, Ltd., 38a, Bessborough Street, Westminster, S.W.1.

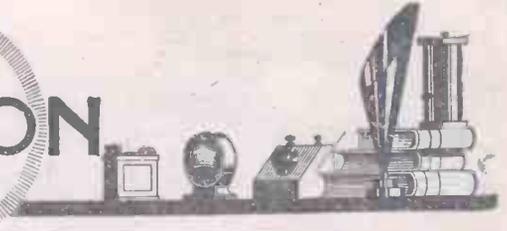
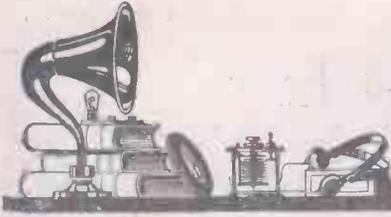
Of special interest on this stand is the Tuninal, a single-valve broadcast receiver hav-

(Continued on page 746)



All the parts of this Gravity detector are totally enclosed and adjustment is made by rotating the knurled ring.

OUR INFORMATION BUREAU

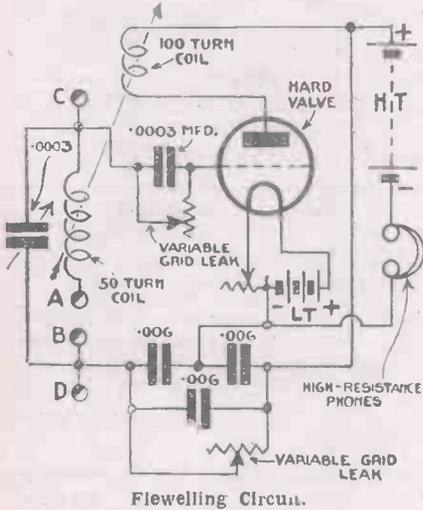


RULES.—Please write distinctly and keep to the point. We reply promptly by post. Please give all necessary details. Ask one question at a time to ensure a prompt reply, and please put sketches, lay-outs, diagrams, etc., on separate sheets containing your name and address. Always send stamped, addressed envelope and attach Coupon (p. 759).

Flewelling Circuit

Q.—Please give me a circuit diagram of the Flewelling super-regenerative receiver.—L. C. (Brighton).

A.—The fixed condensers employed in this circuit must be of first-class quality. The grid



leak and the resistance shunting the trio of .006-microfarad condensers should have a resistance varying between .5 and 5 megohms. Either a bright- or a dull-emitter valve may be used. Should the receiver be used in conjunction with a frame aerial, a suitable size of frame is one having sides each 3 ft. in length, forming a square on which eight turns of wire are wound. The two leads from the frame aerial are connected to A and B, shown in the circuit diagram. If an outside aerial and earth system is used, connect the aerial to terminal C, the earth to terminal D, and short circuit the terminals A and B with a piece of copper wire.—D. C. R.

List of Crystals

Q.—An enthusiastic crystal user, I have for some months been using hertzite. Now, for a change, I should like to try some other crystals. Can you give me a list of likely ones?—J. K. D. (Hammersmith).

A.—For experimental purposes we suggest you try the following crystals: Zincite-bornite, carborundum, copper pyrites, galenagraphite, molybdenite, silicon and tellurium. Of these you will probably find the zincite-bornite combination the most interesting with which to carry out experiments.—X.

Condenser Capacities

Q.—I present for your explanation a little problem that I am unable to solve. A .001 microfarad condenser is variable from zero to .001 microfarad. This being so why do you insist on the fact that even a .0003 microfarad variable condenser is of too high a value to tune the anode coil in a high-frequency amplifier?—R. D. (Wick).

A.—You are wrong in supposing that a .001 microfarad variable condenser, or any other condenser for that matter, has zero

capacity when set at the zero mark. With a large variable condenser, such as that you mention, there is quite an appreciable capacity between the edges of each set of plates. The fewer the plates the smaller will be the minimum capacity value of the condenser. A condenser of more than .0001 microfarad is not to be recommended for tuning the anode inductance of a high-frequency amplifier, for the slightest adjustment of a large variable condenser makes a very big change in wavelength with the result that tuning will be very difficult.—D. C. R.

Edison Accumulator

Q.—What are the advantages of the Edison accumulator, one of which I possess?—K. M. I. (Leeds).

A.—The electrolyte used in this type of accumulator is an alkali and the plates are nickel. This accumulator is very suitable for all purposes, especially where a heavy rate of discharge is required. It is almost indestructible and even shorting the terminals does not harm it. The E.M.F. per cell is 1.2 volts, so that two of these cells would be excellent for use with dull-emitter valves of the .06-ampere type.—D. C. R.

Interference from Generator

Q.—I have a two-valve set and am troubled by interference from the generator of a picture theatre 200 yards away. I have tried a capacity earth but with no effect. Is there any other remedy?—F. T. W. (Caerau).

A.—Loose-coupled tuning coils will decrease

generator interference to a considerable extent, and a variable condenser connected in the earth lead often proves beneficial. Tinfoil shields should be provided for variable condensers, iron-cored transformers and rheostats. All leads should be well separated from one another. Small cylinders of tinfoil may be placed over the valves, and these with the other shields connected to a common earth.—H. R.

Condenser Across Reaction Coil

Q.—Would a variable condenser across the reaction coil improve results?—F. C. (Wimbleton).

A.—If the reaction coil and aerial tuning inductance are correctly balanced there is no need for a variable condenser across the former, although the addition of one might make it easier to control the degree of reaction. If, on the other hand, your reaction coil is on the small side, a small variable condenser of about .0002 microfarad will improve results.—D. R.

Altering Accumulators for Dull-emitter Valves

Q.—I possess a 4-volt 60-ampere-hour (actual) accumulator. If possible I wish to convert this into a 2-volt battery, using both cells. Can this be done?—G. R. (Halifax).

A.—At present there is a connecting bar joining the positive terminal of one cell to the negative terminal of the other. This bar should be removed and the two cells joined in parallel. The resultant actual capacity of the battery will be 120 ampere-hours.—D. C. R.

WIRELESS TERMS TRAVESTIED



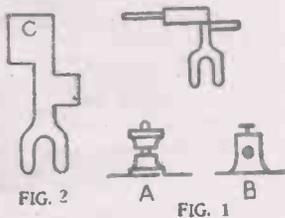
A BROADCAST RECEIVER.



PRACTICAL ODDS AND ENDS

Terminal Tags

TO amateurs who are continually altering the wiring of their sets to test various circuits, the following device will be found to be of great assistance when the



Figs. 1 and 2.—Terminal Tags.

terminals on the panels are of both the types illustrated.

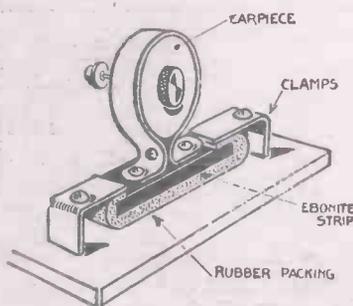
If wires are repeatedly bent to fit terminal A, Fig. 1, and straightened to go through the hole of terminal B, the ends are liable to weaken and will eventually break off. All that is required to prevent this is a sheet of very thin brass, from which several pieces, in the shape shown by Fig. 1 are cut.

The end of the wire is soldered at C and the whole rolled into the shape shown in Fig. 2, when it will be found that wires thus fitted can be easily connected to either type of terminal. F. C. L.

Microphone Vibration

A SIMPLE method of protecting the earpiece and microphone of the "A.W." Crystal Loud-speaker Set from shocks and other outside disturbances is shown by the illustration.

The phone is mounted on a strip of ebonite or hard wood secured to the base-board of the set by two inverted L-shaped



Preventing Microphone Vibration.

clamps, a piece of sponge or other soft rubber being inserted between the clamps and the earpiece mounting strip as shown, thus completely insulating the microphone from external vibrations. R. N. W.

Changing Connections

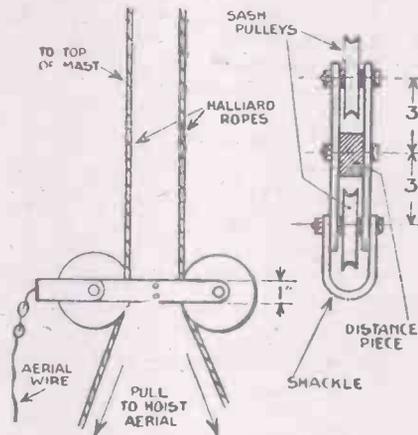
EXPERIMENTERS who often want to make quick changes in connections should use small paper clips, to which permanent leads can be easily soldered.

D.

Hoisting Aerial Wire

IT may happen that the aerial halliards become fast in the pulley block at the top of the mast, thus making it seemingly impossible to hoist the aerial wire. This, however, may be done as follows:

Two strips of flat iron $\frac{1}{4}$ in. by 1 in. by 6 in. are drilled $\frac{1}{8}$ in. (right). A distance piece, slightly thicker than a sash pulley, is bolted between the strips. A sash pulley was mounted in each end of the fork and bolted in position. A shackle



Method of Hoisting Wire.

is mounted on one spindle bolt in order to attach the aerial wire. The actual hoisting is easy. One halliard is threaded through each pulley and the ropes pulled at an angle to each other. Surprisingly little effort is needed to make the wire ascend. A. E. M.

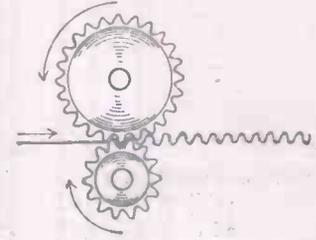
Soldering Earth Plates

MANY amateurs make use of old zinc or galvanised-iron baths for earth plates. When these have been in other service previously great difficulty is usually experienced in clearing the surface sufficiently well to enable tinning and soldering the earth wire to be accomplished.

An excellent tip is to dab a quantity of raw spirits of salt on the place to be soldered and in a minute or so wash off with clean cold water. It will be found that the spirit has eaten away the surface, leaving a perfectly clean surface. C. W.

Copper-tape Aerial

READERS who use copper-tape in place of the ordinary stranded wire for aerials will find that an extra 50 ft. or 50



Corrugated Aerial Tape.

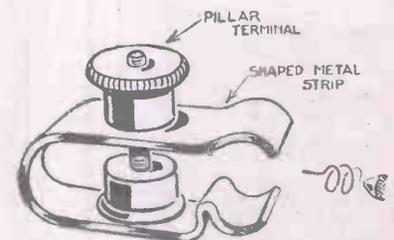
can be suspended between the two masts if it is first corrugated in the manner outlined in the accompanying sketch. The tape is simply passed between two suitable gear wheels which are preferably a little worn, so that the clearance between the teeth is at least equal to the thickness of the tape.

If one possesses a selection of various gear combinations a corrugating "machine" may easily be rigged up. The writer used the gears of an old miniature mangle arrangement used for glazing photographic prints. O. J. R.

Crystal Holder

CRYSTAL experimenters will find the simple clamping device shown in the illustration of special convenience when crystals are to be quickly changed, such as is likely to be the case when comparing different makes of crystal during a broadcast item. The arrangement can also be used in the construction of a simple crystal detector for ordinary use.

A small-sized pillar terminal is used,



Simple Crystal Holder.

which clamps the crystal tongue to the base of the detector, the head of the terminal providing the means for clamping the crystal in position or releasing it as required. R. N. W.

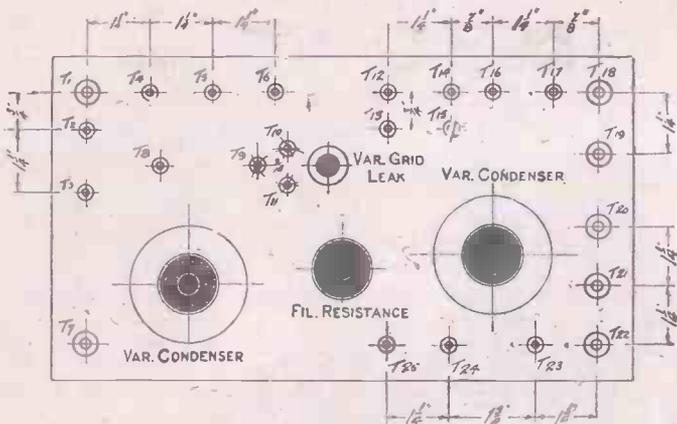


Fig. 2.—Layout of Panel.

EVERY amateur at some time or other during his experiments must have gazed with dismay at his spidery, tangled bench hook-ups, and sighed for some decent-looking instrument that would present a good outward appearance to the eye and yet retain its flexibility and capacity for experiments.

