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Amateur Wireless

SIXTY 3^d.
PAGES

and
Radiovision

Vol. XIII. No. 332

Saturday, October 20, 1928

THE CHAPMAN-REINARTZ TWO
 FREE SUPPLEMENT PRESENTED WITH "AMATEUR WIRELESS," OCTOBER 20, 1928

BLUEPRINT No. A.W. 148

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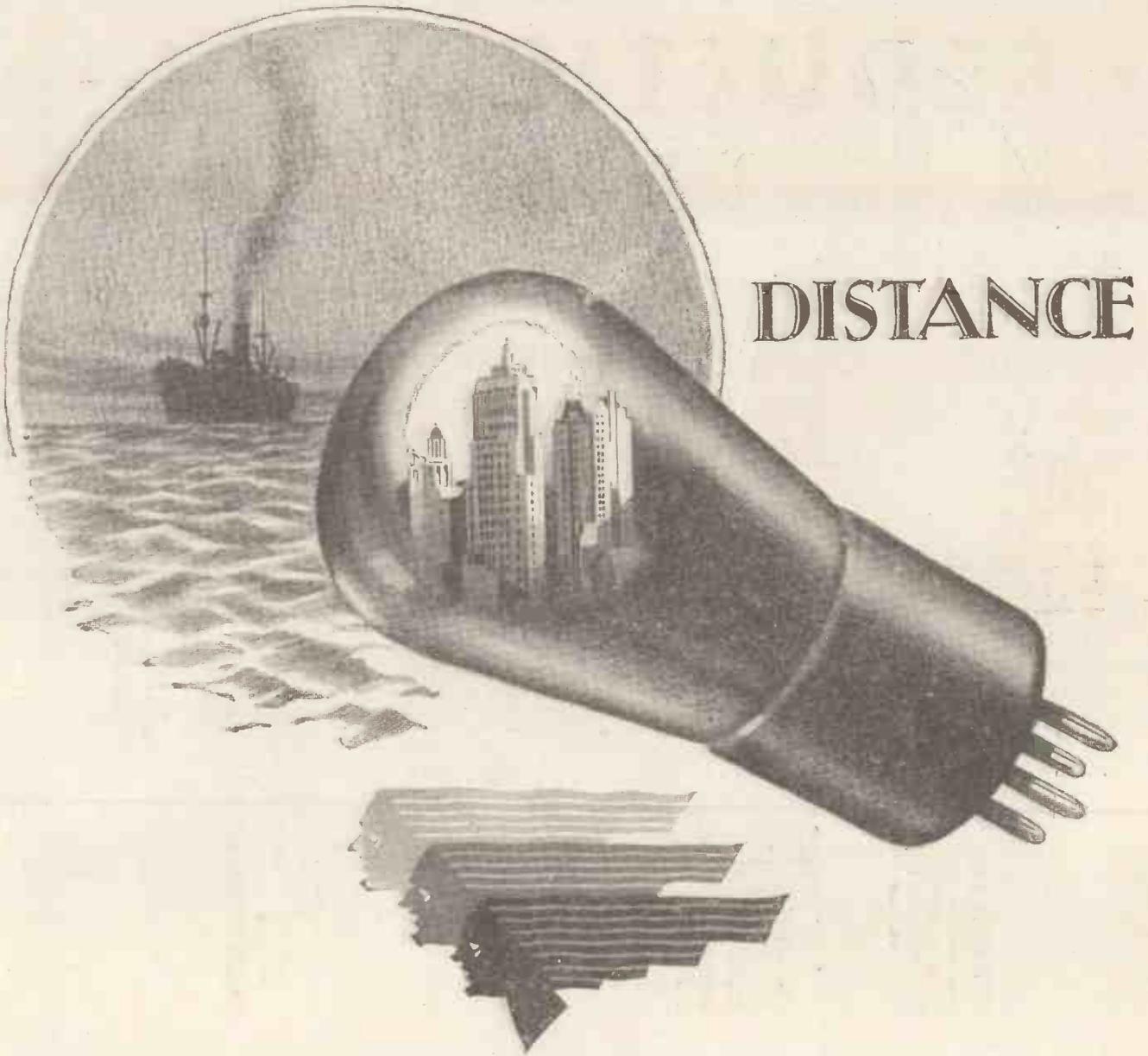
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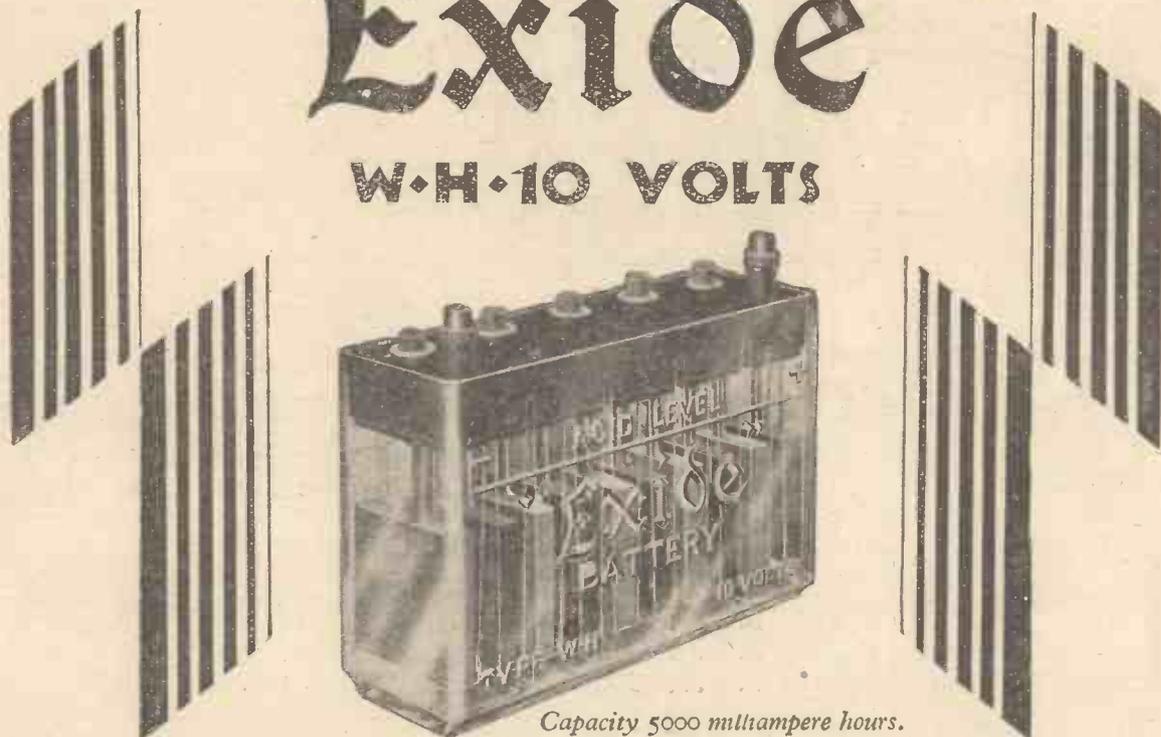
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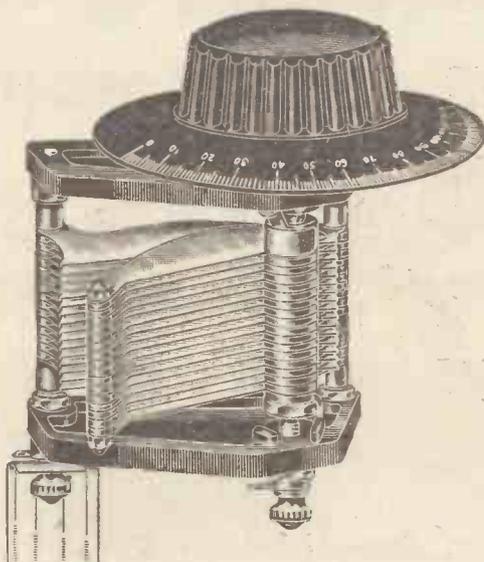
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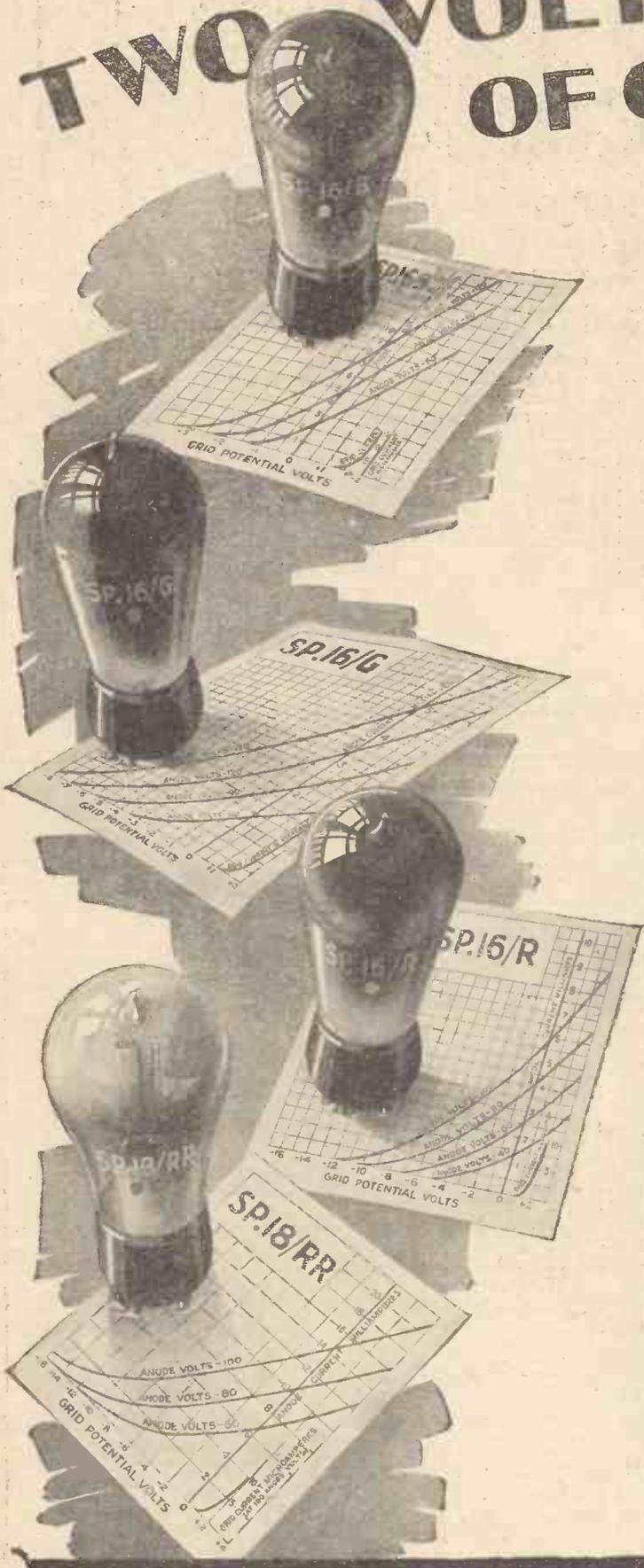
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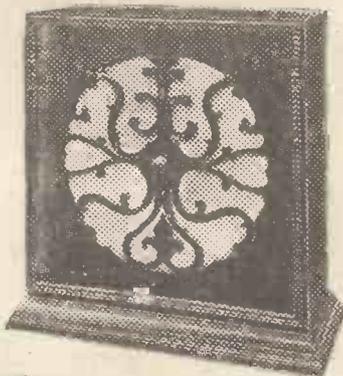
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Don't Forget to Say That You Saw it in "A.W."

THE INVENTION OF THE YEAR!

A MOVING COIL SPEAKER WHICH WORKS OFF AN ORDINARY 2-VALVE RECEIVER, WITHOUT SPECIAL VALVES, ACCUMULATORS, OR MAINS



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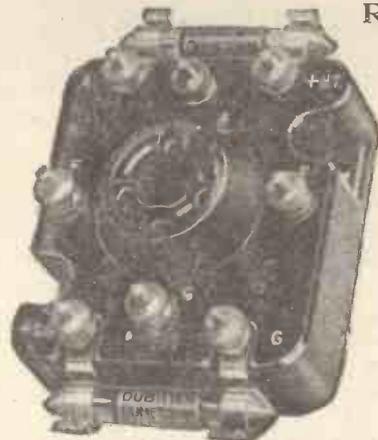
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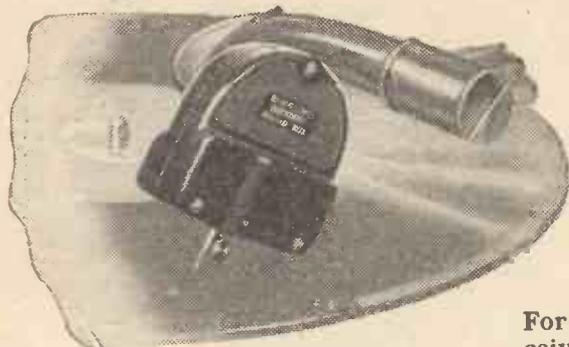
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ADAPTER:
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Publication No. 127 gives complete Instructions and Circuit Diagrams, together with practical advice on how to get the best out of gramophone records: it is sent out with each Soundbox.

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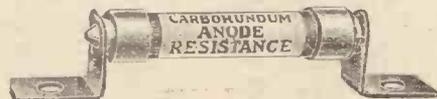
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ANODE RESISTANCES & GRID LEAKS

are incorporated in the leading purity receivers

CARBORUNDUM RESISTANCES ARE PERMANENT. Experimenters have tried to burn them out by applying as much as 850 volts and failed. At this voltage 100 Milliamps were passing and the resistances were afterwards as good as ever. That troublesome crackle spoiling your programme is probably due to a faulty anode resistance. Carborundum resistances are unconditionally guaranteed against this.