The receiver shown by Fig. 1 and about to be described is the result of several attempts to solve this problem for the experimenter with one-valve circuits. As most of these can be readily and efficiently tried out, it enables the advantages and disadvantages of each circuit to be compared and useful data compiled. Withal it is compact, neat in appearance, portable and, last but not least, dustproof. It also makes an ideal instrument for the beginner.

The sizes of cabinet, ebonite panel, etc., are given, but these can, of course, be modified to suit the components used, provided the general scheme of layout is adhered to. The wiring should be kept well spaced. One of the points that should be noticed is that the terminals are kept at a uniform distance apart ($1\frac{1}{4}$ -in. centres in this case) wherever possible. This admits of using one size of connecting link for most of the connections, making for ease and rapidity when wiring up, which would not be the case if the terminals were at any odd centres.

Components

The components required are as follows: One two-coil holder; two .0005 variable condensers (Polar were used in the writer's set, but any good make of condenser will do, although the depth of case may have to be modified. Condensers with a vernier adjustment incorporated would probably be an advantage for real fine tuning); one grid condenser .0003 microfarad; one variable grid leak; one .006 fixed condenser; one .002 ditto; one rheostat (preferably one that can be used either with bright- or dull-emitters); one pair H.R. phones; low-capacity tuning coils, Nos. 35, 50, 75, etc.

If the coils are home-made the writer recommends the lattice-wound type on 2-in. formers, using No. 22 d.c.c. wire with well-spaced windings for the sizes mentioned.

Also (at a later date if preferred) a good crystal detector, an intervalve transformer and a general-purpose valve (say a ".06" dull-emitter).

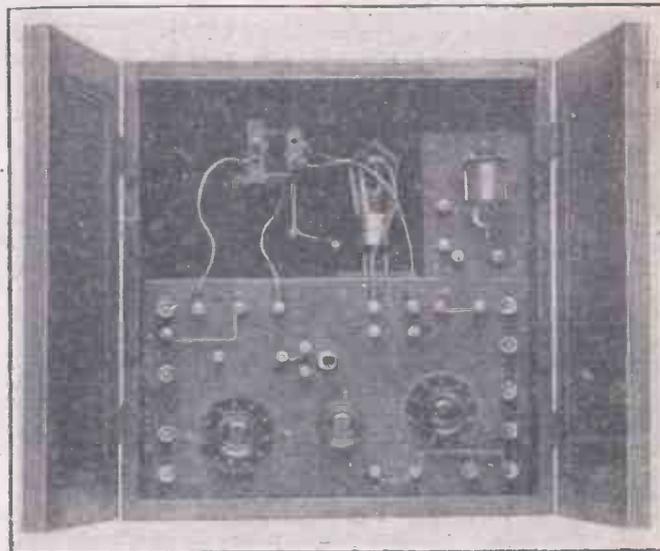
The advantage of using a dull-emitter is that it makes the set portable if required. Although more expensive at first cost, it will repay itself in the long run. In addition there will be required a 60-volt H.T. battery, four valve legs, seven 2 B.A. screw-down terminals; eighteen 5 B.A. ditto, and some spade tags.

The cabinet is of stained and polished mahogany; the internal dimensions are 13 in. by $12\frac{1}{4}$ in. by $4\frac{1}{2}$ in. A bead $\frac{1}{8}$ in. wide is fastened at a depth of $1\frac{1}{2}$ in. along the bottom and for $6\frac{1}{4}$ in. up each side, to which the ebonite panel is screwed.

The ebonite panel measures $12\frac{1}{4}$ in. by 7 in., and has the surface removed with fine emery-cloth as usual. Oil should be used as a lubricant to save the ebonite from being scratched during the process.

Fig. 2 shows the relative positions of the components and terminals. The valve legs are screwed into a piece of ebonite (this component can be bought ready-made), which is screwed to a wooden shelf, which is in turn fastened to the main panel by means of a

A SELF-CONTAINED THE EXPERIMENTAL



strip of the $\frac{1}{2}$ -in. square heading and small wood screws.

The components should then be mounted and the whole wired up. No. 18 bare tinned-copper wire is suitable for connections, all joints being soldered. Fig. 3 shows the wiring, and it is also apparent in the photograph, Fig. 4.

The coil holder should be fastened in position at some convenient height. In the instrument described Meccano strips suitably bent were used. Connections between terminals on the front of the panel are made with wire links bent as shown in Fig. 5. The same wire as was used for wiring up will do nicely for these.

Holes should be drilled in the case opposite those terminals which take external leads, and rubber rings pushed on to the

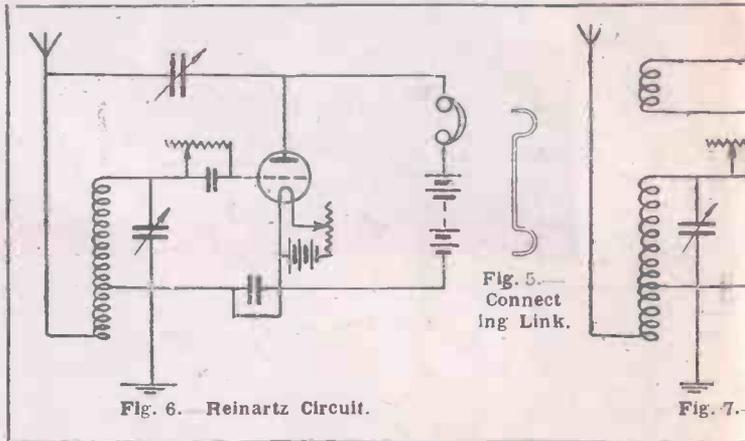


Fig. 6. Reinartz Circuit.

Fig. 5. Connecting Link.

Fig. 7.

AINED SET FOR RIMENTER

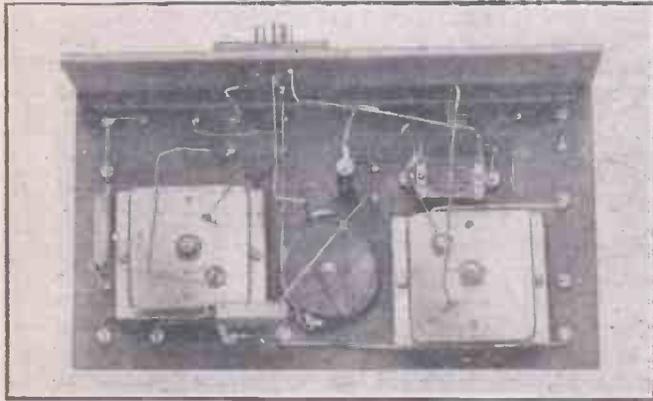


Fig. 1 (photograph on the left).—The Complete Receiver.

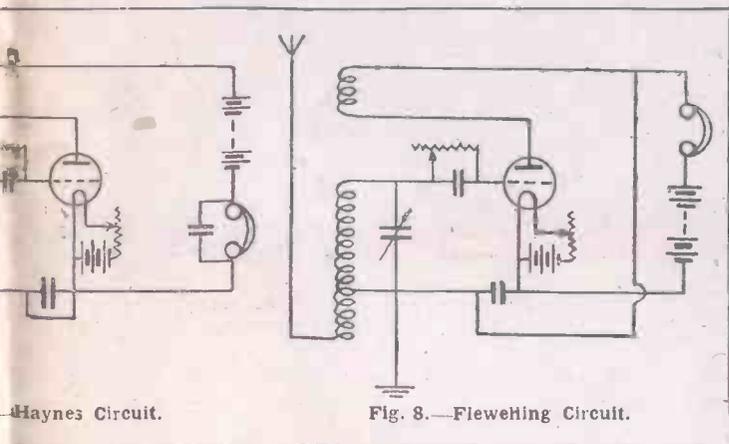
Fig. 4 (photograph above).—View of Back of Panel.

leads to fill up the holes when in position. This enables the doors to be left closed with everything in position, whilst the rings shut out the dust.

Some Circuits

No. 1.—Single-valve detector, series-tuning condenser, with or without reaction.

Aerial T1, earth T7, A.T.I. coil holder leads T6 and T4, reaction if used (otherwise terminals shorted), (T12, -T14), H.T. + T18, H.T. - T19, telephones T20, T21, L.T. + T22, L.T. - T23, (T2, T5) (this will require a special link), (T9, T10), (T16, T17), (T21, T22), (T25, T24), (T24, T22) (this requires a special-shaped link bent to miss T23, otherwise L.T. would be shorted) (see photograph). Coils in respective holders.



Haynes Circuit.

Fig. 8.—Flewelling Circuit.

detector, with or without reaction. Aerial, earth, phones, H.T. and L.T., and reaction (if used) as before.

A.T.I. coil holder leads T2, T6, (T4, T5), (T8, T9), (T10, T11), (T21, T22), (T16, T17), (T25, T24), (T24, T22), suitable coils.

No. 4. Reinartz (Fig. 6).—For this circuit a special coil is required, and for convenience the writer has adopted the following method of winding this. Compared with the more usual basket windings, it does not seem to suffer in efficiency. The coil was wound in the usual lattice fashion on a 2-in. diameter former, with well spaced turns, but with the following modifications: No. 22 d.c.c. wire was used, sufficient being cut off for about 26 turns.

This we will call wire A, the rest of the wire being left on the reel B. A zigzag turn and then a layer of spaced turns, and again the usual zigzag turn was wound on from reel B and the wire temporarily fastened to prevent it unwinding.

Next a layer of turns was wound on immediately above the first layer, using the lengths of wire A, and finishing with the zigzag turn.

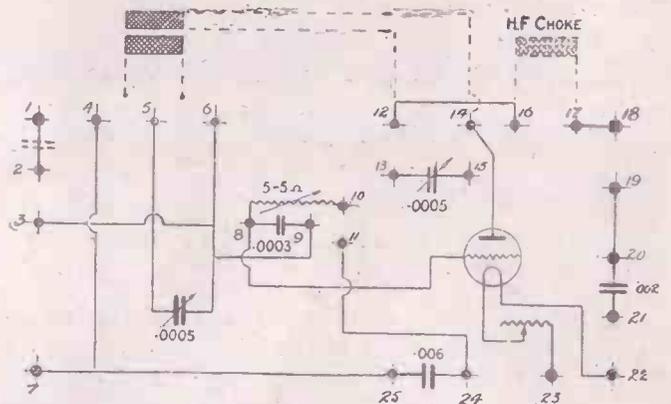


Fig. 3.—Wiring Diagram.

No. 2.—Single-valve detector, parallel-tuning condenser, with or without reaction.

As No. 1, but delete connection (T2, T5) and substitute (T2, T3), (T4, T5).

Special Coils

No. 3.— Short-wave single-valve

This was also temporarily fastened. The wire used for the first layer, wire B, was then "unslacked" and a further layer put on, finishing with the zigzag-turn and again fastened. Then another layer of the wire A was wound on in the same manner, until there were about 16 turns in each of the separate windings of wire. The winding with wire B was then continued until a resultant coil of about 50 turns was formed, not counting the 16 turns of A.

All this sounds complicated, but actually is quite easy to carry out. The coil was then dipped in hot wax, carefully drained, and when cool the pins were removed, the first zigzag turn pulled out, and the coil slipped off the former. The great advantage of winding this way is that the coil can be tapped or mounted on the usual coil plug (although this is not connected up), and the same coil will do for several other circuits.

A piece of ebonite with three equally spaced small terminals was fastened across the face of the coil, and connections made in the following manner. The beginning of the coil wire A was taken to the one outside terminal T26. The beginning of coil wire B and the other end of coil A were joined together and taken to the middle terminal T27. The remaining wire was taken to the remaining terminal T28.

Connections for the Reinartz Circuit

Aerial T1, earth T7. H.T. + T20, H.T. - T21. Telephones T18, T19. The special coil can be either placed in the coil holder or laid on the left-hand side of the shelf. (T26, T1 or T2), (T27, T4), (T28, T6), (T9, T10), (T12, T14), (T16, T17), (T14, T15), (T13, T2) (a special straight length of wire necessary for this last connection). Right-hand condenser now controls reaction. (T25, T24), (T24, T22) special link, (T21, T22).

No. 5.—Haynes DX (Fig. 7).—Special coil must, of course, be put in the holder for this circuit. The connections are as for Reinartz, but delete (T12, T14), (T14, T15), (T2, T13); connecting suitable coil in

reaction coil holder leads to T12, T14; reverse position of phones and H.T.—that is, H.T. + T18, H.T. - T19; phones T20, T21.

No. 6.—Flewelling (Fig. 8).—Connections as No. 2, but T25, T24; reverse phones and H.T.; phones T18, T19, H.T. + T20, H.T. - T21. Connections T12, T25 (special length link required).