Made in all values from 2,500 ohms up to 7 megohms, 2/6 each (complete with two clips for mounting).



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CARBORUNDUM STABILISING DETECTOR UNIT, 12/6.

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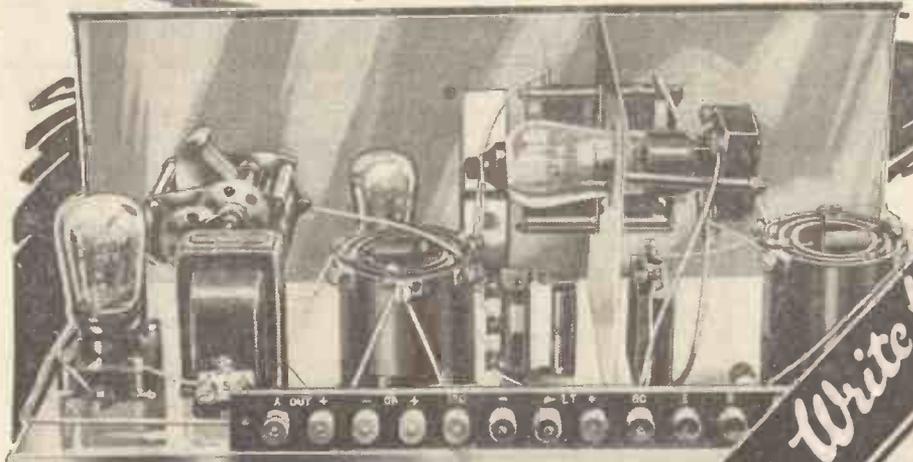
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in one hour and get
27 stations"

*You are echoing the thoughts
and actions of thousands!*

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The OSRAM MUSIC MAGNET with the highly efficient **OSRAM VALVES** given below is the soundest engineering job for the home constructor—another striking success of G.E.C. research.

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The introduction of a new patented coil enables the condensers to be ganged, giving a single dial control without loss of efficiency in tuning. The condenser dial is calibrated from 250 to 2,200 metres, so you won't have to search for stations. A child can tune in either home or foreign stations on the OSRAM MUSIC MAGNET.

Note these 6 important points:

- 1 **SINGLE DIAL CONTROL.**
- 2 One hour to make. 3 No soldering.
- 4 Gets 27 stations. 5 No changing of coils.
- 6 No interference with your neighbours through oscillation.

Remember! The OSRAM MUSIC MAGNET is designed for only

OSRAM VALVES—
OSRAM SCREEN-GRID S215,
OSRAM HL210 and
OSRAM DEP215 or DEP240.

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THE THREE VALVE SET WITH A FIVE VALVE PERFORMANCE

Amateur Wireless and Radiovision

The Leading Radio Weekly for the Constructor, Listener and Experimenter

— Editor : BERNARD E. JONES —

Technical Editor: J. H. REYNER, B.Sc., A.M.I.E.E. :: Research Consultant: W. JAMES :: Assistant Editor: H. CORBISHLEY

—and Radiovision—Our Research Consultant—How to Begin Biology— Radio as Anti-Communist!—"Q" Coils and Screen-grid Valves

—and Radiovision—The inclusion of these words in our title this week is a sign of the times. While we make no prophecy as to when radiovision will be an everyday fact of the commonplace life, we know that it has definitely come and that AMATEUR WIRELESS by keeping its readers informed as to the progress made will play its part, however small, in bringing it about. "Radiovision" is a big term and covers for the moment television of which the Baird and many other systems are examples and still-picture transmission of the Thorne Baker and Fultograph systems. AMATEUR WIRELESS must do its duty in recording and explaining every phase of wireless progress of interest to the amateur, and the minor alteration of our title is therefore inevitable. Who would care to forecast what the next alteration will be?

Our Research Consultant—There are two new names in the heading to this page. Mr. W. James, who has been acting for some weeks as special contributor, has now definitely joined our staff in the capacity of Research Consultant. Readers will welcome him heartily. His fame as a designer of sets and as an exponent of wireless principles has gone far, and one of his functions as Research Consultant will be in conjunction with our Technical Editor, Mr. J. H. Reyner, to keep an eye on our constructional policy and on that of AMATEUR WIRELESS's big brother *Wireless Magazine*. Mr. W. James is Mr. William James by the way. A fine example of his skill as a set designer is to be found in the coming number of *Wireless Magazine* published next Wednesday, October 24. It is the "Touchstone," a set on beautiful lines which gives a truly remarkable performance. The other addition to the names in our heading is that of the Assistant Editor, Mr. H. Corbishley, who has served AMATEUR WIRELESS in that capacity from the first issue.

How to Begin Biology—Would-be scientists will be interested in the B.B.C.'s announcement



The Italian survey ship, the "Citta di Milano," which played a large part in the rescue of General Nobile, has been lying in the Thames off Gravesend. In our picture Chief Telegraphist and Telegraphist are seen holding the airship's wireless receiving set and part of the airship's rigging which was used as a wireless mast on the ice.

that, beginning on November 6, Daventry 5XX will inaugurate a series of weekly broadcast lectures on "How to Begin Biology." The object of these talks, states an official, is to help listeners to learn at first-hand, instead of depending entirely upon books and other hearsay knowledge. It is recommended that practical experiments be undertaken to augment the lectures.

A New Departure—To encourage listeners to adopt this procedure, the B.B.C. has arranged a scheme whereby the necessary "laboratory" apparatus, such as a pocket lens, specially prepared leaves, and the chemicals, can be obtained from Mr. Alfred Millard, c/o the B.B.C., Savoy Hill, London. Parcels of these materials can be obtained post free for 2s. 6d. Early application is urged.

Radio as Anti-Communist!—In front of the President's and Premier's chairs in the recently opened Prussian Parliament have been erected microphones, by means of which their speeches can be relayed through loud-speakers and so heard above competing noises. The President's "mike" is also furnished with a penetrating whistle system, which will place at his disposal a volume of "official" noise sufficient to ruin the loudest of the Communist "concerts."

Murmurs from brother "Reds" of "To what base uses . . . !"

"Q" Coils and Screen-grid Valves—Many visitors to the show at Olympia anticipated an imminent development when they asked whether it would be possible to combine the outstanding advantages of "Q" coils and screen-grid valves in a practicable receiver. Mr. Reyner has been working on this problem for some months, and next week will give readers the fruits of his research in a description of his latest receiver, which consists of a screen-grid H.F. valve, a detector, and a transformer-coupled low-frequency valve, with two "Q" coils for the aerial and anode tuning. Look out for constructional details in next week's special gift issue (see page 595).

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BROADCAST ARTISTES IN PICTURE



HEDDLE NASH.—A noted member of the B.N.O.C., Mr. Nash was heard recently in one of his best roles in "The Barber of Seville," broadcast from 5GB. Mr. Nash has appeared at most of the great concert halls, and has toured the stations.



MURIEL BRUNSKILL.—An Australian member of the B.N.O.C., Miss Brunskill has been heard at the Proms concerts and from most of the stations. She has also appeared at many of the great festivals held at Queen's Hall.



JOHN BUCKLEIGH.—The possessor of a fine bass voice, Mr. Buckleigh turned from art to music, and speedily established himself in the front rank of vocalists. An early broadcaster, his songs range from Sanderson to Moussorgsky.



EDITH ASHBY.—A brilliant pianist and a pupil of Mark Hambourg, Miss Ashby, who has been heard recently from 2LO, was one of the chief pianists at the Winter Gardens, under Sir Dan Godfrey. She is prominent as soloist.



ARIE SPIERO.—Mr. Spiero made a great London reputation as solo violinist and conductor, then took over the conductorship of the orchestra at the Blackpool Palace, which he made noted. He has broadcast with his orchestra on many occasions.



IRENE SCHARRER.—She is a noted exponent of the Matthey method of pianoforte playing, and made her musical debut in 1901 at the old St. James's Hall. Since then she has played under most of the world-famous conductors.



DENIS NOBLE.—Another member of the B.N.O.C., Mr. Noble has been heard in most of the famous operas, and has sung at many of the B.B.C. studios. One of his best roles is in "Madame Butterfly."



MAVIS BENNETT.—Miss Bennett has established herself as one of the finest coloratura singers both in operatic and concert work. She has been heard in the B.B.C.'s light concerts at 2LO, and has toured all stations.



LOUIS HERTEL.—One of the first of the great B.B.C. entertainers, he turned from variety to wireless. His sketches, and especially the character, "Mrs. Struggles" became exceedingly popular. He was the first to broadcast the famous sketch, "A Sister to Assist 'Er."

How I Developed the New REINARTZ CIRCUIT



WHEN the Reinartz circuit was first described in England, a number of English wireless experimenters immediately recognised in the circuit a basis for a great deal of fascinating experimental work, and it is interesting to note here that several improvements to the original circuit have resulted from the work of English experimenters.

Reinartz Modifications

Experimental work on the Reinartz circuit is very largely a matter of experiments with the coil or coils used in the circuit. The earliest Reinartz receivers made by the present writer had their reaction and aerial-earth-grid coils wound on cylindrical formers of three-inch diameter. Tappings from the reaction coil were taken to one selector switch. Tappings from the aerial-earth coil were taken to a second selector switch, and tappings from the earth-grid coil to a third selector switch.

After a good deal of experimental work with cylindrical coils, a return was made to the original type of basket coil used by Reinartz. Experiments with these, and other coils of the basket type, proved that the basket type of coil as used by Reinartz, gave better results on the whole, than coils of the cylindrical type.

A New Type of Coil

While carrying out experiments the writer made use of a new type of basket coil which brought the signal strength of the Reinartz circuit up to that of any other reaction circuit. The increased signal strength given by this coil was due to the tighter coupling obtained between the aerial-earth and earth-grid sections of the aerial-earth-grid coil. This tight coupling was obtained by winding the two sections of the coil simultaneously.

In such a coil the earth-grid section was three or four times as long as the aerial-earth section. The two sections of the coil were wound together on the same basket former. When the aerial-earth winding

By Dr. E. H. CHAPMAN, M.A.

was complete, the earth-grid winding was continued alone. Finally, the end of the aerial-earth winding was connected to the beginning of the earth-grid winding.

Two of the coils shown below are of the type in which the aerial-earth section is wound simultaneously with the earth-grid section. The coil on the left was wound on a cylindrical box of five inches



Some Experimental Coils used by the Author

diameter, the wire being No. 22 d.c.c. The reaction coil, at the top of the cylinder, consisted of twenty turns. The aerial-earth coil consisted of ten turns of the wire wound simultaneously with the first ten turns of the earth-grid coil, the earth-grid coil then being continued alone for another thirty-three turns. This coil has a wavelength range of from 270 metres to 500 metres, and over twenty broadcasting stations have been picked up on it at good loud-speaker strength.

The second coil with the simultaneous winding is that on the right of the photograph above. This coil, wound with No. 26 d.c.c. wire on a wooden "X"

shaped former, had a first winding of fifty turns as a reaction coil. Next were sixty turns of aerial-earth coil and sixty turns of earth-grid coil wound simultaneously, and last, two hundred turns of earth-grid coil continued alone. The wavelength range of this coil was from 1,000 to 2,000 metres.

An Important Discovery

The coil in the centre of the photograph is one which had thirty turns of No. 26 d.c.c. wire as reaction coil and sixty turns of the same wire as earth-grid coil wound on a cylindrical former of 3½ in. diameter. The aerial-earth coil consisted of fifteen turns of No. 18 d.c.c. wire wound over the earth-grid coil. Results obtained with this coil were inferior to those obtained with a coil in which the simultaneous winding was employed. Undoubtedly the most important discovery which has resulted from the experimental work now described is the coil with the windings which are put on simultaneously and is used in the receiver described on pages 612-614.

INTERNATIONAL RADIO REGULATIONS

THE results of the labours of the Washington Radio Telegraphic Convention have now been published. In view of the possible advent of television it is interesting to see that radio-communication is defined to include the transmission of writing, signs, and facsimiles of all kinds by Hertzian waves. If this precedent is followed it seems clear that television transmissions must be subject to the general licence of the P.M.G.

Distress calls are naturally given priority over all other signals. The telephone equivalent of the SOS signal is "may-day" from the French *m'aider*—help me. As a measure of precaution and vigilance, all mobile maritime service stations must listen for "distress" signals on 600 metres from the fifteenth to the eighteenth and from the forty-fifth to the forty-eighth minute after every hour, B. A. R.

FULL CONSTRUCTIONAL DETAILS OF A UNIQUE RECEIVER
USING THIS CIRCUIT ARE GIVEN ON PAGES 612 - 614

The POWER-PLUS



LOUD-SPEAKER

AMONG the various types of diaphragm which have been used for loud-speaker construction, that employed in the loud-speaker here described may be classed among the most successful.

As will be noted from the photographs, the diaphragm used is simply a rectangular sheet of stiff paper folded down the centre and then opened out to form two leaves similar in appearance to two leaves of an opened book.

By anchoring the two straight edges of a diaphragm of this type and coupling the reed rod of a cone loud-speaker unit to the centre of the creased portion we have all that is needed for reproduction of sound.

Baffle-type

For the best reproduction of the bass notes, however, some form of baffle must be employed in order that the air pressure produced at the front of the diaphragm shall not be neutralised by the rarefaction of air at the rear.

Experiments proved that the most convenient form of baffle to use was an ordinary cabinet of the type shown in the illustrations. A cabinet of suitable size can be made up quite cheaply from $\frac{3}{8}$ in. wood, while the fretted front may be of any convenient design provided plenty of free air space is left between the frets.

Two Units

An interesting variation from the ordinary type of loud-speaker is the adoption of a dual-drive system, two cone loud-speaker units being coupled to the crease in the

diaphragm at a distance of 8 in. apart. The use of two units was found in practice to give increased "punch," particularly on bass notes while the tone of the loud-speaker can be varied by using the windings either in

Sheet of cone paper, 19 in. by $15\frac{7}{8}$ in. (Six-Sixty).

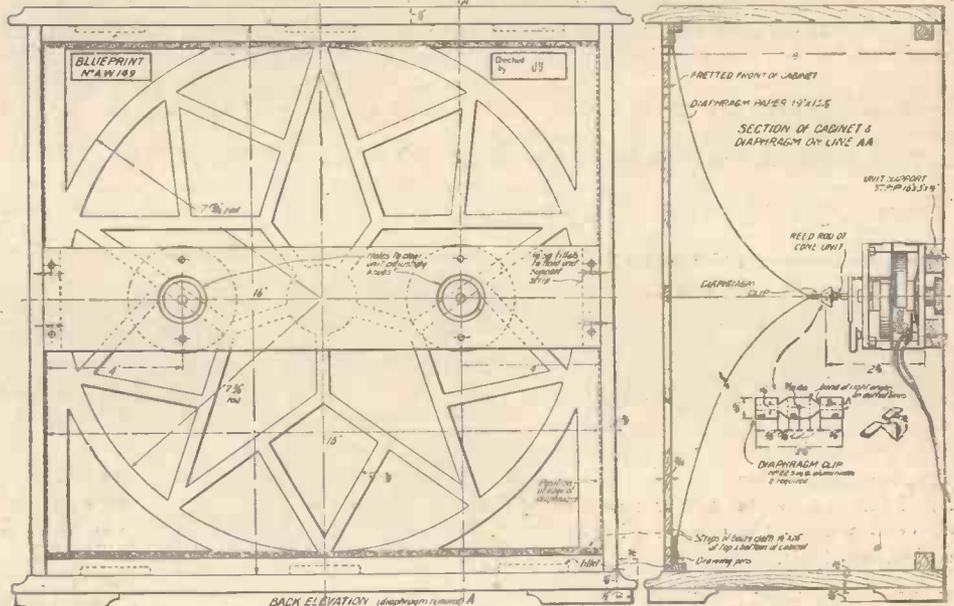
Two coupling clips or aluminium for making them (Paroussi).

Two strips green baize, 16 in. by $\frac{1}{2}$ in.

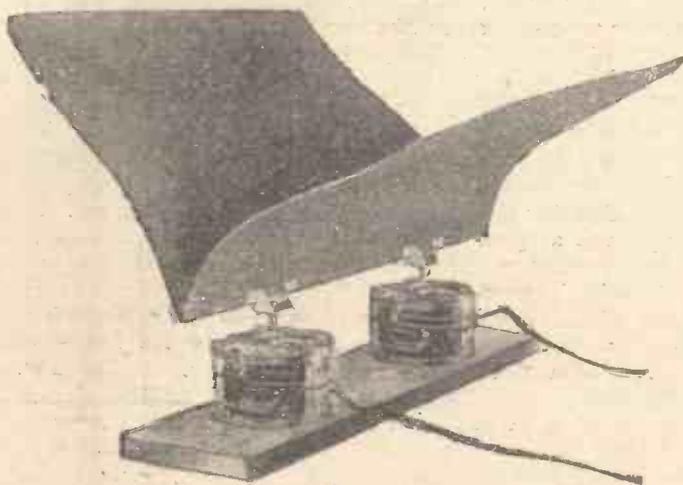
Two cone loud-speaker units (Goodman, Bluespot, Lissen, Whiteley Boneham, Lassophone, "OV," Bullphone).

It will be noted that the size of the cone paper called for is unusual; the smaller dimension $15\frac{7}{8}$ in. is important as not more than $\frac{1}{16}$ in. should be left between the sides of the cabinet and the edge of the

By ARTHUR YORKE



Constructional details of the speaker. Blueprint available, price 1s.



This is how the two units and the diaphragm are arranged

series or in parallel. Experimentally-minded constructors might fit a small series-parallel switch in the back of the cabinet so that an instant change over can be made from series to parallel or vice versa.

To turn to the constructional details, the components required are as follows:

Cabinet, 16 in. by 16 in. by 8 in., complete with back strip (Carrington, Pickett Bros., Artcraft).

diaphragm. In order to preserve the lower notes, as a matter of interest, it may be stated that the less the clearance between the edge of the diaphragm and the inside of the box, the better will be the reproduction of the bass notes, the diaphragm must not, however, actually touch the cabinet or unwanted resonances will result.

To turn to the actual constructional details, the first part to be put in hand will be the cutting out and attachment of the diaphragm to the cabinet. The cone paper as supplied measures 19 in. by 19 in.

A pencil line should be drawn $15\frac{7}{8}$ in. away from and parallel to one of the edges. The paper can then be cut along this line, when it will be of the size required.

A second pencil line should now be drawn parallel to one of the shorter edges (Continued at foot of next page)

Next Week's Free Gift to Every Reader!

AN AUTOMATIC STATION FINDER



Using the "A.W." Station Finder

The most novel and intriguing presentation ever made by any wireless journal

THREE THINGS THE STATION FINDER WILL ENABLE YOU TO DO

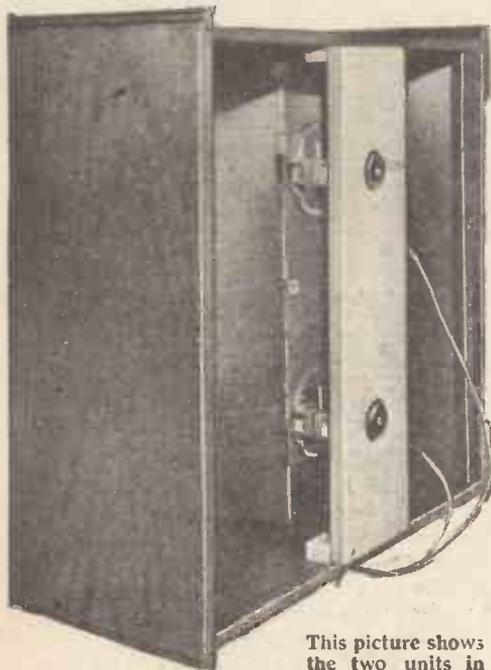
- (1) To set your condenser dial automatically to tune in any possible station.
- (2) To ascertain automatically the approximate wavelength and frequency of all stations heard.
- (3) In most cases to identify those stations.

Please tell your Wireless friends and, to avoid disappointment, **ORDER NEXT WEEK'S "A.W." NOW**

"THE POWER-PLUS LOUD-SPEAKER"

(Continued from page 594)

and midway between the latter to act as a guide for folding the diaphragm; this latter operation should be done carefully so as to make a straight even crease.



This picture shows the two units in position

Drawing pins are used for fixing the edges of the paper to the cabinet front—strips of green baize being interposed between the diaphragm and the cabinet in order to make the joint sufficiently airtight.

Attachment of the cone units to the back strip should now be proceeded with. As the actual method of attachment and size of holes for the adjusting nuts (if any) will depend on the make of units used, this part of the work must be left to the discretion of the constructor; the units should, however, be fastened to the back strip at a distance of 4 in. from each end of the wood.

Before the reed rods of the units can be coupled to the diaphragm, two coupling clips of the type shown in the detail diagram of the loud-speaker will have to be clamped over the crease in the paper. The clips should be placed in position so that the centre hole of each is 4 in. from the inside of the cabinet.

One final point which should be

noted is that if the units are joined in series the positive terminal of one should be connected to the negative terminal or black cord of the other, while when used in parallel the positive terminals of each unit should be connected together.



The back of the loud-speaker

The Truth About DUAL IMPEDANCE

Our Technical Editor gives the Facts

AFTER a somewhat slow start, dual-impedance coupling is coming into its own. The important properties of this method of coupling are being recognised, in consequence of which circuits are beginning to appear embodying this form of coupling.

Certainly those who have tried the method become enthusiastic in its favour, for it has the valuable property of flexibility whereby the bass may be accentuated, if desired, to overcome defects in loud-speakers or, if necessary, the curve can be maintained absolutely level. The way in which this is done is of interest, for it is quite easy to miss the fundamental effects and so fail completely to obtain the desired results. The simple analysis of the method of operation indicates exactly why the resonance in the bass is obtained and how it can be controlled.

A Simple Example

A simple dual-impedance coupler is shown by Fig. 1. There is a choke in the anode circuit, the voltages across which are transferred to the grid circuit through a coupling condenser, the grid being stabilised by an impedance leak instead of a resistance leak, as is more usual. At first sight it appears as if these two chokes are

ever, a resonant effect occurs between the coupling condenser and the grid choke. When this occurs the voltages across the coupling condenser and the grid choke are equal and opposite. Moreover, due to the resonance, these may be many times greater than the original voltage applied across the two in series. Thus, although the voltage

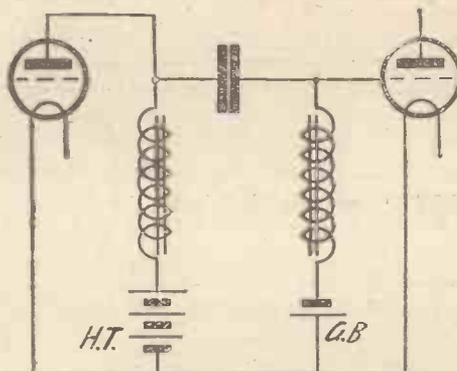


Fig. 1. Simple Dual-impedance Coupling.

developed across the anode inductance has fallen owing to the reduction in frequency, the voltage across the grid inductance is higher than this value, due to the resonant effect, and consequently the voltage applied to the second valve is either maintained level or definitely rises.

This effect can quite easily be seen in the curve shown by Fig. 2. This represents a characteristic taken on a dual-impedance coupler and serves to illustrate the point just made. At about 200 cycles per second, the amplification tends to fall off slightly and would actually fall right away as indicated by the dotted line. The resonant effect referred to, however, occurs at about 70 cycles, in consequence of which the fall away in the amplification is checked on either side of this point and the curve, instead of dropping off, is maintained level for a short distance and actually rises above the normal value at the resonance point. After this, it falls off again somewhat rapidly, but it will be seen that the amplification is maintained well below 50 cycles per second.

This resonance hump in the bass produces a definite increase in the amplification, over and above that given by the valve itself, which is particularly useful in the case of the average loud-speaker which

is relatively less sensitive in the bass. Where one's loud-speaker is satisfactory in the lower registers, however, the resonance may cause unpleasantness. In such a case it can quite easily be reduced by increasing the value of the coupling condenser, the effect of which is to lower the effective resonance point. By the time resonance occurs, therefore, the voltage on the anode choke has fallen so low that the effect of the resonance merely serves to maintain the curve approximately level and does not cause any definite resonance hump. There is thus quite a field for experiment should the reader be so minded. The curve in Fig. 2 illustrates the effect of increasing the coupling capacity and shows how the shape of the curve at the lower end of the scale can be varied to suit one's own convenience.

At the upper frequencies we have a further important advantage over resistance-coupling. With this latter method we obtain what is known as "high-note loss," due to the shunting effect of the self-capacity in the resistances and in the circuit generally. In the dual-impedance coupler this self-capacity merely serves to produce a resonance circuit with the effective

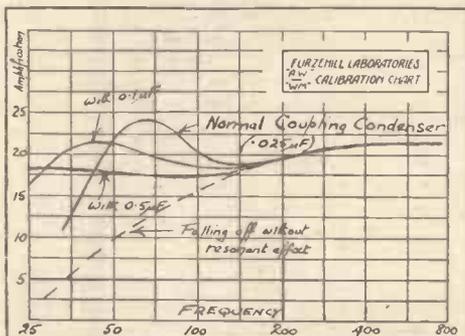


Fig. 2. Showing how the characteristic may be altered.

effectively in parallel so that they act as a somewhat poor choke-coupled arrangement.

This is actually the case in the middle frequencies and as the frequency decreases, so the effective impedance of the anode circuit falls and the amplification begins to decrease. At a certain frequency, how-

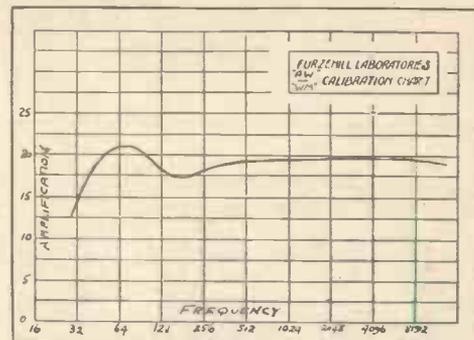


Fig. 3. Typical Response Curve of Dual-impedance Coupler.

ative anode impedance consisting of two chokes in parallel. This particular resonance is not capable of producing a hump in the curve, but merely serves to maintain the amplification at the maximum possible value (i.e., that of the valve itself) in the upper frequency range where other methods of coupling are beginning to fall away. Fig. 3 shows a complete curve of a typical dual-impedance coupler.