The Haynes DX circuit may also be used as a modified form of Flewelling by deleting connection T24, T25, and adding the feed-back connection T12, T25.

Note.—The Flewelling works best on a small indoor aerial or frame, but it is very tricky to handle, although it is a very interesting circuit to experiment with. If a frame aerial is used connections would be as follows: Frame-connection leads to T1, T7, A.T.I.; coil-holder leads to T2, T6, also connection T4; T5; reaction-coil holder, etc., as before.

The above circuits give a good idea of the adaptability of the receiver and the methods of connection, etc. Most one-valve circuits which have appeared in this and various periodicals can be tried out in this way. A study of the wiring diagram of the set and the diagram of the circuit to be tried out will soon show what connections are required.

Terminals T16 and T17 are for connection to a choke coil should one be required in any particular circuit. (This is the case in some American circuits. It is also sometimes an advantage to use one in the Reinartz or Flewelling, although the

writer has never found it necessary.) Any good low-capacity lattice or duolateral coil of about 250 turns will do.

Adding a Crystal Detector

A crystal detector unit has been added, as this enables the valve to be used as an H.F. amplifier when greater range is required, with only a slight additional cost.

This consists of a box 3 3/8 in. by 4 1/2 in. with an ebonite front, four terminals and detector. It stands on the right-hand side of the shelf and is best held in position by a small brass clip. When the valve is used as an H.F. amplifier T8, T9 are shorted.

If a further similar unit containing an intervalve transformer with necessary terminals, etc., is added an interesting field in dual amplification is opened up. This transformer unit is best placed at the left-hand end of the shelf and can be retained in position by a similar clip.

Various positions for putting the secondary winding in circuit can be tried, as (1) in series with the A.T.I. (earth side), (2) in parallel (using choke in series with secondary winding of transformer, using T8, T11, or (3) across the grid condenser T8, T9.

Grid Bias

Experiments in grid bias can be tried by connecting the grid cells across T25, T24.

No notes as regards performance of the various circuits have been given, as of

course, these vary with different aeriels and operators, but on the writer's indoor aerial excellent results have been obtained from all B.B.C. and Continental broadcasting stations with any of the circuits mentioned. One refinement, however, might be added, namely, a suitable base to hold necessary batteries, etc., or a compartment with separate door built into the case itself.

A large capacity condenser of about 1 microfarad should also be placed across the H.T. battery. As the positions of the battery connections do set varies, this cannot be placed across any two terminals in the set itself, so it is best incorporated in the H.T. unit. F. W. O.

THE NEW HIGH-POWER STATION

ALTHOUGH no site for the new high-power station in the Northampton district has yet been decided upon, B.B.C. engineers are planning many improvements based on experience gained at Chelmsford.

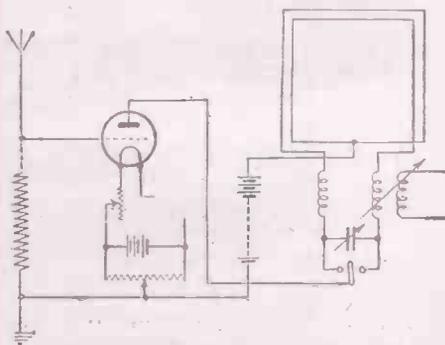
Captain Eckersley has mentioned one such improvement, which is the movement of a single spot of light in a darkened room to show if there is any distortion in the signals being transmitted. The device will be kept in a special copper-shielded room.

It is understood that two aerial masts are proposed, each 500 ft. high.

PROGRESS AND INVENTION

Directional Reception

BOTH an untuned open aerial and a tuned frame aerial are used in a method of directional reception outlined in Patent No. 222,210/24 (N. P. Hinton, of Golders Green, and Metropolitan-Vickers Electrical Co., Ltd., of Westminster).



Directional Reception (222,210/24).

The principle on which the arrangement works is briefly as follows: Both the desired signal and any interfering signal are received on the open aerial in the ordinary way. The frame aerial is tuned

to the wavelength of the undesired signal. By altering the position of the switch and the magnification factor of the valve, the currents produced in both open and frame aerial circuits can be balanced out. It should be noted that only one tuned circuit is used.

If the switch connecting the frame aerial to the valve anode is in the open position, plain frame reception is obtained, the open aerial being entirely cut out. The switch may be moved to one of its operative positions, the brilliancy of the valve filament of the potential of the grid or the resistance in circuit with the open aerial being varied until the signals received by the frame are completely balanced by those received from the open aerial.

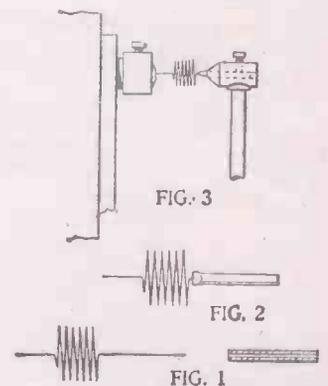
Catwhisker Improvement

ALL crystal users will agree that the average catwhisker is far from being substantial. This fact becomes of particular moment when attempting to clamp a fine wire catwhisker into a holder.

In order to facilitate this operation it is proposed in Patent No. 222,334/24 (W. J. Bowyer, of London, N.W.5) to strengthen

one end of the catwhisker by a metal sleeve. The arrangement is clear from the diagrams. Fig. 1 shows the catwhisker and sleeve separated and Fig. 2 assembled.

It is a simple matter to clamp the com-



Figs. 1 to 3.—Catwhisker Improvement (222,334/24).

paratively thick sleeve in a holder (Fig. 3) and there is practically no limit to the fineness of the catwhisker itself. The sleeve is fixed to the catwhisker by being pinched at each end.



ACCORDING to Captain Eckersley, there is a distinct difference between the view points of British and American listeners. The American looks on wireless as a hobby, but the British listener aims at getting tone and clarity of reception and regards wireless as an entertainment.

It is suggested that it would be beneficial to install loud-speakers in a hall at Bradford for the reception of church services broadcast from London.

Mr. J. K. A. Nicholson, the engineer in charge of 5PY, who has been promoted engineer-in-charge of the Newcastle main station, was recently presented with a suitably inscribed silver cigarette-case by the entire staff.

Chamber music, provided by the Kutchner String Quartet, will be broadcast on November 19.

The third National Radio Exposition at New York was opened through the medium of wireless by Senatore Marconi from London on November 3.

Mrs. Kendal, the great Victorian actress, has arranged to broadcast next month. She has chosen *Granny's Juliet*, by Mr. Herbert Swears, and in this bright one-act play she will "speak" with Lady Trece.

An appeal is being made for funds to supply a set to the Blind and Deaf School, Stoke-on-Trent.

Next month General Ferric (chief of the French Army Wireless Department), in conjunction with other foreign experts, will begin a series of operations for determining the exact size of the earth by wireless. It is stated that the scientists will make numerous measurements, and then wait for several years before making them again in order to determine accurately whether the earth's dimensions have altered during the interval.

A jolly birthday programme is to be broadcast on November 14, at which various members of the B.B.C. staff will have an opportunity of displaying their talents.

Some of the youngsters at a Sheffield elementary school take their own phones to listen-in after lessons or when it is too wet for games.

Much valuable data with regard to long-distance broadcasting is expected to be obtained as the result of the voyage to the Antipodes of the ss. *Orama*. It is expected that on the outward voyage Chelmsford will be received as far as Port Said.

Lord Gainford, chairman of the B.B.C., was at one time Postmaster-General.

Those who were pleased with the recent solo night given from 2LO will be interested to hear that a similar programme will be broadcast on November 20. Mr. George Bernard Shaw will read from his own play, *O'Flasherty, V.C.* This will be S.B. from all stations.

Free to readers of
"Amateur
Wireless"
A Copy of
"The Amateur Mechanic"

Edited by Bernard E. Jones. The contents of this money-saving weekly for handy men are always Practical, Reliable and Straightforward. Week by week it gives just the kind of advice on the thousand and one domestic jobs and hobbies which every handy man or woman needs to ensure the best results from his or her work. Whether you own only a few simple tools or a fully equipped workshop, "The Amateur Mechanic's" weekly help will make all the difference to your pleasure and your success, and will show you how to make and save money by using your spare time profitably.

Send a postcard with your name and address to the Editor, "Amateur Mechanic," Room 97, Cassell's, La Belle Sauvage, E.C.4, and a free copy of this practical weekly will be forwarded to you post free.

By "listening-in" to a total eclipse of the sun, American wireless amateurs are to aid astronomers early in the new year. It is desired to learn whether the shadow path acts as a reflecting mirror to wireless waves.

A bright orchestral programme will be broadcast on the afternoon of November 16. Miss Sybil Maden and Mr. Glyn Eastman, both well known for their concert work, will sing.

Twenty-five pounds has been offered to the Nottingham General Hospital Board for the provision of a valve set for use in the children's section of the institution. An appeal is also being made for funds to provide a four-valve set for the patients in the Whiteabbey Sanatorium.

A Shakespearean night will be given on November 18, and delightful music associated in some way or other with Shakespeare and his plays will be broadcast.

Work has started in the West End of Berlin on the construction of an "Eiffel Tower" for wireless transmission work. The tower will be over 430 ft. high.

Heterodyning, owing to the coincident wavelengths of 2LS and a French station, was the cause of an annoying whistle in the Leeds transmissions recently.

It is interesting to know that there is a possibility of further American transmissions, but so many amateurs can get America fairly well that it is not worth while the B.B.C. relaying the programmes unless they are particularly good.

An amateur at Buenos Aires has succeeded in communicating with Nice on a wavelength of 87 metres and over a distance of 8,750 miles.

Hearing that the world's largest crystal, weighing 137 grams, has been purchased by the British Museum, a correspondent wants to know what kind of catwhisker they will use with it.

The ss. *Plum Branch* reports that on a voyage from South America, and while still in mid-Atlantic, two-way communication was established with Valencia. The daily evening weather reports were received from the Air Ministry for over a week prior to the ship's arrival at Liverpool. Coast stations were read comfortably from 3,000 miles.

A "super-howler" is at work in the London area, who jams all wavelengths up to 450 metres with powerful howls.

Senatore Marconi has returned to London after an absence of about three months, during which time he has been further developing his new beam system. He states that this system will be soon effective for signalling over any distance by day as well as by night.

By the time these lines appear in print the Dundee station will be open.

Despite some objection, the Liverpool Licensing Committee decided to grant a temporary permit for the installation of wireless sets in six licensed premises.

The Post Office authorities are satisfied that nearly everyone using a wireless set has taken out a licence. In September, 1923, 180,000 wireless licences had been issued, and last September the number had increased to 970,000.

It is extraordinary the number of people who do not seem to know that it is possible to get 5XX every night. Chelmsford is still going very strong and can be picked up easily all over the country.

A high-power transmitting station is to be installed at the Sûreté Général (French Scotland Yard), and receivers will be established at all important police stations throughout the country.

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List of Technical Books**

The B.B.C. announces that American Presidential election results were picked up by them at 2 L.O. Many results conveying specific figures were received via K D K A.

Wireless enthusiasts at Belfast are up in arms against the closing of the broadcasting station on Sundays. It is asserted that local "killjoys" are responsible for the ban.

The value of direction-finding apparatus to ships was conclusively demonstrated during the voyage of the ss. *Arca* to the Kara Sea. Wireless bearings showed that unknown currents had set the vessel twenty miles to the northward of her expected position.

The Saturday night travelogue, or "radio-photologue," as it might best be called, has apparently come to stay in the United States, and station WMAQ broadcasts the talk of some noted lecturer or traveller from 8.40 to 9 p.m. every Saturday night. The illustrations for the lectures are printed on the picture page of the *Chicago Daily News* on Saturday morning, so that amateurs can listen to a description of places or events while looking at the pictures of them.

A United States Army aeroplane recently succeeded in broadcasting the voices of the observer and pilot to a land-receiving station while flying at top speed through a heavy rainstorm. The land set

was supplied with a microphone and re-broadcast the message to amateurs all over the country. The two aviators who conducted the experiment flew over Chicago, where the W.G.N. broadcasting station picked up and relayed their messages. The voices could be heard quite clearly above the roar of the motor. The aeroplane sending set had a radius of ninety miles.

The period of fine weather enjoyed throughout most of Europe for the two middle weeks of October are taken as conclusive proofs by expert meteorologists that wireless does not cause bad weather and rain.

MODERN SHIPS' WIRELESS

GONE are the days when ships were fitted with little ¼-kilowatt induction-coil transmitters that could only "cough" hoarsely over ranges of 100 miles or less. Nowadays even the smallest cargo boat is fitted with powerful apparatus that enables its operator to keep in touch with stations hundreds of miles distant.

A cargo vessel being built at Barrow will be equipped with the most modern devices for safety at sea, including Marconi direction-finding equipment and lifeboat apparatus.

The main transmitter is a Marconi 1½-

kilowatt quenched-spark set capable of long-distance working, similar to that carried by the largest vessels afloat. The receiving apparatus, which comprises a valve amplifier with crystal detector, is capable of adjustment for any wavelength now in commercial use up to 2,500 metres.

In addition to the ordinary navigating instruments, the ship will be fitted with Marconi direction-finding equipment, which will enable its position to be plotted reliably in thick fog or under adverse weather conditions which may prevent visual observations.

The vessel being built will be one of the first cargo boats to carry a lifeboat wireless set, which has a quenched-spark transmitter with a range under normal conditions of at least 50 miles. As the receiving apparatus combines the "all-round" and directional principles, the lifeboat, having transmitted its circumstances to all stations in range, can first listen for replies from all directions, and then employ the directional apparatus to concentrate attention on one station only. The lifeboat can thus take a bearing on the answering ship or land station and set her course towards it.

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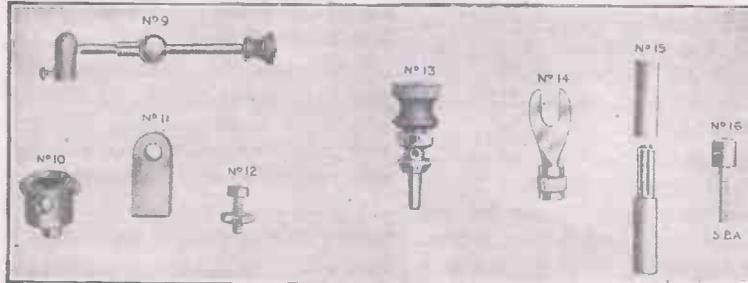
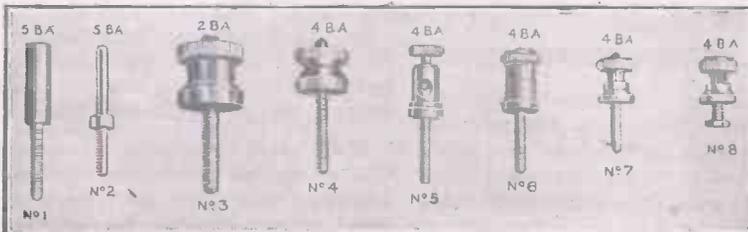
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NOTE.—In the following list of transmissions these abbreviations are observed: con. for concert; lec. for lecture; orch. for orchestral concert; irr. for irregular; m. for metres; and sig. for signal.

GREAT BRITAIN

The times given are according to Greenwich Mean Time.

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

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

Bradford (2LS), 310 m. **Dundee** (2DE), 331 m. **Edinburgh** (2EH), 328 m. **Hull** (6KH), 335 m. **Leeds** (2LS), 346 m. **Liverpool** (6LV), 315 m. **Nottingham** (5NG), 322 m. **Plymouth** (5PY), 335 m. **Sheffield** (6FL), 301 m. **Stoke-on-Trent** (6ST), 306 m. Programmes relayed.

CONTINENT

The times are according to the Continental system; for example, 10-30 is 4-30 p.m., and 08-00 is 8 a.m. (G.M.T.).

AUSTRIA.

Vienna (Ravag), 530 m. (1 kw.). Daily: 08-00, markets; 10-00, time sig., con.; 12-20, weather; 14-30, Stock Ex.; 15-00, time sig., news, con.; 16-15, children (Tue. and Thu.); 18-30, news, weather; 19-00, time sig., con., news; 21-00, dance (Wed.).

BELGIUM.

Brussels (SRB), 265 m. (1½ kw.). 17-00, orch., children (Wed. and Thurs.); dance (Tues. and Sat.); 18-00, news; 20-00, lec., con., news (opera, Mon. and Wed.).

Häeren (BAV), 1,100 m. 13-00, 14-00, 16-50, 18-50, weather.

CZECHO-SLOVAKIA.

Kbely (OKP), 1,150 m. (1 kw.). Weekdays: 09-00, 10-30, 12-30, 16-00 and 17-00, Stock Ex.; 18-15, lec., news, weather, con. (time sig., 19-00), daily; 10-00, con. (Sun.).

Komarov (OKB), 1,800 m. (1 kw.). Weekdays: 13-00, Stock Ex., weather, news; 09-00, con. (Sun.).

DENMARK.

Copenhagen (Kjobenhavns Radiofonistation), 750 m. 19-00, con. (Sun. and Wed.).

Lynby (ONE), 2,400 m. Week-days: 18-20, news and Stock Ex.; 20-00 and 21-00, news, weather and time sig.

Ryvang, 1,025 m. 18-30, Eng. lesson (Wed.); 19-00, con. (Tue. and Fri.).

FRANCE.

Eiffel Tower, 2,650 m. (5 kw.). 06-40, weather (exc. Sun.); 11-00, markets (exc. Sun. and Mon.); 11-15, time sig., weather; 14-45, 15-35, 16-30,* Stock Ex. (exc. Sun. and Mon.); 18-00, con. and news; 19-00, weather; 22-10, weather (exc. Sun.).

* From Nov. 1, on 1st and 15th of each month, at 16-45.

Radio-Paris (SFR), 1,780 m. (10 kw.). Sunday: 12-45, orch.; 13-45, news; 16-45, con.; 20-30, news, con.; 22-00, dance. 12-30, news,

Stock Ex., orch.; 16-30, markets, Stock Ex., con.; 17-45, Stock Ex., news, women's hour; 20-30, lec., news, con.; 22-00, dance (not daily).

L'Ecole Sup. des Postes et Télégraphes (PTT), 458 m. (500 w.). 16-00, lec. (Tues. and Thurs.); 20-30, Eng. conv. and con. (Tues.); 20-30, lec. or con. On 3rd Sun. of each month, organ recital, 20-45.

"**Le Petit Parisien**," 340 m. (500 w.). 21-30, con. (Sun., Tues., Thurs.).

Lyons-la-Doua, 480 m. 10-30, news and con.; 11-30-11-45-12-15, 16-15, Stock Ex.; 20-00, news and con.

Toulouse Aerodrome (MRD), 1,525 m. 09-42, 19-42, weather.

Agén, 335 m. New high-power station testing daily.

Issy-lez-Moulineaux, 1,600 m. Tests.

GERMANY.

Berlin (1), Vox Haus, 430 m. (700 w.); (2), 500 m. (1½ kw.). 09-00, educat. lec. (Sun.); markets; 09-15, news; 10-35, markets*; 11-15, Stock Ex.; 11-55, time sig.; 12-05, news; 13-15, Stock Ex.; 14-00, markets*; 15-00, markets*; 15-30, orch.; 16-00, markets*; 17-45, lec., children (Wed., Sun.); Eng. conv. (Mon.); 18-00, Eng. conv. (Mon.), children (Wed.), lec.; 18-45, lec.; 19-30, con., news, time sig.; 21-30, dance (Thurs. and Sat.). Evening lec. and con. from 18-00 relayed by Berlin (2) on 500 m. * On W.L. 500 m. only.

Berlin (Telefunken Co.), 750 m. (1 kw.). 10-30, con. (almost daily); 19-00, con., tests (irr.).

06-30, 19-40. 2,800 m. (4 kw.): 10-50, con. (Sun.). 3,150 m.: Telegraphen Union, 06-00, 20-00, news. 4,000 m. (10 kw.), Express News

Königswusterhausen (LP), 680 m. (4 kw.). 09-40, con. (Sun.). 2,450 m.: 10-20, con. (irr.). 2,550 m. (5 kw.). Wolff's Buro. Press Service: Service, 06-00, 20-00.

(Continued on page 744)

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BROADCAST TELEPHONY (continued from page 742)

Breslau, 415 m. (1½ kw.). 11.00, sacred con. (Sun.); 10.15, Stock Ex., weather; 11.55, time sig., weather (Sun.); 12.25, time sig., weather, Stock Ex.; 14.00, Berlin news; 15.00, children (Sat. and Sun.); 16.30, orch., lec. (Sun.); 18.30, Esperanto (Mon.); 19.30, con. (Sun.); Eng. conv. (Thurs.); con., lec. (other days).

Frankfort-on-Main, 467 m. (1½ kw.). 07.00, sacred con. (Sun.); 10.10, news; 10.55, time sig. and news; 15.00, con. (Sun.); 15.10, markets; 15.30, orch.; 16.00, children (Sun.); 17.00, lec.; 18.30 lec.; Esperanto (Fri.); 19.00, lec., Eng. conv. (Mon. and Wed.); 19.30, con., opera; 20.30, news, weather; 20.50, tech. lec., women's hour; 21.00, time sig.; con. (irr.).

Hamburg, 387 m. (1½ kw.). Weekdays: 06.25, time sig., news; 11.45, markets; 12.00, time sig.; 13.30, markets; 14.00, news, women, markets; 17.00, con.; 18.00, lec.; 19.00, con. or opera; 21.00, weather, markets, sport; 21.50, news (in English), dance (not daily). Sundays: 07.55, time sig., weather, news, lec., women; 10.15, sacred con.; 11.15, chess; 12.15, con.; 14.30, photo talk; 15.30, children; 16.30, con.; 17.45, English conv.; 19.00, con. or opera; 21.00, on as weekdays.

Königsberg, 460 m. (1½ kw.). 07.10, markets (Wed., Sat.); 08.00 sacred con. (Sun.); 10.15, markets; 10.30, con. (Sun.); 11.55, time sig.; 13.15, news, Stock Ex.; 15.00, markets; 15.30, orch., children (Wed., Fri.); 18.00, lec.; 19.00, con., weather, news; 20.10, dance or con. (irr.).

Leipzig, 452 m. (1½ kw.). 08.00, sacred con. (Sun.); 10.55, markets; 11.58, time sig.; 12.00* and 15.00*, Stock Ex. news; 15.30, con., children (Wed.); 17.00*, markets (exc. Sat.); 18.00, lec., Esperanto (Mon.); 18.30, lec., chess (Wed.); 18.45, Eng. lec. (Tues.); 19.15, lec., con. or opera; 20.30, news; 21.00, dance (Sun.). *Except Sunday.

Munich, 485 m. (1½ kw.). 09.30, sacred con.

(Sun.); 13.00, time sig., news, weather; 15.30, con.; 16.00, children (Wed.); 16.30, Eng. conv. (Mon.); Esperanto (Thurs.); 17.00, markets, news, women's hour (Tues. and Fri.); 17.30 and 18.30, con., lec.; 19.30, con., news, weather, time sig.; 20.00, dance, news, weather, time sig. (Sat.).

Munster, 407 m. (1½ kw.). 06.55, time sig., news; 10.00, sacred con. (Sun.); 11.30, Stock Ex.; 12.00, time sig.; 14.30, markets, news; 15.00, orch.; 18.40, children (Wed. and Sat.), weather, news; 19.15, con. dance (Sat.); 20.15, news. Sun.: 19.00, con., news, dance.

Nuremberg (relay), 340 m. Programme relayed from Munich (q.v.).

Stuttgart, 437 m. (1½ kw.). 10.30, con. (Sun.); 11.00, markets; 15.00, con., time sig., news (Sun.); 15.30, news; 16.30, markets, con., weather, time sig., children (Wed., Sat.), women (Fri.); 17.00, news, time sig. (Sun.); 17.30, weather, time sig.; 18.30, lec. (Mon. and Tues.), Eng. lec. (Fri.); 19.00, lec., con., weather, time sig., news.

HOLLAND.

Amsterdam (P.A.S.), 1,050 m. (200 w.). 19.40, con. (Wed); 20.40, news; 21.10, con. (irr.). (PCFF), 2,125 m.: News and Stock Ex. almost hourly from 07.55 to 16.10.

Ymuiden (PCMM), 1,050 m. 20.10, con. (Sat.).

Hilversum (NSF), 1,050 m. (500 w.). 19.40, con. (Sun.); 20.40, lec. (Fri., irr.); 19.45, children (Mon.).

HUNGARY.

Buda-Pesth (MT1), 950 m. Half-hourly (PTT), 458 m. (500 w.). 16.00, lec. (Tues. and from 06.45, news, Stock Ex.; 10.00, con.; 11.30, news (daily).

ITALY.

Rome (iRO), 422 m. (1½ kw.). 19.30 to 21.30, con.

PORTUGAL.

Lisbon (Aero-Lisboa), 375-410 m. 20.30, tests, music, speech (irr.).

Montesanto (CTV), 2,450 m. (15 kw.). Tests, music (irr.); 13.00 and 23.00, weather.