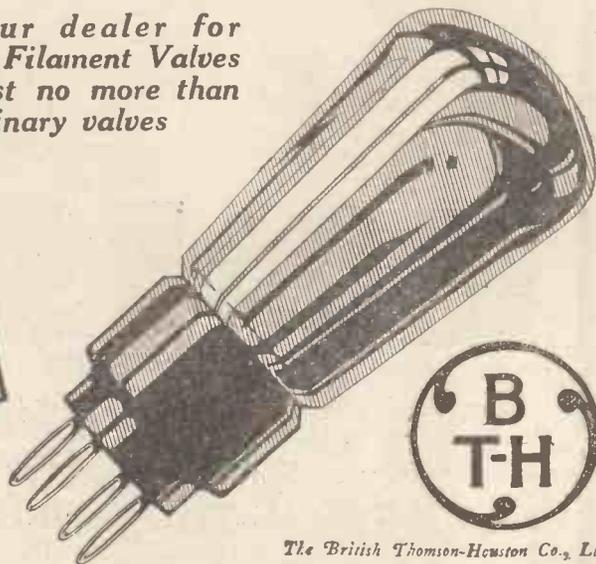
Sergeant Nickel says

"It is steep, and that is just what is wanted in a valve." The slope of a valve is the indication of its goodness ; the steeper the slope the greater the goodness.

Mazda Nickel Filament Valves have steeper slope characteristics than any other valves of corresponding types. Hence the reason for their invariable success. Remember that they are made and guaranteed by the greatest valve manufacturing organisation in the world.

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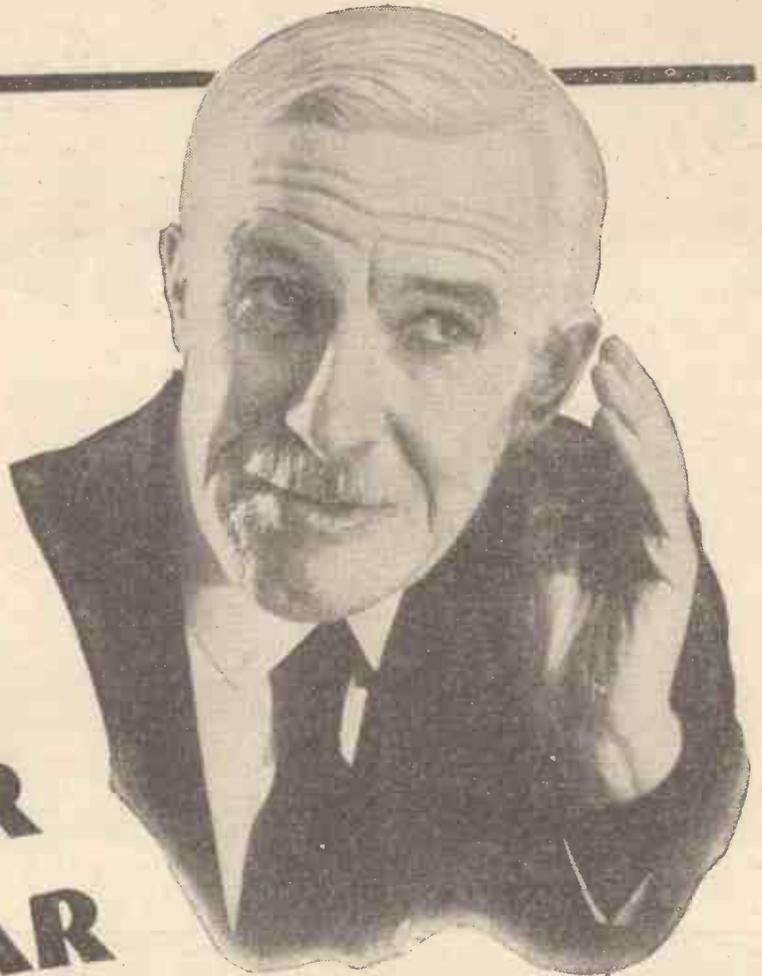
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**YOU CAN BET
THE VALVES
ARE**

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After all, it's what
the valve does that
counts!

The remarkable performance of the famous Ediswan
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EDISWAN—THE WORLD'S FIRST RADIO VALVE

You will Help Yourself and Help Us by Mentioning "A.W." to Advertisers

On Your Wavelength!

Censoring Applause!

THE people who control the volume of sound at the B.B.C. have now acquired a new "vice." They have decided that the noises between musical items, applause and all the usual atmosphere of the concert-hall, shall be excluded from the transmissions. The shining example of this latest idiosyncrasy was the final concert of the Promenade season, which was so controlled as to rob listeners of the enjoyment of hearing the terrific enthusiasm of the audience in the Queen's Hall. Every time there was a burst of applause down went the volume of sound, giving the effect of a hose-pipe being turned on the audience in order to damp their enthusiasm. And this artificially introduced anti-climax had a most depressing effect on listeners. Now, if only those control men would carry out their "reduced volume" stunt on the announcements between musical items we should be better pleased. This would get rid of that objectionable boom on speech which we so frequently get on our loud-speakers and which is solely due to faulty transmission.

The Lure of the Talkies

Quite a large number of B.B.C. engineers have succumbed to the lure of the talking films. One of the leading British film companies has put an ex-B.B.C. research engineer in charge of the design and erection of a special sound film studio at Elstree—the Hollywood of England. I think that this is a very wise step, for the B.B.C. have certainly got acoustic problems well "taped up" and have made more progress in this direction than any other broadcasting organisation in the world. There is no need for the British film companies to go to America for engineers to work the sound-film apparatus, and I anticipate that many more engineers will leave the B.B.C. and the gramophone record companies for the rather more prosperous parish of Elstree.

Developments

The B.B.C. development and research sections personnel are going ahead with the design of the new twin station at Potter's Bar. Among other innovations an entirely new form of modulation is to be used on the transmitters at this station—a system which overcomes at one sweep the difficulties of avoiding change of wavelength on heavy modulation (which is closely related to "fading"), of the problems of 100 per cent. transmission of all musical frequencies, and of certain annoying "flash over" characteristics of water-cooled valves. This latter phenomenon, known to radio engineers as the "rocky point" of water-cooled valves, has been

responsible for the loss of many thousands of pounds' worth of valves in the various high-power radio stations in the world, and has been a factor which has almost halved the average life of such valves. Hats off to the B.B.C. for this valuable step in the progress of radio transmission!

At Clapham

In the meantime the B.B.C. laboratories at Clapham, where experimental work is carried out, are buzzing with highly technical language about "transients," "linearity," and "audio-frequency attack." Slide rules are working with the regularity of trombone slides in a Wagner overture,

NEXT WEEK:

"A.W." WILL CONTAIN A GIFT OF A UNIQUE NATURE AND OF PRACTICAL UTILITY TO EVERY LISTENER.

Read all about it on page 595.

and the mathematical problems associated with the terms "cosh," "tansh," and "gerzinta" appear to be mere child's play to these radio wizards.

A.C. Developments

A.C. enthusiasts will look forward to a great time this season. There are numerous new types of valve for them to try, and the new directly-heated Marconi valves will be of great interest. These valves are made with particularly thick filaments which run at a relatively low temperature, so that comparatively rapid fluctuations in the heating current, such as is obtained from the 50-cycle supply, makes very little difference to the actual heating of the filament. The filament, indeed, acts as a heat reservoir, very much in the same way as a reservoir condenser in an eliminator. The filament receives a minute increase of energy one moment and passes it out again the next, the result being an almost constant emission of electrons. Consequently, if the grid returns are taken to a potentiometer connected across the filaments, so that they are effectively connected to the mid point, no serious hum is obtained.

Many Varieties of A.C. Valves

In this series there are not only the customary H.F., L.F., and power valves, but there is also a screen-grid valve which will be hailed with enthusiasm by experimenters. I have not yet had an opportunity of trying one of these, but I am

looking forward to a great deal of pleasure when I do. A valve which I have been able to try is another A.C. screen-grid valve—the Cosmos. This is an indirectly-heated valve, similar in general construction to the well-known A.C. valves which are marketed by this firm. It has extremely pleasing characteristics, and they naively point out in their leaflet that a little care must be exercised in handling two stages of these valves, as the amplification with a low-loss coil may exceed 500,000. Well, that's very nice of them, anyhow. I am at present dabbling with one stage which I imagine is going to give me he-man results. When I graduate on to two stages I shall expect he-man² results; and I have no doubt I shall get them.

A Noble Idea

Did you not like the story of the fellow in Berlin who abducted a topical talker and subsequently took his place before the microphone to pour forth a fervid oration on a subject quite different from that assigned to his victim? It appears that Herr "A" was down to tell the world something about a dry-as-dust topic. Herr "B," who felt that his message was infinitely more important, having got him safely out of the way, walked into the studio with an airy wave of the hand, and delivered a glowing eulogy on Bolshevism. Now, I must say that I think there is quite a lot in this idea. If, for example, Professor Buggs is billed to talk from one of our own stations on "Rheumatism in Caterpillars," won't one of our Bright Young People sandbag him before he gets to the studio and, having been skilfully made up by Clarkson, go before the microphone in his stead? We might then be treated to something really snappy.

More Mystery Stations

I mentioned recently that mystery stations were operating on the upper broadcast band. As a matter of fact, there have been quite a few transmissions that never have been traced on both this and the lower band. A couple of years ago, some readers will remember, if they happened to tune it in, an astonishing broadcast took place one Sunday afternoon. Reception was reported from all over the British Isles, as well as from places on the Continent, for it came through with considerable power. Interspersed with the programme were some of the most violent and inflammatory speeches that I have ever heard. No one has discovered where the transmission came from or who was responsible.

The other day the French tracked down a station which had been causing quite a

On Your Wavelength! (continued)

lot of trouble, for it was pouring into Italy propaganda much against the government. The reports of some of the lay papers were distinctly amusing. One of them referred to it as the "mystery wireless post," not realising that the French word "poste" becomes "station" in English, and that a wireless post is the thing that you use to hang your aerial on. It was also stated that the range of the station was 156 miles. I like that "six." Obviously, some bright lad saw in the French account that the range was 250 kilometres, remembered that a kilometre is five-eighths of a mile, and carefully worked out the sum.

Jumps and Jerks

The little bother between the B.B.C. and the theatrical music-hall people seems to be an unconscionable time in dying. The other night I read in my evening paper that a star music-hall turn was shortly to be broadcast. "Cheers!" said I to myself. "This really looks as if we are getting on a bit." But next morning's paper brought me down to earth with a severe bump, for I saw that it had been impossible to broadcast the surprise item on the previous evening since the two actors who were billed to provide it had discovered clauses in their contracts which prevented them from appearing before the microphone. Some day, I suppose, we shall get this business straightened out and people will get over their fears that wireless is going to spell death to every other form of entertainment.

Little Things That Matter

If you are a constructor of wireless gear, as no doubt you are, you can hardly fail to have noticed how much easier your path has become in the last year or so. If one wanted a little gadget not so very long ago, there was usually nothing for it but to hew the thing out of brass or ebonite with hacksaw and file. Now you can purchase almost everything that you are likely to want ready made, to the vast saving of time, trouble, and temper. The neat little bits and pieces that we have nowadays make an immense difference both to one's pleasure in building sets and to their handiness and appearance when they are finished.

Think of the jolly terminals of all kinds that are available nowadays. Time was when we had no choice except between the telephone and the milled nut varieties. Then, as sure as eggs are eggs, if you fitted telephone terminals, everything that you wanted to attach to them had loops or spades on its leads; in the same way, it would be a certainty if you used screw-down terminals that you would be flooded with things provided with pin tags. I

used to make little adaptors to get over this kind of thing, but nowadays there is no need for anything of the sort, for one can purchase terminals that will take equally well plugs, pins, spades, hooks, loops, or almost anything else that you can think of that may grace the end of a lead.

Other Boons

There are many other things for the constructor of to-day. If he wants to set a variable condenser well back from the panel he hasn't got to go to all the bother that used to come our way a couple of years ago. We had to make a special bracket to hold the thing; he buys a condenser that can be mounted equally easily on the panel or baseboard. And he can purchase ready made an extension for the spindle to make the connection between the condenser and the far-away dial on the panel. Rheostats, potentiometers, and the like can be mounted without trouble either on the baseboard or on the panel, according to requirements. Resistance holders will stand up or lie down, according to the space available. Components intended for the baseboard are provided with holes through which screws of reasonable size will pass; in the old days the holes were often so small that you were faced with the alternatives of drilling every blessed one out again or using tin tacks. Last, but by no means least, almost every component is now provided with terminals.

Wireless-controlled Aeroplanes

The recent experiments made in France with wireless-controlled aeroplanes carrying no pilots were very interesting. Similar trials have, I believe, been made in this country as well with equally encouraging results. There are still a good many difficulties to be surmounted before the system becomes perfect; once the plane is in the air, wireless control is easy enough, but taking off and landing are awkward businesses with no pilot at the plane's controls. I have no doubt, though, that time will see a satisfactory solution.

A Battleship!

The poor old *Centurion*, once a proud 23,000-ton battleship, is having a very rough time just now, for she is acting as a target ship to the Fleet. When gun practice is toward she makes her way to the firing ground, where her crew are taken off by the attendant destroyer

Shikari. Then off she goes all by herself, turning, twisting, altering her speed in accordance with *Shikari's* wireless orders. Very wonderful is the wireless gear installed aboard her which makes all this possible. So ingenious is it that when the operator on *Shikari* moves his controls and sends out an order an immediate acknowledgment of its reception is sent by the crewless battleship. *Centurion* is also able to inform *Shikari* at once if anything goes wrong with her works. An uncanny business!

The "Graf Zeppelin" Transmissions

The many trial flights made by the new German dirigible *Graf Zeppelin* prior to its test trip across the Atlantic Ocean to New York afforded a few thrills to a number of listeners both on the Continent of Europe and in Great Britain. It is not every day we are given the opportunity of hearing cross-talk between an airship and land stations; but numerous were the fans who picked up communication between the *Graf Zeppelin* and the Stuttgart and Frankfurt broadcasting centres in the early morning. The range of the airship's wireless equipment was an adequate one, as is proved by a reader who heard the conversation which took place between the *Graf Zeppelin* and the Frankfurt station whilst the former was cruising off the east coast of England. One call, however, which appears to have mystified many was the "Hallo! Hallo! Debeg" sent out by the airship. This was, as a matter of fact, a coined word: a contraction of the multi-syllabic name of the German wireless organisation (Deutsche Betriebsgesellschaft für Drahtlose Telegraphie), which, working in co-operation with the German Broadcasting Company and the Zeppelin construction works, enabled these radio tests to be brought to the ears of the general public.

You May Hear It

As I write these lines I am informed that the *Graf Zeppelin*, taking advantage of a favourable meteorological forecast, has left for its initial trip to the United States, and it is possible that incidents in connection with its departure may have been picked up by the thousands of enterprising radio fans who daily search the ether, for it was the intention of the German Reichsfunk to relay to all their transmitters the send-off given to the airship's passengers and crew. For these wireless communications the *Graf Zeppelin* has used a wavelength of 1,020 metres, the broadcasting stations called up replying on their respective wavelengths, in addition to the transmission carried out by the high-power Zeesen station on 1,250 metres.

THERMION.

**MAKE SURE OF
THE "A.W." STATION FINDER
NEXT WEEK BY ORDERING
YOUR COPY EARLY.
FULL DETAILS ON PAGE 595.**



WHAT THE CHAPMAN-REINARTZ WILL DO

An Account of a Daylight Test—You Can Get the Same Results

TO give AMATEUR WIRELESS readers an idea of the capabilities of the "Chapman-Reinartz 2" (illustrated and described on pages 612 to 614) we asked Dr. Chapman to carry out a special *daylight* reception test. His report is as follows:—

A Daylight Test

"During this test, which took place in daylight, seven British stations were received at loud-speaker strength. These seven stations were the two Daventrys, distance seventy miles; London and Newcastle, distance about a hundred and thirty miles; Manchester, distance forty miles; Stoke, distance thirty miles; and Nottingham, distance twenty miles.

"In addition, several Continental stations have been received at good loud-speaker strength on the 'Chapman-Reinartz 2,' including Radio-Paris, Hilversum, Budapest, and the usual German stations.

"Apart from its good performance as regards volume, range, and selectivity, it may be claimed for the receiver that it gives extraordinarily good purity of reception."

Our Own Tests

It was with this encouraging report that members of the AMATEUR WIRELESS Technical Staff carried out independent tests in North London. We can confirm Dr. Chapman's estimation of the receiver's capabilities; we consider that the receiver is considerably superior to the average straightforward two-valve Reinartz.

Hamburg was received clear of interference from the strong transmission from 2LO, and whilst selectivity was quite exceptional, it was gratifying to find that this valuable attribute had not been attained at the expense of volume, which was well up to normal for a two-valver.

Valves and Batteries

Constructors of the "Chapman-Reinartz 2" who desire to duplicate the results

we have shown the receiver to be capable of delivering, should make a note of the following operating and working details.

As regards the type of valves to use, we refer the reader to the valve table on this page. Any of the combinations recommended can be relied upon to give good results. If 4- or 6-volt valves are preferred, the corresponding types in these voltages can be selected.

An H.T. battery of not less than 120-volts

Valves to use with the "Chapman-Reinartz 2" Some highly-recommended two-volt combinations		
Make	Detector	L.F.
B.T.H.	GP210	P227
COSMOS	SP16/G	SP18/RR
COSSOR	210LF	230P
EDISWAN	LF210	PV225
MARCONI	DEL210	DEP240
MULLARD	PM1LF	PM252
OSRAM	DEL210	DEP240
SIX-SIXTY	210LF	230SP

is necessary; one of the medium-capacity size is advised.

A 16-volt grid-bias battery and an accumulator rated at 2, 4, or 6 volts, according to the voltage of the valves, will complete the battery requirements.

Operation

Assuming that the valves and batteries have been provided and a reasonably good aerial and earth system is available, as well as a good-quality loud-speaker, the operation resolves itself into a careful manipulation of the tuning and reaction condenser dials.

With the switch to the left and the rheostat on, broadcasting between wavelengths of 300 and 500 metres can be picked up. Set the reaction-condenser dial on the left to zero and then slowly rotate the tuning-condenser dial on the right until the local station is heard.

If this is not loud enough at the minimum reaction setting, increase reaction until good strength is obtained. The reaction must be very carefully applied, and not in excess, otherwise two things will happen: (1) the quality will be impaired owing to a cutting off of the sidebands and (2) oscillation will be set up, causing interference with neighbours' reception.

Owing to the special selectivity of the receiver, it is important to rotate the tuning control *very slowly*, otherwise weak stations may easily be missed.

The Long Waves

For long-wave reception, set the switch knob to the right, thus bringing into circuit the large basket coil, and at the same time cutting out the small basket coil.

The choice of programmes is considerably widened by the inclusion of long-wave tuning, for it is a fact that many listeners fail to take advantage of the several high-power long-wave Continental stations just because they lack long-wave coils. A flick of the switch and no coil-changing makes long-wave reception a simple and well worth while procedure with the "Chapman-Reinartz 2."

Relays of programmes from Continental broadcasting stations are included among the features promised for next winter to Irish Free State listeners.

In August, 303 radio-telephone conversations were exchanged between England and America and 323 between France and America. The calls from Germany numbered only 67, Holland 9, Belgium 6, Denmark 2, and Sweden none.

Full constructional details of this remarkable receiver, which is the subject of the free blueprint given with this issue, appear on pages 612-614

AMATEURS have not taken to the metal panel. Personally, I never thought it offered any decided advantages, except for receivers for short-wave work or those having two or three H.F. stages.

My Wireless Den

Weekly Tips for the Amateur *By W. JAMES*

a certain waveband and so if you have a receiver containing a choke and instability occurs on certain wavelengths, suspect the choke—I always do. One choke that I recently tested seemed to work fairly well on the medium wave-

Metal Panel Precautions

Many components cannot be used with very thin panels unless bushes or spacing washers are used. A further difficulty is that components are also not always suitably insulated. Take, for example, the popular type of push-pull switch. These usually comprise two contact springs held by nuts and bolts to a piece of ebonite. As a rule, the heads of the bolts are well counter-sunk below the surface of the ebonite, but I have noticed examples where the heads were flush with the surface. If one of these were used with a metal panel . . . ! Look out for points of this sort if you are thinking of forsaking ebonite!

Mains Hum

It is strange how individual wireless components have their own little peculiarities.

I was recently testing an H.T. eliminator with a four-valve receiver, and I found that it gave a slight hum when the set was tuned to the carrier wave of the London station. The hum was not sufficient to interfere with speech or music, but was, all the same, quite noticeable.

I altered the value of the various smoothing condensers and also earthed the cases of the components—two devices which are usually successful in cases of this sort. But this time they were quite ineffective.

I finally stopped the hum by connecting a small H.F. choke in each lead to the power transformer. Elaborate coils were not necessary, a pair of hand-wound coils of 100 turns each and about 2 in. in diameter being quite satisfactory. I used No. 34 d.s.c. wire.

Loud-speakers—and Receivers

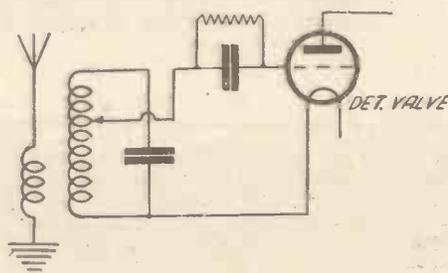
One job of testing which always fascinates me is that of determining the lowest frequency at which different loud-speakers will respond. I have a special low-frequency oscillator for this kind of work.

The average horn-type of speaker does not reproduce far below 100 cycles. The frequency of middle C on the piano is 256 cycles, and 100 cycles is little lower than one octave below middle C. Many people whose loud-speakers do not reproduce lower than this, however, seem to be quite satisfied! There are some cone loud-speakers which cannot reproduce notes much below this.

My advice to the amateur who wants good quality is to exercise great care and to stint no money in the choice and purchase of his loud-speaker, and then to design his receiver to suit it. It is quite useless, for example, to have a receiver that will amplify low notes which the speaker cannot reproduce. It is even worse than useless, since distortion and motor-boating are more likely to occur in receivers which reproduce the low notes well.

A Tuning Tip

Many readers will have found that a circuit connected to a detector of the leaky grid-condensers type usually tunes broadly. This is because the grid leak is across the tuning coil; when the tuning coil is inefficient the lowering of selectivity will not



A Tuning Tip

be very marked, but in the case of highly-efficient low-loss coils it certainly will be.

Above a method is indicated whereby I find these effects can be minimised. When the grid condenser is joined to the top of the coil, tuning is broad, but as the connection is made further down the coil selectivity and volume improve. These improvements are most marked when the tuning coil is a good one. After a certain point on the coil results will begin to fall off again.

H.F. Chokes

Good results cannot be obtained in wireless without team work among the components! Likewise the standard of the set is the standard of the worst component! Of course, some components are of more importance than others. For example, the anode-circuit choke coil can cause any amount of trouble if it is poorly designed. Its function, of course, is to prevent H.F. currents getting into the L.F. amplifier (which would, of course, cause instability).

Many choke coils are satisfactory on only

lengths, but caused the set to oscillate when it was tuned to the longer wavelengths. Manufacturers should not issue choking coils which are faulty in this respect—some of them seem to think that a choking coil merely comprises three or four thousand turns of wire, which is certainly not the case! The sizes of the wire and former and the number of turns in each slot are the important factors.

Coil Sizes

Do you know how to work out coil sizes? I always remember that the L.C. value for 600 metres is very nearly 0.1. Thus, if the tuning condenser has a maximum value of .0005 microfarad, the inductance of a 600-metre coil will be 200 micro-henries ($\frac{1}{0.0005} = 200$ micro-henries, since the L.C. value involves farads). Similarly, if the tuning condenser had a maximum value of .0003 microfarad a 330 micro-henries coil would be required.

The minimum wavelengths of these two circuits would be about 200 metres. All these values are, of course, only obtained when the coil and condenser are used by themselves—as in a tuned-anode circuit such as might be employed with a shielded valve. They will, however, be roughly correct for the aerial circuit provided the aerial is joined to a tap on the coil which does not include more than about one quarter of the total number of turns.

Winding Details

With the inductance value known, the following list gives the number of turns of wire necessary for different formers:

	Coil of 200 micro-henries	
Tube 3	in. dia.	50 turns of No. 24 d.s.c.
" 2 1/2	" "	60 " " " 24 "
" 2	" "	70 " " " 26 "
	Coil of 330 micro-henries	
Tube 3	in. dia.	67 turns of No. 24 d.s.c.
" 3	" "	53 " " " 26 "

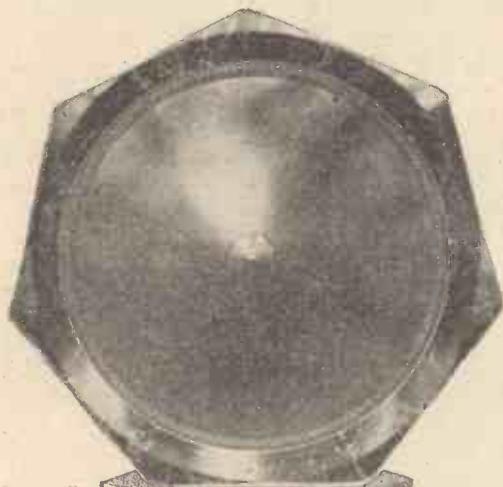
A dispatch from Shanghai states that the National Government has decided to construct a powerful wireless station at Lung-hua, a suburb of Shanghai, and has entrusted the plans to the director of the Nanking Wireless Office. It has been ascertained that it is an independent undertaking of the Nationalist Government. Already a contract has been made with the Siemens Schukert Company, of Germany, for the purchase of plant.