SPAIN.

Madrid (Radio Iberica), 392 m. (1½ kw.). 19.15, weather, time sig., Stock Ex., con.; 22.45, con., time sig. (23.14); 23.30, con., dance.

Barcelona, 325 m. (100 w.). New station testing. 18.00 and 21.00.

SWEDEN.

Stockholm (TV), 440 m. 10.10, service, relayed (Sun.); 11.35, weather, time sig.; 18.15, con., news.

Stockholm (Radio-Akt), 470 m. 19.10, con., news (exc. Mon., Wed. and Fri.).

Gothenburg, 460 m. 18.10, con. (Tues., Fri. and Sat.). 680 m.: 18.10 (Mon., Wed. and Thurs.).

Boden, 2,500 m. 17.40, con. (Tues. and Fri.); 16.40, con., news (Sun.).

SWITZERLAND.

Geneva (HB1), 1,100 m. (500 w.). 12.15, lec. No Sun. transmissions.

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

Zurich (Höngg), 650 m. (500 w.). 12.00 and 16.00, weather, news, Stock Ex.; 17.15, children (Mon., Wed., Fri.), women's hour (Thurs.); 18.00, weather, news; 19.15, lec., con.; 21.00, news. Sun.: 11.10 and 19.15, con.; 21.00, news.

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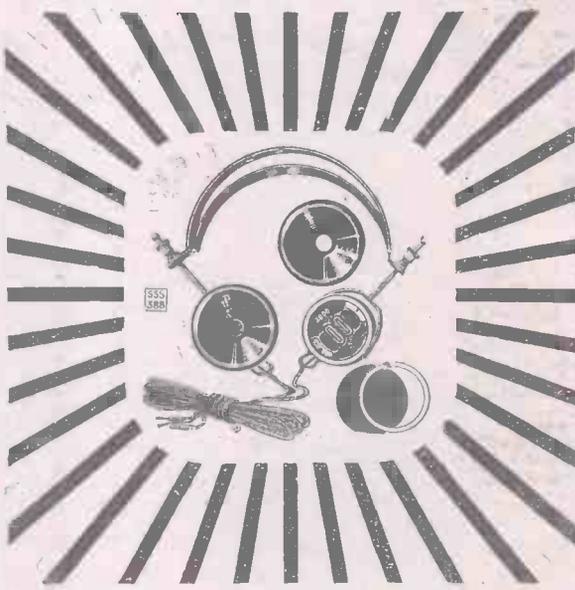
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KNOBS.—2 B.A. bushed 1/4 in. dia., 2d.; 2 B.A., 1d.; 4 B.A. bushed 1 in. dia., 1 1/2d.
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LEADING IN TUBES.—6-in., 8d.; 9-in., 10d.; 12-in., 1/-.
NUTS.—4 B.A., 2d. doz.; 2 B.A., 2d. doz.
NAME TABS.—Circular with hole for fixing under terminal, 1d.; straight type, 1/2d.; strips of 12 names, 6d.; Aerial, Earth and Phones, 1/2d.; Pointers, 1d.
PHONES.—Sketaphones, 16/6; The New T.M.C., 6 ozs., 22/6; Brown's Feather Weight, 25/-; Sterling, 25/-; G.E.C., 25/-; B.T.H., 25/-; Western Electric, 25/-; Claritone, 25/-; Siemens, 25/-; All 4,000 ohms.
SINGLE EAR PHONES.—2,000 ohms, 6/6; 4,000 ohms, 7/6.
PULLEYS.—Aerial, 6d. and 8d.
POTENTIOMETERS.—Special line, 4/6; T.C.B., 5/-; Igranite, 7/-; Lissen, 12/6.
PHONE PLUGS.—G.E.C., 2 pin, 1/8.
ROTORS.—Wood, 2 1/2 in., 1/-; Ebonite, 2 1/2 in., 1/9.
ROTORS AND STATORS.—2 Stators and 1 Rotor, complete set, 3/-.
RESISTANCES (FIXED).—Mullard, 100,000 ohms, 2/6. (Clips for above, 9d. per pair.)
RESISTANCES (VARIABLE).—Woodhall 100,000 ohms, mounted on Ebonite, 2/9; Allen, 50,000 to 100,000, 1/6; Lissen, 50,000 to 100,000, 2/6; Watmel, 50,000 to 100,000, 3/6.
RUBBER PHONE EAR-CAPS.—"Sorbo," per pair, 1/6.

SCALES.—Half circle, 0-180°, 2d.; complete circle, 360°, black or white, 4d.
STAPLES (Insulated).—Per doz., 3d.
STAPLES (Tin).—Per doz., 1d.
SLIDERS AND PLUNGERS, 3d.; G.W. type, very efficient, 8d.
SHELLAC.—Per bottle, 5d., 7d., & 10d.
SWITCHES.—S.P.D.T. Miniature panel mounting, 1/-; D.P.D.T. Miniature for mounting, 1/6.
SWITCHES (EARTH AND AERIAL).—Mounted on Ebonite, S.P.D.T., 1/3 & 1/9; D.P.D.T., 3/3. (Above fitted with Terminals.)
SYSTOFLEX.—Per yard, 4d.
SPRING WASHERS.—(Copper), per doz., 5d.
SWITCHES for Flush Panel mounting, 1/11; Switches, round, (Toggle), 2/-.
SWITCH ARMS.—Best quality, 10d.; second quality, 6d.
TERMINALS.—Small fancy, 1d.; small W.O., 1d.; large W.O., 1 1/2d.; Telephone, 1 1/2d.; Nickelled, 2d. (All above complete with nut and washer.) Red and Black Terminals, per pair, 1/-; Screw Spade Terminals, each, 1d.; screw pins, each, 1d.; "Clix" Terminals, complete, 4d.
TERMINAL TAGS for connecting Aerial Wire to Earth Wire, per pair, 1 1/2d.
TRANSFORMERS (Low Frequency).—General Radio Co., 15/-; Powquip "Bucks" for Reflex Circuits, 12/-; Powquip Shrouded, 18/6; Burndept Cheap Type, 15/-; Lissen T.2, 16/6; Lissen T.3, 25/-; Silvertown, 21/-; Igranite, 21/-; Fuller Shrouded, 22/-; R.1, new type, 25/-; Eureka Concert Grand (the finest transformer made), 30/-; Eureka 2nd stage, 22/6.

TINFOIL.—Per sheet, 4d.
TRANSFERS.—"Easie-fix" Aerial, Earth Phones, per set, 2d.; large sheet of Words and Scales, 9d.
VARIOMETERS.—Small Brown, excellent value, 1/11; L. Variometer, 2/6; L. Variometer with Ball Rotor, 3/6; Ebonite Variometers with Knob, 4/3 4/11 and 5/6. Igranite and Sterling always in stock.
VALVES.—Thorpe K.4 for Unidyne circuit, 17/6; Cossor, B.T.H., Marconi R., Marconi R.5V., Mullard-Ora, Ediswan, Myers, all at 12/6.
DULL EMITTER VALVES.—Marconi D.E.R., 21/-; Ediswan A.R.D.E., 21/-.
VALVES, DULL EMITTER, .06.—Marconi D.E.3, 25/-; B.T.H. B.5, 25/-; Ediswan A.R., 25/-; B.T.H. 6 Volt Power Valve B.4, 35/-; Mullard and F.A.I., 35/-.
VOLT METERS, 0 to 15 Volts, 5/-; double reading, 0-10, 0-100 volts, 12/-.
VALVE HOLDERS.—With 8 nuts and washers, 8d.; 5 Leg Valve Holders for K.4 Valves, 1/3; Valve Holders for Flush Panel Mounting, per set, 8d.; Valve Pins, 1/2d.; Valve Sockets with nut and washer, 1d.; Valve Windows, 6d.
BELL WIRE.—Single, 2 yards, 1 1/2d.; Bell Wire, Twin, per yard, 1d.; Bell Wire, Rubber-covered, for connecting up, per yard, 1d.
WIRES.—Tinned, No. 18 gauge, 3 yards, 2d.; Tinned, Square, 2 ft. lengths, 1 1/2d.; Tinned, No. 18 gauge, for connecting up or for Aerial, 100 ft., 1/6.
DOUBLE COTTON COVERED WIRE.—No. 20, 1/2 lb. Reels, 8 1/2d.; No. 22, 1/2 lb. Reels, 9 1/2d.; No. 24, 1/2 lb. Reels, 10 1/2d.; No. 26, 1/2 lb. Reels, 11 1/2d.; No. 28, 1/2 lb. Reels, 12 1/2d.; No. 30, 1/2 lb. Reels, 14.
WIRE (Rubber-covered).—For Lead-in, Earth, Earth or Aerial, 2d. and 2 1/2d. per yard.

Valves and High Tension Batteries sent through post at purchaser's risk only and are not returnable. Price Lists Free.

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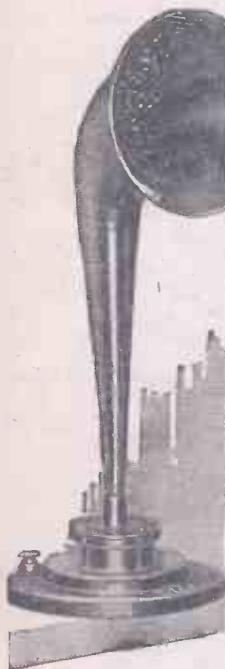
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TrueMusic JUNIOR Loud Speaker.

Before you decide on the Loud-speaker for your Set, see, and listen to a TrueMusic Junior.

Its clear, pure tone is a revelation.

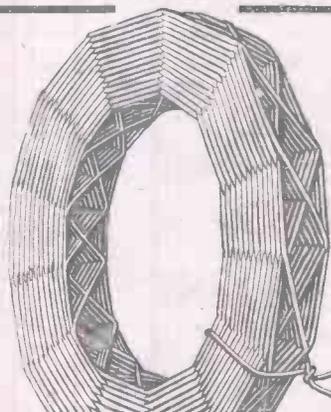
Reproduction of Broadcasting is so faithful, because the metal in the Horn is not stretched or twisted. It is made in one piece of electrolytically deposited copper.

Drop us a Post Card for our Catalogue.

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£2 : 17 : 6

The Telephone Manufacturing Co., Ltd.,
Hollingsworth Works,
West Dulwich, London.

EACH Reactone Inductance Coil is wound by a special process applying a constant tension to the wire. This ensures absolute uniformity of all coils, enabling each to be guaranteed accurate in calibration, and also makes the coil rigid and strong.



Tension Wound Coils

for Sharper Tuning, Louder Signals and Better Reaction

The formation of Reactone Coils, and their heavy gauge wire, ensure extremely sharp tuning and loud signals. Their uniform maximum air-spacing makes self-capacity extremely low (no shellac or wax is used), and their thinness makes very close coupling possible.

Reactone TENSION-WOUND Inductance Coils

are supplied in sets of 5 (Nos. 25, 35, 50, 75 and 100), and each set is boxed. Be sure to see the name "Reactone" No. 150 (Chelmsford), price, 2/6.



Ask your Wireless Dealer. In case of difficulty send P.O. for 4/9, with your Dealer's name and address, to Sole Distributors for U.K.

V. Zeitlin & Sons, 144, Theobalds Road, London, W.C.1.

Phones: Museum 3795, 6841.

Manufactured by Lewis Harforth & Co., London.

WHITE CITY EXHIBITION (continued from p. 733) ing an exceptionally wide wavelength range. Other sets from simple crystal receivers to four-valve cabinet receivers are on view.

Stand 50. Sydney Jones and Co. (London), Ltd., 28, Endell Street, W.C.2.

This firm (wholesale) is exhibiting an extended range of loud-speakers, ebonite, brass work and component parts that will prove worthy of attention.

Stand 51. Refty Electrical Appliances, Ltd., 2, Featherstone Buildings, High Holborn, W.C.1.

The well-known Refty terminals and crystal cups are the chief exhibits on this stand. Sets making use of these time-saving devices will also be on show.

Stand 51A. Radio Improvements, 12-18, London Mews, Maple Street, W.C.

On this stand will be found a full range of Bretwood specialities, grid leaks and anode resistances, and the new Trolite anti-capacity valve holders and switches. An interesting feature is the testing of the efficiency of Bretwood grid leaks by means of a megger and a neon-lamp tester.

Stand 52. M. W. Woods, 15-16, Railway Approach, London Bridge, S.E.1.

Battery chargers for all supply voltages and secondary outputs will be on view on this stand, and all who are not satisfied with their present system of accumulator charging should see these D.C. rotary transformers.

Stand 53. Gran-Goldman Service, 71, Fleet Street, E.C.4.