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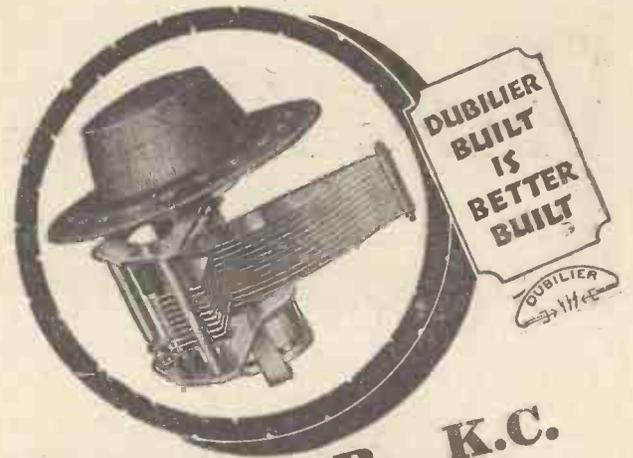
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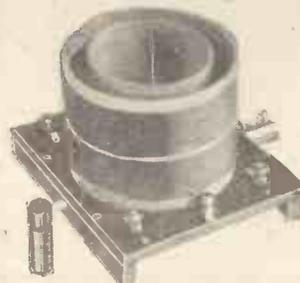


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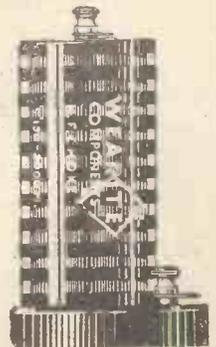
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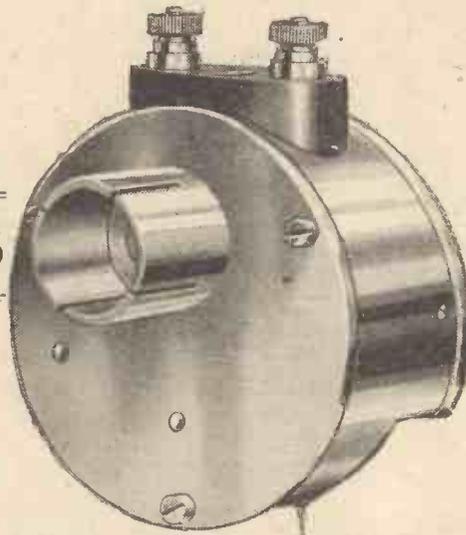


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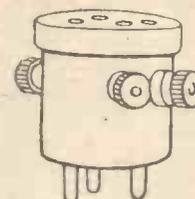


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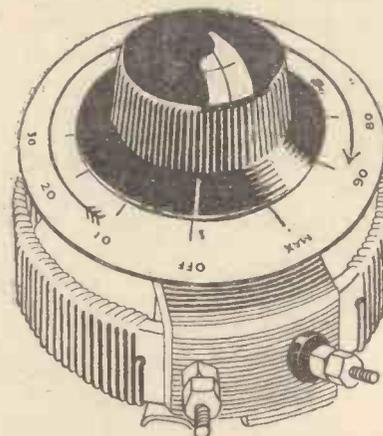
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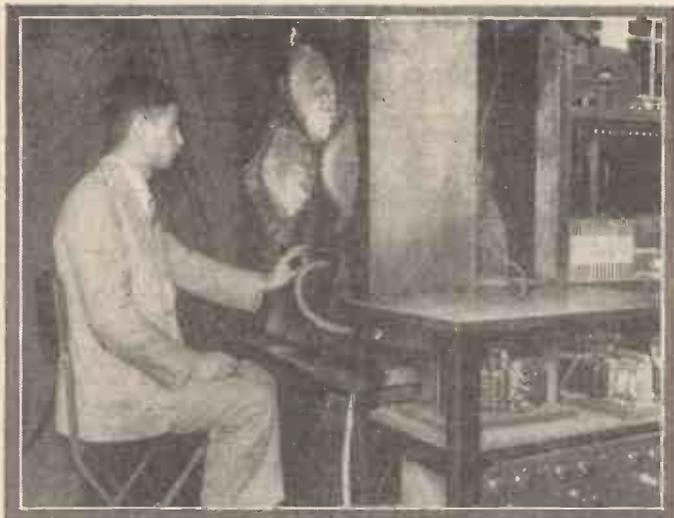
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A START WITH TELEVISION BROADCASTING IN AMERICA

WRNY Puts Out A Regular Transmission



A general view of the television transmitter. The arc light is at the extreme right, facing the scanning disc and the person being televised. The edge of the disc is just visible beyond the wooden framework. The three round affairs are the photo-electric cells covered with copper gauze for shielding.

TELEVISION broadcasting on the regular broadcast band was successfully demonstrated for the first time in New York recently, when the images of living people were put on the air through the transmitter of station WRNY, located at Coytesville, N.J., and received in Philosophy Hall, of New York University, at University Avenue and 181st Street. The images as viewed in the television receiver were about 1 1/2 in square, and comprised the heads and faces of various individuals. The images received resembled rough newspaper half-tones and were clear enough to enable the observers to distinguish the winking of a man's eyes, the opening and closing of his mouth, and the movement of his head from side to side.

The television impulses were broadcast within the 5,000-cycle modulation channel to which all broadcast stations are limited in the U.S.A. The WRNY television transmissions were made on the regular 326-metre channel, and the receiving was done with a standard broadcast radio receiver to which had been added a flat metal disc, a small motor, and a device known as a "neon tube." Listeners who had their sets tuned to WRNY during the periods the experiments took place heard the television impulses as a fluctuating squeal.

The development of the transmitting and receiving apparatus has been made by the Pilot Electric Manufacturing Company, of Brooklyn. The equipment was designed by John Geloso, chief engineer of the company. He has collaborated with Hugo Gernsback, president of WRNY and publisher of *Radio News*.

The first broadcast marked the inauguration of what Mr. Gernsback claims is the first regular television broadcasting service in the world. Television transmission has been undertaken by a few scattered stations, he says,

but only of an experimental character. For the benefit of television

experimenters, the Pilot television will be "on the air" through WRNY for five minutes of each hour during the time WRNY broadcasts. The images of living persons, animated dolls, and other objects will be televised, not only through WRNY on its regular 326-metre wave, but also through its associated short-wave station, 2XAL, operating on 30.91 metres. The signals of the latter station are heard with great regularity in Europe, South America, Africa, and Australia; so it is quite likely that listeners in these countries will be able to reproduce the images with the proper receiving apparatus.

The WRNY and 2XAL schedule of broadcasting is as follows:—

MONDAYS	TUESDAYS
7 a.m. to 9 a.m.	7 a.m. to 9 a.m.
11 a.m. to 1 p.m.	11 a.m. to 1 p.m.
2 p.m. to 7 p.m.	7 p.m. to 12 midn't.

WEDNESDAYS	THURSDAYS
7 a.m. to 9 a.m.	7 a.m. to 9 a.m.
11 a.m. to 1 p.m.	11 a.m. to 1 p.m.
2 p.m. to 9 p.m.	
FRIDAYS	SATURDAYS
7 a.m. to 9 a.m.	7 a.m. to 9 a.m.
11 a.m. to 1 p.m.	11 a.m. to 1 p.m.
2 p.m. to 11 p.m.	7 p.m. to 10 p.m.
SUNDAYS	
7 a.m. to 9 a.m.	
11 a.m. to 12.30 p.m.	
1.30 p.m. to 6.30 p.m.	

Technical Details

The operation of the Pilot television system is explained by Mr. Geloso as follows:—

The person to be televised sits in a booth facing three large photo-electric cells, arranged in a triangle in a wooden frame, through the centre of which is an opening about 6 in. square. On the other side of this frame is a scanning disc with a spiral of 44 tiny holes. This revolves at the rate of 450 revolutions per minute in front of a powerful electric arc, the light of which passes through the holes and falls on the face of the subject.

These rays of light are reflected into the photo-electric cells, which produce electrical currents corresponding in intensity to the light and dark portions of the skin and hair. This action may be compared to that of the microphone in translating the tones of the voice into electrical vibrations. The impulses generated by the cells are amplified by a series of specially shielded resistance-coupled amplifiers, which in turn feed the broadcast transmitter. The latter sends out a signal which is plainly audible in any ordinary broadcast receiver tuned to 326 metres.

At the receiving end the signals are tuned-in in the normal manner, but instead of being made to operate a loud-speaker, are lead to a neon gas glow tube which is fixed behind a scanning disc similar in construction

(Continued at foot of next page)



John Geloso, the designer of the apparatus, observing a picture in the receiver

For the Newcomer to Wireless: ABOUT RECTIFICATION

AT our last meeting you promised to discuss leaky-grid and anode-bend rectification. Which is the better?

It depends on what you want to do.

How do you mean?

Well, each has its strong points and each its weaknesses.

Please explain.

Leaky-grid-condenser rectification is far more sensitive than anode-bend to a weak signal.

That seems a good point.

It certainly is, but—

There always seems to be a "but."

— The grid leak and condenser rectifier cannot deal properly with a very strong signal. Also it introduces a certain amount of distortion and no one in his senses would think of using it in a set designed essentially for good quality reproduction.

Then how should it be used?

It is called for in any set without high frequency amplification which is intended for dealing with weak or distant signals—hence it stands supreme in the short-wave set and the single-valver intended for ordinary work. Another trouble about it is, though, that it makes for rather broad tuning.

Why?

Because, in order to make the valve rectify on this system you must give its

grid a positive bias and when you do that you cause what is known as a flow of grid current. We will discuss grid current another time. It must suffice now to say that its presence flattens the tuning.

But single-valve sets seem fairly selective?

They would not be unless they were fitted with reaction, and often too much use must be made of reaction which sharpens up the tuning at the expense of quality.

What coupling should follow the leaky-grid condenser rectifier?

Undoubtedly the coupling should be of the transformer type, care being taken to see that the primary of the transformer has a big inductance value. This means that the step-up ratio between primary and secondary will be small.

What about anode-bend rectification?

Properly used, anode-bend rectification is very satisfactory. Unless, however, a set incorporating it is intended entirely for the reception of the local station it is essential to have high-frequency amplification.

Why?

The efficiency of the anode-bend rectifier goes up as the square of the applied voltage.

For goodness' sake explain that dark saying.

What I mean is this: If you double the strength of the impulses reaching the grid of such a detector, the output in the plate circuit is not twice, but two *squared*, or four times as great. Make the incoming impulses three times as big and the efficiency of your detector becomes three *squared*, or nine times as great.

Well, supposing that we have a good high-frequency amplifier before the rectifier.

In that case I would vote for anode-bend detection every time.

Just why?

An essential condition in this form of rectification is that the detector valve is given a negative grid-bias which completely prevents any flow of grid current. It can, therefore, be made highly selective and if properly adjusted, it will deal with a strong signal without distortion. The coupling, though, is of importance.

What form should it take?

The anode-bend rectifier does not go well with transformer-coupling. To enable it to work to advantage, I would have a resistance-capacity coupling, or that of the choke-capacity variety, but a choke of high inductance value is desirable.

"A START WITH TELEVISION BROADCASTING IN AMERICA" (Continued from preceding page)

to the one employed at the transmitter. The disc used in the demonstration receiver was 20 in. in diameter, had 44 holes, and revolved at a speed of about 450 revolutions per minute. The neon tube produces a pinkish glow, which varies in accordance with the impulses feeding it. As the scanning disc revolves it builds up a series of images, line by line, with a rapidity sufficient to create the illusion of "moving images." The images were viewed through a square opening.

The important problem of synchronising the transmitting and receiving discs has been solved by a system which involves the transmission of one synchronising impulse at the end of each rotation of the spiral of tiny holes in the scanning disc. In the receiving disc this impulse operates a small relay, which in turn causes a magnetic device to either accelerate or retard the receiver's scanning disc. This arrangement holds the images in the receiver steady and prevents them from slowly wandering out of "frame" when the speeds of the trans-



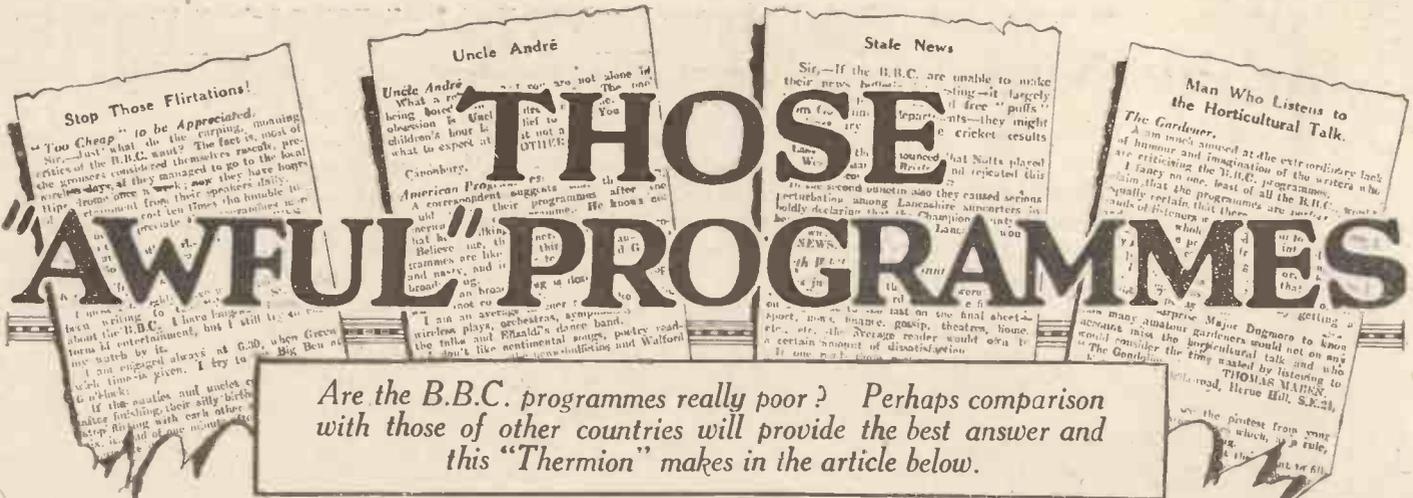
The inside of the broadcast and television receiver. The receiver proper occupies the lower part of the cabinet; the television apparatus the upper

mitting and receiving motors vary slightly. An auxiliary manual control is provided on the receiver to enable the operator to "frame" the images at the beginning of a period of reception.

"Any radio experimenter owning a radio receiver equipped with a resistance-coupled amplifier can readily reproduce the television images broadcast from WRNY," said Mr. Geloso. "The only additional apparatus he needs is a scanning disc, a small motor, and a neon tube."

Those responsible for the broadcasts state that television to-day is only for the experimenter who will assemble his own apparatus. Complete, foolproof television sets will not be ready for some time to come. In the meanwhile experimenters will be gaining valuable experience and will be contributing important improvements.

With a regular television service now under way at WRNY, Mr. Geloso will seek to perfect the numerous details of the system, such as the automatic synchronisation feature, proper modulation of the neon tube.



AS an ardent listener-in since the pre-broadcasting era, I have often wondered whether our home programmes really deserve the caustic criticism that has come their way from the very first day when 2LO put his opening programme upon the ether. I am, I suppose, just as fond of a grouse as most Englishmen, and I am not going to say that I haven't frequently come across programmes from the home stations of which few, if any, items were to my taste. Still, I get a vast amount of pleasure from my receiving set, and though I like occasionally to range abroad, I confess that the bulk of my radio entertainment is derived from 2LO or 5GB.

One is always meeting people who shake their heads sadly at the B.B.C. and say: "Ah, if only they would give us programmes equal to those sent out by the German or the American stations." Funnily enough, I have met quite a number of Germans and Americans who have expressed similar longings about their own stations!

It happens that I am able at most times

of the year to receive one or two German stations with really excellent quality, and by using an extra valve I can bring their strength easily up to that of either of my local stations. Sometimes I have tuned in one of them intending to stick to it for the whole evening, but in such circumstances I have nearly always gone back to one or other of the home stations after an hour or so. Similarly, with the aid of the short-wave set I have listened to many American programmes, and, like many of my readers, can therefore claim first-hand knowledge of them. Quite honestly, I don't think that either Germany or America can show programmes as genuinely pleasing to the majority of listeners as those of the British stations. Some people might like them better, but most of us would not be at all pleased if we had to exchange with either country for, say, a week on end.

Some Comparisons

Before me as I write are the detailed programmes of three representative stations for the week, that between September 30 and October 6. The stations are 2LO, Cologne, and WLW, the last being one of the leading American stations, renowned over there for the brightness of its entertainment. Let us take one night at random and see how they compare. Shutting my eyes and dabbing with a pencil, I find that fate has selected Wednesday, October 3. Very well, we will see how they divide the time between 6 p.m. and 11 p.m. Let us take the London station first of all. Analysing the programme, I find fifteen minutes devoted to light music, seventy-five to variety, forty-five to piano solos, seventy to a play, thirty-five to news, and sixty to talks. That seems pretty varied fare, but naturally the reader exclaims at there being a whole hour of talks. There are four of them, as a matter of fact. Ten minutes devoted to gardening, a quarter of an hour to health, twenty minutes to mechanics in daily life, and a quarter of an

hour to a topical talk of which the title is not given.

—and America

How does America compare? As the station opens at 6.15 p.m. for the evening, the total time under consideration is a quarter of an hour shorter. It is made up of news, fifteen minutes; talks, fifty-five minutes (only five minutes less than our own); orchestra, sixty-five; and variety, one hundred and fifty. But I don't know that the variety is really very varied. My experience of American stations is that variety generally means a succession of singers of "Blues" and kindred things. Further, one of the variety parties is on for half an hour on every night of the week except Sunday, and the orchestral music given on all nights of the week is provided by one of two hotel orchestras.

Now for the German station. Here we have ninety minutes given up to orchestral selections, ninety to light music, ninety to talks, fifteen to news, and fifteen to variety.

(Continued on page 630)



Impressions of Two Popular Broadcasters—
John Kirby and Claude Hulbert

RADIO PARIS' NEW HOME

By Our French Correspondent



An Impression of the Orchestral Studio at Radio Paris

RADIO PARIS, the best of the French long-wave stations, has recently moved into a magnificent new home in the Rue Francois in the most aristocratic quarter of Paris. The station is the French one best known to English listeners, many of whom tune in the Sunday midday concerts.

There are two new studios in the building, one very large and the other cosy and small. Since they came into use, listeners have been very generous in their praise of the conditions which are a great improvement on the old when, in the Boulevard Hauss-

mann days, the studio was in the cellar! Now, too, Radio Paris has its own private line to the transmitter in the suburb of Clichy, some three miles away.

The great oblong studio, which is on the ground floor, is a marvel of artistic decoration. It can accommodate a symphonic orchestra of 60 musicians. Gold is the outstanding colour in a very rich decorative scheme, and the hidden lighting sets off the beautiful yellow-curtained ceiling. At intervals down the length of the room are red and gold pillars of peculiar grace, on which are strung the heavy grey velvet drapings which regularise the echo.

At the end of the room, opposite the Reiss microphone some 50 or 60 feet away, is a dais, flanked by sweeping balustrades, and to which access is by five or six carpeted steps. It is on and round this dais that the choirs are ranged when they perform, the orchestra being at their feet. The conductor stands with his back to the microphone.

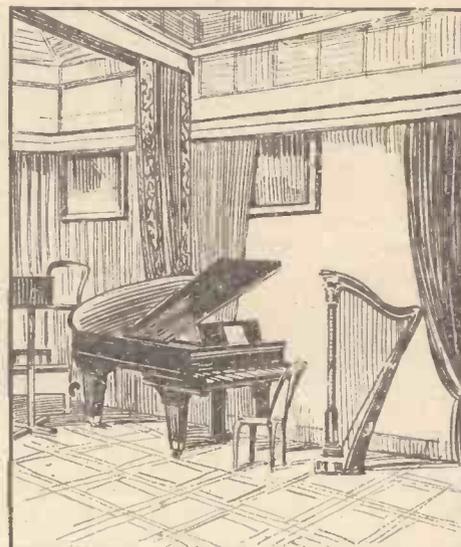
Acoustical Problems

Much studied attention has been given to the construction of the studio and many experiments in the various acoustical problems were carried out.

The announcers' and controllers' sound-proof cabin behind the microphone must not be forgotten.

Up the steps of the dais and through the giant, gold-painted swing-doors is the small

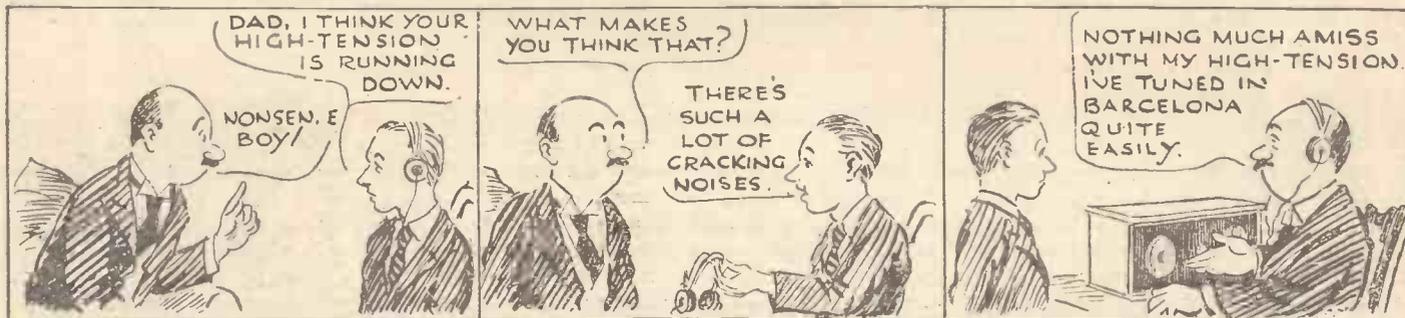
studio. How different from the other! Heavy grey-velvet drapings are everywhere, echo being killed in less than a quarter of a second! Listeners like that studio though, and it is true some merry antics go on in there sometimes as well as serious business. There's Dr. Diffre, the physical jerks expert, who starts early in



A sketch of the ordinary studio

the morning, then there's the well-known quartet, the jazz orchestra, and the children's corner.

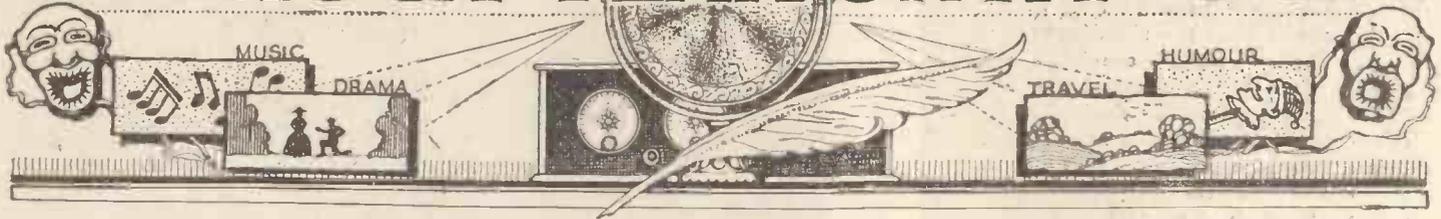
MR. FLEX TUNES IN BARCELONA--



-WHERE THE NUTS COME FROM!



WITHOUT FEAR OR FAVOUR



A Weekly Programme Criticism by Sydney A. Moseley

IT was a good idea of burlesque, *Disgrace*, by Cyril Campion. The profession of burglary as a new career for sons of the New Poor offers scope for broad humour. The climax was weak. Missing shooting a policeman offers little in the way of a curtain. However, the little play was good.

The second, adopted from Guy de Maupassant's *Diamond Necklace*, also had the recommendation of having few characters. These plays are more like the right sort.

In view of the criticism of a friendly correspondent on military bands, I took special notice of one of the latest. The programme was too long to quote here. But it was well varied and fresh without being too heavy.

John Ansell and his orchestra, too, were well in form. What with "Peer Gynt," "Slavonic Dance," and "Ali Baba," his programme must have appealed to nearly everybody—highbrows, lowbrows, and nobrows. Trefor Jones sang nicely.

Diners in our West End restaurants seem to have little respect for good music. Lunch-time transmissions are almost invariably spoiled by the chatter and clatter. (Or is it the clatter which is spoiled?) One wouldn't mind so much if the music was light; but as the music at Frascati's, for instance, often vies with the best broadcast compositions, it is a pity the transmission is accompanied with laughter and a general buzz of conversation. But perhaps these broadcasts are more "experiments in realism." A suggestion made to me is that the B.B.C. should form, say, a five-piece orchestra to broadcast lunch-time music from the studio, the programme being modelled on those provided by their West End contemporaries.

The Birmingham variety concert didn't come up to standard. Brown's "Orlturnatives" Dance Band is new to me. (The stupid name is enough to damn it.) I admired the lone fiddler heroically struggling to make himself heard against the loud pounding of piano, banjo, and drums. Who were the couple who converted their "Spanish Duets", turn into a series of Yankee syncopated numbers?

When it comes to tasteful duets sung with expression, give me Wynne Ajello and Herbert Simmonds. Together with the Squire Celeste Octet they gave a splendid hour's entertainment. "Reminiscences of Tchaikowsky" is always appealing, and is another example of music that must please almost everybody.

Ciciely James has a pleasing voice and comes over well. But don't you like hersongs?

Will Hay's last show previous to his tour was up to his usual standard of excellence. Let's hope the B.B.C. are making arrangements for his immediate re-engagement on his return.

As an example of what he declares to be "the talkie-talkie programme," a friend sends me extracts from one evening's programme from 2LO and 5XX:—

- 6.0. Poetry.
- 7.0. "Week-end in Paris."
- 7.25. "Nineteenth-century Novelists."
- 8.0. "American Labour Problems."
- 8.10. Sir Walford Davies.

"Surely this is too much—five talks in 130 minutes?"

What is the right time for these foreign talks? At about 6.20 I switched on to London in hopes of hearing some music. Instead, I was greeted by a torrent of passionate Italian! Now, Italian is a nice language, and Mr. Breglia probably means well; but these foreign talks are incomprehensible to ninety-nine out of every hundred listeners, and, therefore, in addition to having no entertainment value, are not worth anything educationally.

What did listeners think of "Fantasia on British Sea Songs," arranged by Sir Henry Wood?—an item of the last Promenade Concert.

Now that the season has finished, one can look back gratefully to the many occasions on which we have been allowed to hear well-known composers conduct their own works. We have also heard first compositions. The latest of these is "The Rock," by Dorothy Howell. We have watched other conductors than Sir Henry Wood, and have marvelled that there should be such a marked difference between one man's handling of an orchestra and another's. Perhaps we have paid too much attention sometimes to the conductor rather than to the music—for you cannot do both successfully. But for the advantages derived—many thanks.

A friend tells me that while walking through a wood last Sunday afternoon he heard strains of music. Led on by curiosity, he suddenly stumbled across a little group of people, seated on a carpet of autumn leaves, round a very neat portable wireless set. Up into the still air floated the voice of George Parker, singing a song by Mozart.

The days when music may be enjoyed in the open air are rapidly passing, but these late autumn days are very bewitching. They call you out—and with a portable set you need not feel the wrench of having to forgo a good programme.



A BAIRD TELEVISION BROADCAST

A vocal and visual transmission of Miss Evelyn Laye received at a West End store. Shoppers in the store were able to hear Miss Laye rendering some of her songs, and to see her at the same time.

THE CHAPMAN-REINARTZ TWO

FREE SUPPLEMENT PRESENTED WITH "AMATEUR WIRELESS," OCTOBER 20, 1928

BLUEPRINT
No A.W.148

PANEL 14"x7"

Cut slot in panel 1 1/4" x 3/16"
& fixing holes 1 1/2" apart

AERIAL TUNING 2 1/2"
CONDENSER

.0005 mfd.

To Moving plates

Systoflex covering 3 1/2"

WAVELENGTH
CHANGE
SWITCH

Systoflex covering

REACTION
CONDENSER

.0003 mfd.