Of special interest on this stand is the Ulinkin D.C. home battery charger for charging accumulators off existing direct-current supply. Tapped inductances, high- and low-frequency transformers, coil holders and numerous other components are shown.

Stands 54 and 55. Read and Morris, 31, East Castle Street, Oxford Street, W.1.

A comprehensive range of complete sets and accessories will be found on this stand. The Panelstat, a filament rheostat that has been so designed that the space taken up behind the panel is practically nil, is of special interest. Many interesting multi-valve sets will be shown.

Stand 56. Peronet, Ltd., 38, Bloomsbury Square, W.C.1.

One-, two-, three-, four- and five-valve sets will be displayed on this stand. These are worthy of detailed attention, as they embody many refinements.

Stand 57. Abgar Electrics, 39-40, St. Andrew Street, Plymouth.

A comprehensive range of Red-spot sets and components will be on view.

Stand 60. Superlamp, Ltd., 197, Old Street, E.C.2.

Superadio crystals, lightweight phones and the new Songster loud-speaker will be the chief exhibits on this stand. An interesting exhibit is the Superadio experimenter's set of wireless crystals—a selection of detectors that will appeal to every crystal enthusiast.

Stand 61. Energo Products, 2, Oliver's Yard, City Road, E.C.1.

Low-frequency transformers, low-capacity tuning coils and plug-in H.F. transformers are the chief exhibits on this stand. The Energo one-valve low-frequency amplifier, embodying the well-known Energo L.F. transformer, is of special interest.

Stands 76 and 77. Peter Curtis and Co., 75, Camden Road, N.W.1.

A feature of special interest on this stand will be the new Duodyne receiver of long-distance efficiency, and having the ability to cut out local stations. Paragon ebonite, sheet, rod, tube, and components will also be shown.

Stand 78. Watergate Press, Ltd., 19, Surrey Street, W.C.2.

THE B.B.C. AND WOUNDED SOLDIERS

ON November 23 the B.B.C. aunts and uncles will show their real worth as entertainers, for on that day they will act as hosts (but not by wireless) to over 600 wounded soldiers at a matinee at the Palladium. Each of the fourteen private boxes available will accommodate a party of soldiers under the "charge" of an aunt or uncle.

This entertainment is run by the Adair Wounded Fund, which is urgently in need of money to meet expenses incurred in connection with such Sunday afternoon concerts and teas. Twice a year (November 23 on this occasion) it is possible to admit the public to these entertainments, and seats can be booked at 5s. 9d., 3s. 6d., 2s. 4d. and 1s. 10d. Further particulars can be obtained from the hon. secretary of the Fund, Mr. Basil F. Leakey, at Somerset House, New Barnet.

The occasion is one of interest to all wireless enthusiasts, and it is to be hoped that many readers of AMATEUR WIRELESS will give it their support. Wireless sets are needed by many hospitals, and here again is a chance for the amateur to help.

An important broadcasting station is being built in Kowno, Lithuania, equipped with continuous-wave generators. The station will operate on 1,200 metres.



The Introduction of the



LOUD SPEAKER

marks a definite step forward to the perfection of wireless listening-in. Not only do

You hear the Musician himself

but when vocal music is broadcasted, the consonants "l," "s," and "r," are reproduced with absolute clarity. You who already have Loud Speakers—note how these letters sound on *your* instrument, and then arrange to hear a C.A.V. The result will be a pleasant surprise! Don't spoil a good set with an inferior Loud Speaker—have one that will do justice to the excellent programmes now being broadcasted.

120 ohms £4-15-0
2,000 ohms £5-0-0
4,000 ohms £5-10-0

Write for illustrated folder of
C. A. V. Wireless Productions.

C.A. Vandervell & Co., Ltd.
ACTON VALE, LONDON, W.3

C. A. V. Junior
£2-15-0
C.A.V. Tom Tit
£1-10-0



J.H.W.

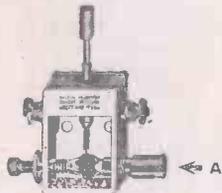
"BELLING-LEE" RADIO REFINEMENTS

INDICATING TERMINALS



Pat. No. 5807/24
16 different engravings.
3½d. ... Brass.
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ROTATING DETECTOR



Pat. No. 5808/24
Knob "A" rotates the crystal.
Price 3/9 each.
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SELF-SHORTING PLUG-IN SOCKET



Pat. No. 19423/24
Brass 6d. per set.
N. P. 8d. per set.

VARIOMETERS



Wood Rotor, Fibre Stator.
4/- ea. cotton wound
4/6 " silk "

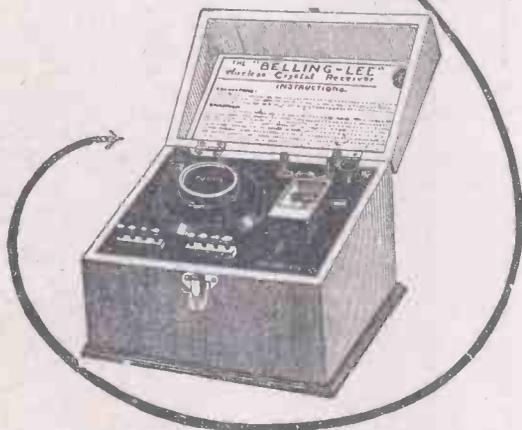
INDICATING KNOBS



16 engravings. Price 4½d ea.

Built to take 4 pairs of phones. Piano-finish mahogany cabinets.

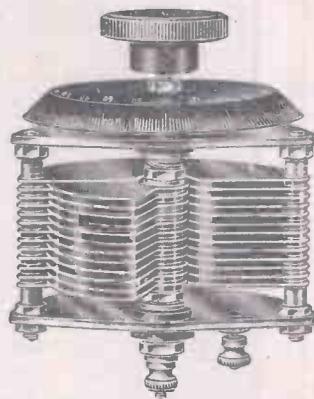
Price **25/-** each.



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Ask your dealer, and if he doesn't stock, write direct to
BELLING & LEE, LTD.,
Queensway Works, Ponder's End.

LISTOLEON VARIABLE CONDENSERS

BEST QUALITY
LOW PRICE
GOOD DELIVERIES



Capacity	With vernier
.001 ... 8/-	9/6
.00075 ... 7/-	8/9
.0005 ... 6/-	7/6
.0003 ... 5/6	7/-
.00025 ... 5/-	6/6
.0002 ... 5/-	
.0001 ... 4/6	
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THE "BIG BEN" OF L.F. TRANSFORMERS IT WON'T BREAK DOWN

Why it is 30/-

The LISTOLEON Transformer is of such quality and perfection that we are able to guarantee it for a period of two years.

We can prove to you that reception when using the LISTOLEON Transformer is free from distortion, enormous in volume, and always to be relied upon.

Will give real tone to any LOUD SPEAKER



Because :

The coil is wound by specialists of 25 years' experience and contains almost twice as much wire as any other competitive transformer sold at 25/-.

The gauge of wire used is such that a current of 20 milli-amps can be safely carried continuously. The LISTOLEON Transformer is therefore eminently suitable for use in conjunction with the biggest types of Power Valves used for broadcast reception.

The LISTOLEON Transformer measures 3½ in. long by 2½ in. over terminals, is 3 in. high, and weighs 2 lbs. The stampings are best Stalloy, dull blacked, and nickel-plated terminals and straps are fitted.

The LISTOLEON Transformer will free your reception from all harshness, whistling noises, and that raucous metallic medley of sound usually associated with loud-speaker reproduction.

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Telephone: Regent 4592

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Telegrams: "Radpholim, Rand, London."



Pleated-paper Loud-speaker

SIR,—Referring to the article with the above title in No. 125, I have just completed making a loud-speaker and am more than pleased with the results it gives.

There is no "noisy background," and it is audible all over the house, which is quite an ordinary seven-roomed one. I found it quite easy to make, and the only part where particular attention is required is in folding the diaphragm.—A. G. A. (London, S.E.).

Heterodyne Wavemeter

SIR,—I was interested to read the article on making a heterodyne wavemeter in No. 126, as I made a somewhat similar meter some eighteen months ago which I have found invaluable.

I should like to warn your readers that the graphs obtained will be approximately straight lines only if a Polar condenser or a "square-law" condenser is used for tuning, though even with an ordinary tun-

ing condenser straight-line graphs will be obtained if logarithmic paper be used instead of ordinary "squared" paper.

I should like to suggest that it is not very satisfactory to calibrate by using broadcasting stations as standards, as very few of them actually operate on their nominal wavelengths. For instance, 2 LO is, or was, actually 357½ metres instead of 365. It is far better to use the harmonic method recently described by Thermion and use one of the standard calibration signals sent out daily by the Air Ministry.—V. G. P. W. (High Wycombe).

Accumulator Trouble

SIR,—Our attention has been drawn to the reply given on your "Information Bureau" page of No. 124 to the query re "trouble with accumulators."

We very much appreciate the practical manner in which the queries are dealt with in this section, and it is with no desire

to criticise that we write to point out a slight inaccuracy in the reply. It is stated that the specific gravity of the electrolyte "when fully charged should be 1.22 (sometimes written 1.20)"; in most portable cells the acid has a specific gravity of 1.250.

Unless it can be seen that the sediment is short-circuiting the plates, we would hesitate to recommend that the acid be drawn off and replaced with fresh acid, because the cause of the trouble might be sulphation of the plates, and changing the acid would only aggravate the trouble.—THE CHLORIDE ELECTRICAL STORAGE CO., LTD. (Manchester).

Reception of New Zealand

SIR,—With reference to recent announcements of the reception of New Zealand amateurs, the following information of G 5 N N's work may be of interest to you.

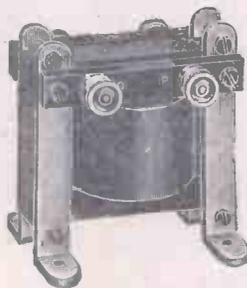
Z 4 A A, Z 4 A G, Z 4 A K were first heard at 5 N N on Monday, October 20, at 6.42 a.m. Constant reception, often with phones on the table, has been carried out on each succeeding morning to date. On Sunday, October 26, Z 4 A A reported G 5 N N QSA. Two-way working was not established owing to sunrise. On Thursday, October 30, Z 4 A Q called G 5 N N and reported signals very QSA with slight QSS. Signals readable all the period that they were audible.

Transmitter at G 5 N N consists of

(Continued on page 750)

Blame your Transformer—if it isn't a Woodhall

If your Loud Speaker says "Burragurrumph!" don't blame the announcer or the loud-speaker—if the soprano shrieks, don't blame the singer or wireless. Think first of your Transformer.



Cheap Transformers may amplify, but they will not reproduce. "One-to-Five" implies nothing except a doubtful "step-up."

In the "Woodhall No. 4" you have, with only a 1.2:8 ratio, a wonderfully faithful "tone," that is due to correct proportioning of impedance, uniform

amplification, plenty of wire, heavy core, and a unique method of winding.

That method is the use of SILK, simultaneously wound with the wire—a method used in no other Transformer. It is costly, but remarkably efficient.

The "Woodhall No. 1" is sold by all Wireless Dealers, who can obtain supplies through their usual Factors. Sole Distributors:

PRESSLAND ELECTRIC SUPPLIES LTD., HAMPTON-ON-THAMES.

The Woodhall-Wireless Manfg. Co., Ltd.



OPEN THIS WEEK

THE SHOW FOR ALL CONSTRUCTORS

Signals unheard
with TEN other
headphones—
perfectly audible
with this super
head-set



Bechstein

"Headphones that Amplify"

This is a notable result of tests carried out on a one-valve reaction set with no amplification.

American Stations WGY and KDKA, also Canadian amateurs and most European Stations, have been consistently received with a singular absence of distortion.

Bechsteins are almost the equivalent of a valve amplifier when used in conjunction with a crystal set, the range of which is increased by roughly ten miles.

With a one-valve set, employing no amplification, the range covers

a vastly increased radius over which formerly no signals have been logged.

Get what you are missing—and improve what you are getting in wireless, by insisting on the "Headphones that Amplify." Bechsteins are the last word in comfort, and every pair is guaranteed.

Further particulars are given in an illustrated folder on request.

If your local dealer does not stock Bechsteins, write direct giving his name and address to:—



5,000 OHMS

FOLDER ON
REQUEST

25/-

Bechstein

RADIO COMPANY
4, CANAL ROAD, BRADFORD, YORKS.

WHOLESALE DISTRIBUTORS:—Liverpool: H. Kniveton, Norman Road, Runcorn, Chesh. London: Penton Engineering Co., 15, Cromer Street, King's Cross, W.C.1. Manchester: Accelero Co., 7, Liverpool Road. Leeds: Radio Productions, Ltd., 107, Portland Crescent. Sheffield: Sheffield Wholesale Motor Supplies, 43, Carver Street. Glasgow: London Radio Stores, 11, Bath Street. Nottingham: Super Radio Co., 32, Parliament Street.

CORRESPONDENCE (continued from page 748)

Meissner circuit; full-wave rectification with MT₁ valves; oscillator, two T₂₅₀ valves in parallel; input, 200 watts; radiation 1.85 amps. on 97 m.; aerial, 56 ft. high, six-wire cage; six-wire counterpoise 12 ft. above ground; receiver, Burndept Ultra III. using detector (DEQ) and one L.F. (DE₅) only. Reception when working New Zealand amateurs always carried out without aerial to avoid atmospheric. — J. H. D. R. (London, S.E.).

Other Correspondence Summarised

P. B. R. (Scarborough) has received Hull, Newcastle, Leeds, Bournemouth, Chelmsford, Aberdeen, Radio-Paris, Eiffel Tower and many German stations on his one-valve ultra-audio set, built from instructions given in No. 120.

H. F. (Leicestershire), referring to his letter in No. 124, states that the station, amongst others, which he received was KGO and not KGI.

C. V. B. (Fenton) wishes to know the identity of the foreign station which transmitted *Il Bacio* about midnight on October 21.

E. C. W. (London) would like to know which Continental station transmitted music which sounded like a combination of guitars or string instruments, followed by, presumably, a news bulletin and items by a tenor and soprano, between 10.40 p.m. and 12.15 p.m. on October 14. The station

was working on a wavelength between 400 and 425 metres.

E. C. T. O. (Shepperton-on-Thames) wishes to know the identities of four stations, particulars of which are here given. On October 19, at 8.2 p.m., a foreign station broadcast string orchestral music on a wavelength of 425 metres, and at 11 p.m. gramophone records, on a wavelength of 490 metres, were received, presumably from a French amateur. On October 20, at 7.45 p.m., the "Soldiers' Chorus" from *Faust* was broadcast on a wavelength of 545 metres, and at 8.50 p.m. a lady's song, presumably from Copenhagen, was received on a wavelength of 508 metres.

T. B. (London, N.W.10) states that he has received all the B.B.C. stations at good phone strength, five French stations and WGY on his one-valve Flewelling receiver made from instructions given in No. 113.

G. G. L. (Cambridge) has received six American stations, ten Continental stations and all the English stations, except Plymouth and Edinburgh, on his four-valve set.

D. T. F. (London, W.14) would like to know the identity of the foreign station which transmitted on a wavelength of 420 metres on October 20. The word "Antonio" was repeated several times.

W. S. H. (Cheshire) has received seven B.B.C. stations, two French ones and

Radio Iberica on his ultra-audio one-valve set made from instructions given in No. 120.

T. B. G. (Liverpool), referring to the article "A Great Evening with WGY" in No. 126, states that he received that station until it closed at 5 a.m., English time, on October 18.

AMERICAN ELECTION RESULTS

FOR some weeks B.B.C. engineers have been making Transatlantic tests, and on November 4 and 5 picked up the American election results, which were broadcast from KDKA, while they were experimenting on short waves.

KDKA started tuning-up at 11 p.m. and transmitted its normal programme from 11.30 p.m. until 12.45 a.m.

They started to give election results at 12.55 a.m., and during the intervals, while waiting for further results to come in, they transmitted musical items which were of a standard higher than those in their usual programmes.

All the election results, after being given in English, were repeated in Spanish for the benefit of South American listeners.

Reception was very distorted and unsatisfactory until 1.30 a.m. Atmospherics were also severe before that time, but reception became very clear later.

PHONE 4857

INGERSOLL WIRELESS Co. Ltd.,

PHONE 4857

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TRADE NOTES

Pleated-paper Loud-speaker

GR^{EAT} interest has been taken in the article "Making a Pleated-paper Loud-speaker" that appeared in *AMATEUR WIRELESS*, No. 125. The greatest difficulty in constructing one of these is to get just the right kind of paper, but the vegetable parchment made by J. Halden and Co., Limited, of 8, Albert Square, Manchester, seems to be the ideal substance.

I understand that this firm is willing to supply parchment paper in sheets of a suitable size from their London branch at 15 and 17, Broadway, Westminster, S.W.1.

Reactone Tuning Coils

W^{OUND} by a special process under constant tension, Reactone inductance coils are of special interest to every amateur. By an oversight, however, these coils were called Selectone in the advertisement that appeared on p. 701 of our last issue; for this Reactone should be read in every case.

The distributors of Reactone coils are V. Zeitlin and Sons, of 144, Theobalds Road, W.C.1. A set of five coils costs only 4s. 6d.

Neat Crystal Set

I^N an early issue I hope to give the results of a test of the neat crystal set made by Belling and Lee, Limited, of

Queensway Works, Ponders End, Middlesex, which is sold at 25s. The detector is particularly ingenious, being totally enclosed yet easily accessible. Provision is made for rotating the crystal without disturbing the cover of the detector.

VANGUARD.

SOMETHING TO WRITE FOR

A **REVISED** accessory list and folder dealing with the Sparta crystal set have been sent us by Fuller's United Electrical Works, Ltd., of Chadwell Heath, Essex.

Particulars of the Phillips rectifier for charging accumulators are given in a folder issued by A. de Jong, of 58, Southwark Street, S.E.1.

Two publications received from Siemens Brothers and Co., Ltd., of Woolwich, S.E.18, deal with ebonite products and wireless component parts.

Copies of their home-edition and transmitting catalogues have been received from Burndep, Ltd., of Aldine House, Bedford Street, Strand, W.C.2.

An illustrated catalogue and brochure describing Atlas specialities have been sent by H. Clarke and Co. (Manchester), Ltd., of Eastnor Street, Old Trafford, Manchester.

Useful hints on the choice and upkeep of Exide batteries are given in a new list issued by the Chloride Electrical Storage

Co., Ltd., of Clifton Junction, nr. Manchester. A study of this booklet will well repay users of accumulators and readers of "A.W." are advised to send for one, mentioning "A.W."

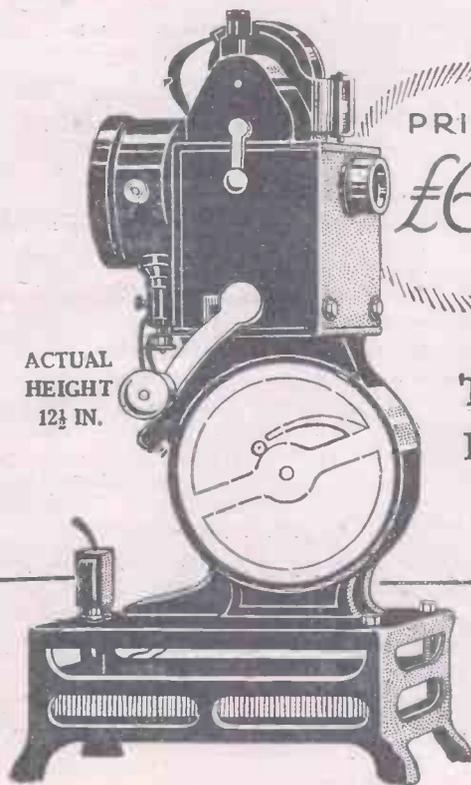
LISTENING TO CANADA BEFORE BREAKFAST

A **MATEURS** will be interested to learn that the *Daily Express* has made arrangements with the broadcasting station CKAC, of the *La Presse* newspaper of Montreal, to transmit a special concert on November 19.

The powerful transmitting apparatus at the *La Presse* station will be trebled in power in order that listeners on even small valve sets may be able to pick up the programme. Transmission will be timed for reception this side of the Atlantic at about 5.30 a.m., an hour which it is estimated will be more convenient to the majority of listeners than the ordinary American "three o'clock in the morning" signal.

This concert will mark a memorable event in the wireless history of the Empire, as never before has a special transmission been arranged between an overseas Dominion and the home country.

"**Experimental Transmission.**"—Owing to the demands upon our space we regret that we have been obliged to hold over this week's instalment of the series of articles on experimental transmission.



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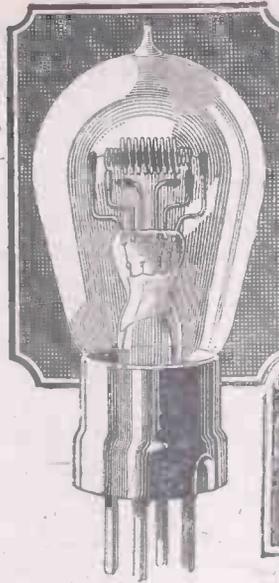
PROOF—

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The outlay required is only ten shillings.

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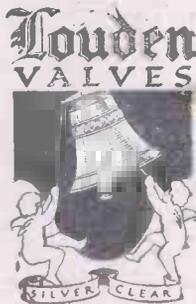
Only one of its good qualities is the saving which it will effect in your accumulator bill.

The current consumption of the Louden Valve is exceptionally low (0.4 ampere), whereas that of the ordinary bright filament valve is almost double this figure.

Satisfied users of Louden Valves report that "their accumulators now last twice as long," that the journeys to the charging station are now halved, as also is the accumulator bill.

If this were the only advantage which the Louden Valve possessed over others it would alone be sufficient to recommend it, but when you consider that in addition it gives a reproduction startling in its silver clarity, that it gives the same volume as valves costing considerably more, and that the life of the filament is greatly prolonged by the absence of "bombardment" you will agree that in fairness to your purse you should fit your set with Louden Valves at the earliest possible date.

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CKAC

THE well-known Montreal broadcasting station, owned by the newspaper *La Presse*, is now transmitting regular concert programmes on 425 metres with an energy of 7½ kilowatts. Following are the times of transmission:

Daily, 21.00 G.M.T., Stock Exchange, weather; 18.45 G.M.T., orchestra (Monday, Wednesday, Friday); 24.00, children's corner (in both English and French) (Tuesday, Thursday, Saturday); 00.30, orchestra (Wednesday, Friday); 01.30, orchestra (Sunday); 03.30, dance (Sunday). On first and third Thursdays of each month, concert at 05.00 G.M.T.

J. G. A.

A NEW FRENCH STATION

SENATOR PAUL DUPUY, whose newspaper *Le Petit Parisien* broadcasts a programme on a wavelength of 340 metres each evening which is listened to with pleasure in England and in France, has just opened another broadcasting station. It is the first station erected on a high mountain, being at the Pyrenean Observatory at the top of the Pic du Midi.

The station will be used principally for helping agriculturists by broadcasting weather forecasts. Reports that the new station was heard in Central France on a crystal set indicate its success. In his inaugural address M. Dupuy said that as the station was the highest in the world,

the investigation of many wireless phenomena, such as fading and the effect of rarefied atmosphere on the propagation of sound, would be possible. A temporary aerial is at present in use, the permanent aerial not having yet been hauled up the mountain top, which is 9,350 ft. above sea level.

"House Repairs" is the title of a series of articles beginning in the current issue of "The Amateur Mechanic and Work" (3d.), and the subject dealt with is "Renewing Sash Lines." Another useful article gives instructions on carving a device on linoleum in such a manner that when this is inked and impressed on paper, a print or impression of the design is left. Other articles appearing in the same number are "Renovating a Bath"; "How I Built My Bungalow"; "Motor-cycling Practicalities"; "A Winder for Basket and Honeycomb Coils"; "The Insulation of Component Parts"; "Notes by the Way"; "Working in Vulcanite"; "An Easily-made Electric Torch"; "Sharpening a Razor"; "Brass and Where It Should Be Used"; "Our Small Car Page"; "Fishing for Grayling: The Tackle and Lines"; "Don'ts for the Amateur Mechanic."

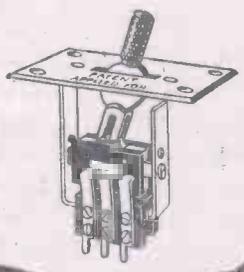
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- W J Z, 455 metres.—Radio Corporation of America, New York City.
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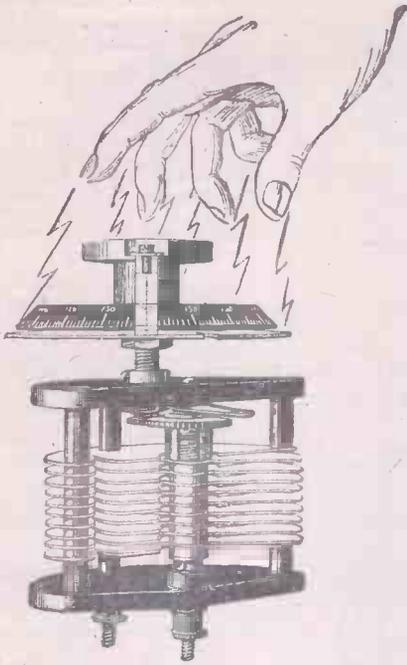
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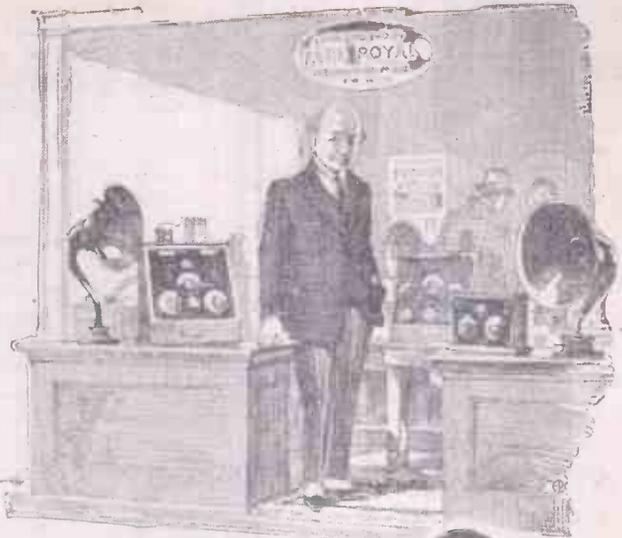
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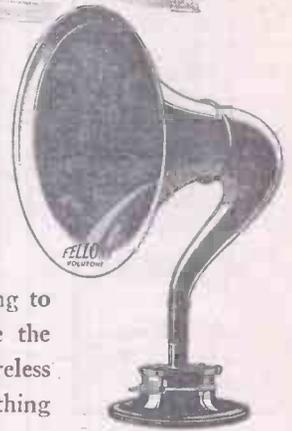
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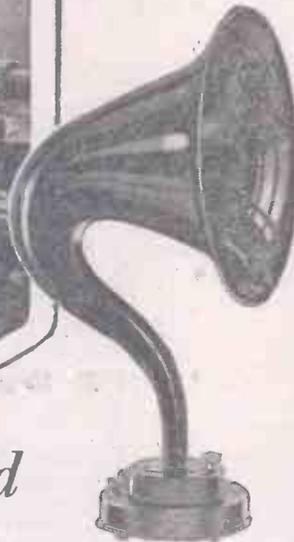


Illustration shows aluminium cases for the H2 type Loud Speaker being machined

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THE high reputation enjoyed by all BROWN Wireless products—not only in this Country but throughout Europe and the Colonies—was not built up in a day. It is the result of an increasing effort to produce apparatus as near electrical and mechanical perfection as possible.

Take for example the BROWN Loud Speaker. Few can realise the immense number of processes necessary before the Instrument reaches its final tests. Even when the Loud Speaker arrives at the Testing Department it is by no means certain that its tonal purity and volume will reach the high standard of efficiency which has been so deliberately set.

No Loud Speaker is ever released for issue until S. G. Brown, Ltd., are satisfied that it

will uphold their reputation as builders of the finest Loud Speakers on the market.

Naturally, to produce such instruments requires sensitive and accurate machinery and workers possessing experience above the ordinary. Although there is such a tremendous demand for BROWN Loud Speakers because the wireless public has realised that its exclusive tuned reed principle must give more faithful reproduction, yet the policy of S. G. Brown, Ltd., is such that every instrument receives individual care from commencement to finish.

It is worth remembering that the very first Loud Speaker for Wireless use was manufactured by S. G. Brown, Ltd.—even the words "Loud Speaker" were evolved by them—obviously such greater experience must have its effect upon ultimate results.

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CHIEF EVENTS OF THE WEEK

SUNDAY (November 16)

London	2.30	"Noises" from the Zoo. (S.B. to all Stations).
	8.15	Service relayed from the Royal Albert Hall.
Birmingham	9.0	Chamber Music and Songs.
Bournemouth	3.0	Squire's Celeste Octet.
Glasgow	3.0	Organ Recital.
Glasgow	9.0	Cedric Sharp (violin) and Herbert Thorpe (tenor).

MONDAY

ALL STATIONS	7.30	"Song, Story and Episode," including "Gipsy Life."
(Except Bournemouth and Belfast.)		
Bournemouth	8.0	Municipal Orchestra Night.
Belfast	7.30	"Mainly Mendelssohn."

TUESDAY

London	7.30	Shakespearean Night, including Songs by John Coates.
Bournemouth	7.30	Dramatic Night.
Cardiff	7.30	An Evening with Mozart.
Manchester	7.30	Novelties and a Play.
Newcastle	7.30	Mozart Concert.
Newcastle	9.40	A Drama.
Glasgow	9.0	The Scottish Orchestra. (S.B. to Aberdeen, Edinburgh, and Dundee).
Belfast	7.30	Irish Night.

WEDNESDAY

London	7.30	Chamber Music Evening.
Birmingham	7.30	Operatic Night—Cavalleria Rusticana.
Bournemouth	7.30	"Other Nations—No. 5." Bournemouth calling Scandinavia.
Cardiff	7.30	Musical Comedy Night.
Manchester	7.30	A Musical Bouquet.
Newcastle	7.30	William Murdoch (solo pianoforte).
Glasgow	8.0	Bach Chamber Concert. (S.B. to Aberdeen.)

THURSDAY

London	7.30	Orchestral Solo Night. (S.B. to other stations.)
	8.30	George Bernard Shaw. (S.B. to all stations except Belfast.)
Manchester	7.35	An Hour of Humour and Song.

FRIDAY

London	7.30	Comic Opera and Musical Comedy.
Bournemouth	8.15	Rotary Dinner—Ladies' Night. Relayed from Grand Hotel.
Manchester	7.30	A Night with Russian Composers. William Murdoch (solo pianoforte).
Newcastle	7.30	Dido and Aeneas (Henry Purcell).
Glasgow	7.30	Clan Night. No. 1—Clan MacLean.
Belfast	7.30	Grand Opera and some British Music.

SATURDAY

Birmingham	7.30	David Garrick (comedy).
Bournemouth	7.30	Musical Comedy Favourites—Old and New.
Cardiff	7.30	An Hour of Instrumental Music.
Aberdeen	7.30	Grand Opera in Miniature—Tannhauser.

ANNOUNCEMENTS

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

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

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

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

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



Clapham Park Wireless and Scientific Society
Hon. Sec.—MR. H. C. EXELL, 41, Cautley Avenue, S.W.4.

ON October 22 Prof. W. Wilson gave a lecture on "The Scientific Work of Clerk Maxwell." On October 29 Messrs. McWilliam and Shirley, representing the British Ebonite Co., gave an account of the manufacture and properties of ebonite.

Lewisham and Catford Radio Society
Hon. Sec.—MR. C. E. TYNAN, 62, Ringstead Road, Catford, S.E.6.

A MEETING was held on October 30 when a lecture and demonstration were given.

Alburgh Amateur Radio Association
Hon. Sec.—MR. R. A. MATTHEWS, 35, Lyttelton Road, Alburgh, Liverpool.

THE opening meeting of the above society was held at the above address on October 30, when the secretary demonstrated his "Superbion" single-valve receiver. All communications should be addressed to the secretary, excepting applications for membership, which should be addressed to R. McMeakin, 14, Rimmington Road, Alburgh, Liverpool.

North Middlesex Wireless Club
Hon. Sec.—MR. H. A. GREEN, 100, Pellatt Grove, Wood Green, N.22.

AN informal meeting was held on October 29 at Shaftesbury Hall, Bowes Park, N., when there was a good attendance of members.

Coventry and District Co-operative Radio Society
Hon. Sec.—MR. A. CURTIS, West Orchard, Coventry.
 ON October 29 the society held a "junk" sale, when a good assortment of components and other useful materials were offered to buyers. Tickets may now be obtained for the society's first social event—a dinner and concert on December 17.

Caterham and District Wireless Society
Hon. Sec.—MR. J. W. DAVIES, Doddington, Caterham Valley, Surrey.

IT is proposed to form a wireless society in the above district, and a preliminary meeting will be held in the Parish Hall, Caterham Valley, on November 18 at 8 p.m.

Tottenham Wireless Society
Hon. Sec.—MR. A. G. TUCKER, 42, Drayton Road, Tottenham.

ON October 29 Mr. Usher gave the first of his series of elementary lectures on "Magnetism and Electricity." An interesting discussion followed.

Economic Electric Extension.—A large extension of the works of the Economic Electric, Ltd., 10, Fitzroy Square, W.1, has been the cause of a slight delay in the delivery of Dextraudion valves. We are sure our readers will not mind the temporary slight inconvenience. It should be noted that the firm is still in a position to execute all orders for the "Xtraudion" general-purpose and H.F. valves.

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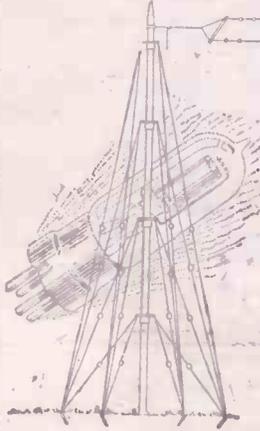
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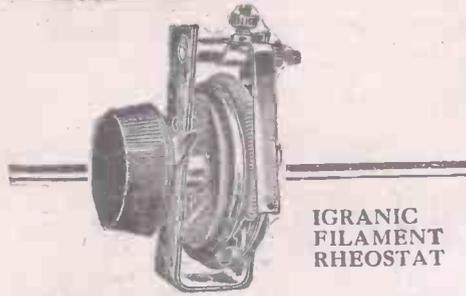
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THE MASTER VALVE

Obtainable from all electricians, wireless dealers, etc., etc.
Advert.—The Mullard Radio Valve Co., Ltd. (A.W.), Nightingale Works, Balham. S.W.12.

AN IMPROVEMENT ON THE SQUARE LAW CONDENSER?



SQUARE law condenser is a condenser which for a given movement along its scale always gives the same alteration of wavelength with a given inductance. That is to say, if one movement of the pointer or dial of a square law condenser through, say, 10 degrees gives an alteration in wavelength of, say, 100 metres, every other movement along the scale will give a *pro rata* alteration.

Although for laboratory work a square law condenser is necessary, for ordinary tuning work it has its disadvantages. For instance, it would be impossible satisfactorily to use a .001 square law condenser in a short wave receiver for broadcasting, as such a receiver would be most difficult to tune—it would be far too critical. On the higher wavelengths the .001 square law condenser could be used without difficulty, because tuning on the higher wavelengths is much less critical than on the lower band, and much easier.

If a square law condenser is used for short wave work it should not exceed .0002 capacity. It would be found critical enough even with this capacity. But .0002 capacity is not nearly high enough for an ordinary receiver, as it does not provide sufficient capacity for working on the higher wavelengths.

It can be said, therefore, that a .0002 square law condenser cannot be used at all on the higher wavelength range, and that a .0005 or .001 square law condenser cannot properly be used on short wave work—certainly not .001.

If, therefore, a condenser can be obtained which has almost the accurate characteristics of a square law condenser but is easier to tune with, provides a negligible minimum capacity at one extreme of the scale while at the other end it provides a high

maximum capacity, a condenser has been found which for ordinary tuning work (outside a laboratory) is a great improvement on any square law condenser.

There is now such a condenser available. On short wavelengths its characteristics make tuning much nicer and easier than even a .0002 square law condenser—it has a more open scale. The effect of this is to make tuning, especially long distance tuning, much easier on short wave work than any square law condenser possibly can be, and incomparably better than a square law condenser of higher than .0002 capacity. This condenser also possesses the advantage that despite its negligible minimum capacity it also possesses a high maximum capacity, which is always necessary for tuning on the higher wavelengths. With this condenser a receiver is equipped for much nicer tuning, better long distance tuning, much more flexible tuning than is possible with any square law condenser. Its pointer makes two revolutions—when small changes of capacity are required, you work on the first revolution, and on the second revolution when more critical changes of capacity are necessary—**WITH ONE KNOB CONTROL.**

This condenser is the new LISSEN MARK 2 MICA VARIABLE CONDENSER—and it is worth its price of 17s. 6d

Negligible min. capacity.

Maximum rated at .001 (actually much higher). Lissen One-hole Fixing, of course.

With this condenser and LISSENAGON coils, a receiver is fitted with the best tuning combination it is possible to have. Ask for them if you are out for ease and distance.

Advertisement of Lissen Limited, 16-20, Woodger Road, Shepherd's Bush, London, W.12.