To Moving plates

3 1/2"

Checked by *AS*

RHEOSTAT

Baseboard level

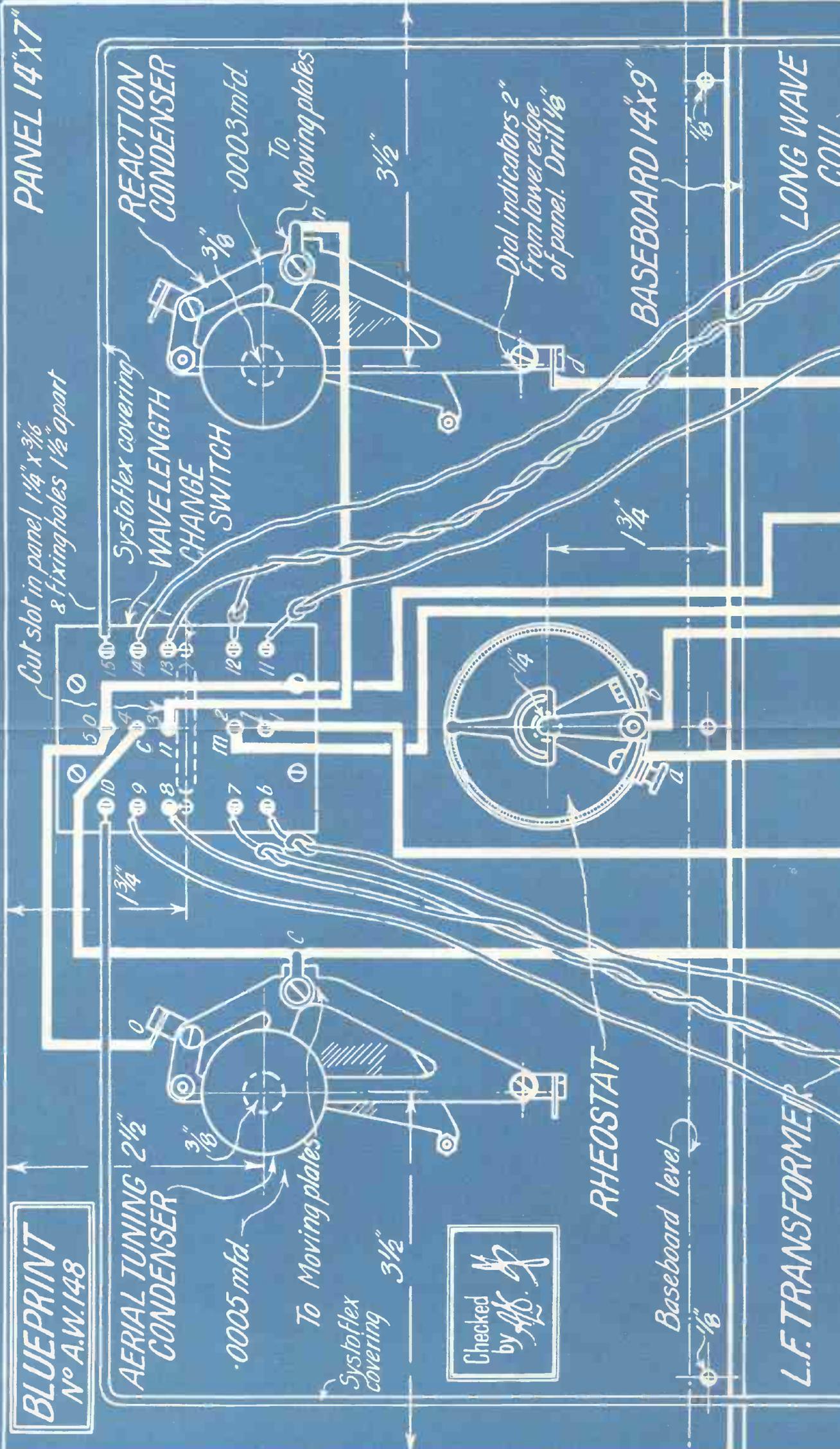
1/8"

Dial indicators 2"
From lower edge
of panel. Drill 1/8"

BASEBOARD 14"x9"

L.F. TRANSFORMER

LONG WAVE
COIL



SHORT WAVE COIL

12 ft. fine flex

1/2" x 1/8" iron bracket

No 2 B.A. screwed brass rod

Ebonite 3/4 x 1"

L.F. VALVE

To grid

44 ft. No 24 d.c.c. wire

GRID LEAK 2 megohms

.0003 mfd.

holder

Ebonite 3/4 x 1"

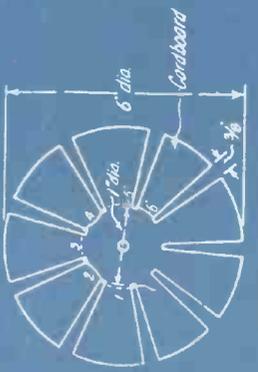
DET. VALVE

To grid

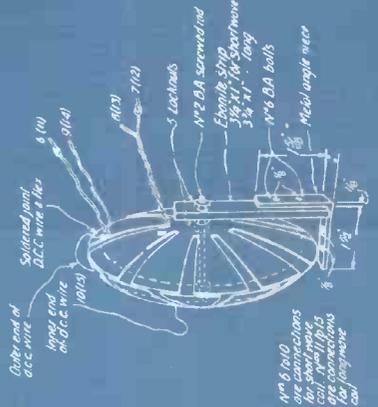
60 ft. fine flex

120 ft. No 24 d.c.c. wire

DETAILS OF THE SPECIAL HOME-MADE COILS



Method of winding D.C.C. wire on short wave coil



Method of winding D.C.C. wire on long wave coil



Ebonite 12" x 2"

L.S.- L.S.+ H.T.+2 G.B.- H.T.- H.T.+1 G.B.+ L.T.- L.T.+ EARTH AERIAL

H.F. CHOKE

G.B.+

L.T.-

L.T.+

EARTH

AERIAL

THE secret of the success of my new receiver illustrated in this article is the coil with the simultaneous windings, whereby a tight coupling is obtained between the aerial-earth and earth-grid coils. Can a coil be devised in which this coupling is tighter or more efficient? For a long time the present writer thought that a more efficient coil for the Reinartz circuit was unlikely to come from further experiment.

However, in wireless, as in everything else in science, the final word *can* never be said. A more efficient coil can be devised for the Reinartz circuit. All that is needed is a length of that twin-wire, twisted electric flex, more familiar to the electrician than to the wireless constructor. In a length of such flex there are two separate, insulated, stranded wires, so twisted together as to give a peculiarly tight and efficient coupling between the two wires.

Coil Connections

How, then, is the flex to be used? A glance at Fig. 1 will answer this question. Here a length of flex on the left is lettered to correspond with the circuit connections on the right. There are two distinct wires in this flex. Let us call the two wires *pq* and *xy*. The starting end *p* of the one wire of the flex is connected to *A* in the circuit diagram. The finishing end *q* of that same wire of the flex is connected to the starting end *x* of the second wire of the flex. The join of *q* and *x* is connected to *E* in the circuit diagram on the right. The finishing end *y* of the second wire of the flex is soldered to a length of ordinary d.c.c. wire, the finishing end of which is

connected to *G* in the circuit diagram.

This flex coil is of considerable interest, and experi-

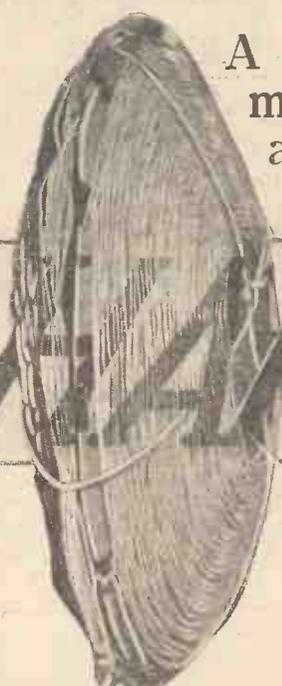
menters who are desirous of trying it in the Reinartz circuit may be glad of the following particulars. For the ordinary broadcast wavelengths, the length of the flex should be 12 ft., and this should be followed by 40 ft. of d.c.c. wire. Such a coil, when used with a .0005-microfarad variable condenser, will have a wavelength range of about 250 to 500 metres. The coil should be of the basket type, wound on a flat cardboard disc with an odd number of radial slots.

For a wavelength range of about 1,000 to 2,000 metres, the length of flex should be 60 ft. This should be followed by

A receiver based upon a modification of the Reinartz circuit, a unique type of home-made windings which are

Build The

CHAPMAN



QUALITY, VOICE CUT OUT THE

Designed by Dr. E.

120 ft. of d.c.c. wire. The coil may be wound on a wooden "X" former. Fuller details will be given next week in a special

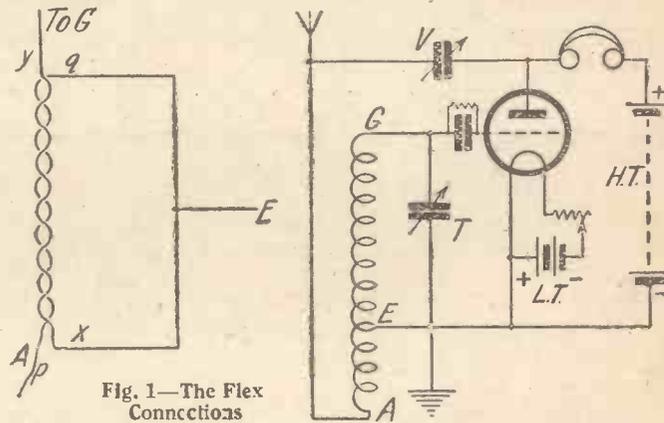
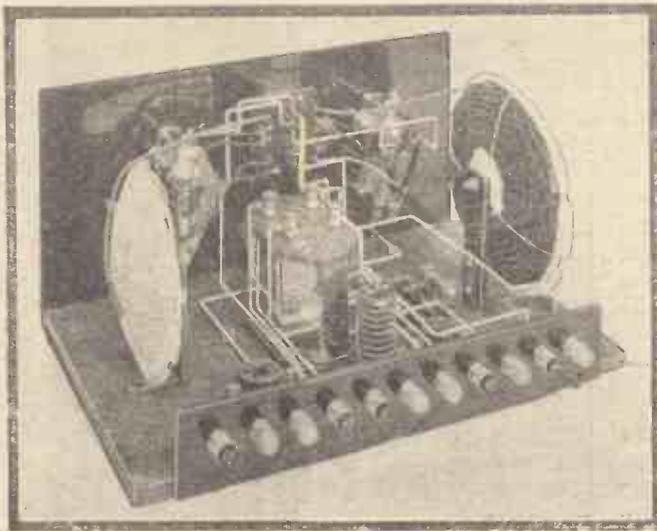


Fig. 1—The Flex Connections



This picture shows the unusual coils

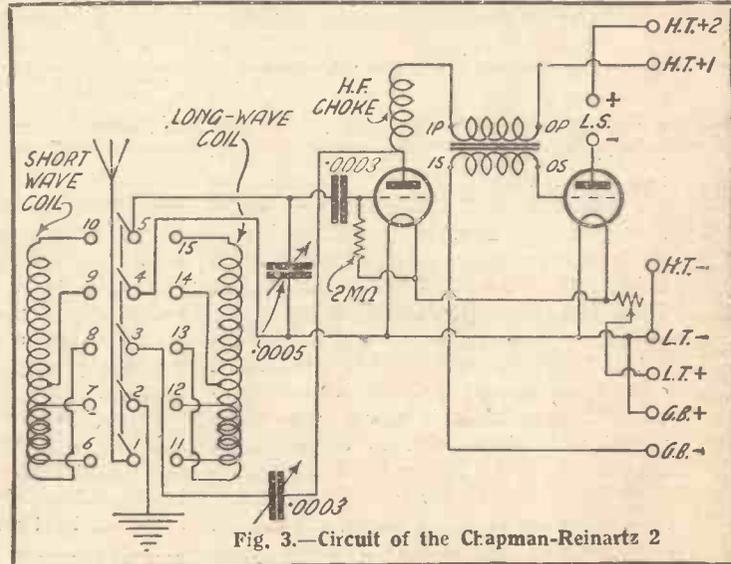


Fig. 3.—Circuit of the Chapman-Reinartz 2

most important development—circuit and incorporating a hand-made coil with special connections put on simultaneously

REINARTZ 2

VOLUME—and YOU LOCAL STATION

H. CHAPMAN, M.A.

article devoted to the coil construction. So far, we have been considering the Reinartz circuit in its original form and

of the Reinartz circuit, and the use of the flex coil in that modified circuit. Consider Fig. 2, in which there are two circuit diagrams.

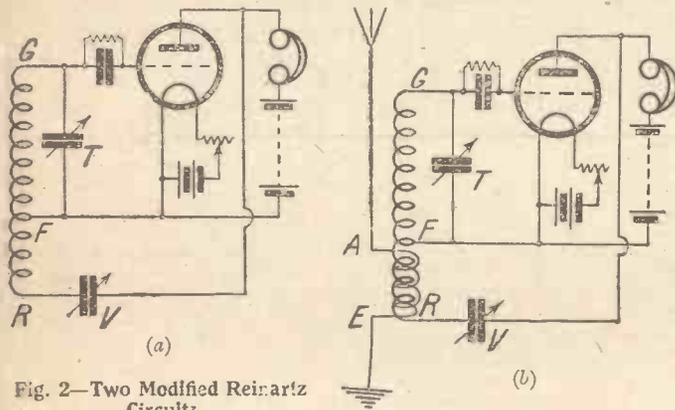


Fig. 2—Two Modified Reinartz Circuits

we have arrived at a point when it may be suggested that the flex coil as used in this receiver is

low-tension positive and the high-tension negative.

Now consider (b), the second circuit diagram of Fig. 2. In this diagram we have circuit diagram (a), with the addition of a separate aerial-earth coil tightly coupled to the coil RF. Clearly, we can make use of our flex coil in this circuit (b), one strand of the flex being used as the aerial-earth coil AE, and the other strand being used as the coil RF. One end of the strand RF will be connected to the reaction condenser v, the other end of that same strand will be soldered to the ordinary d.c.c. wire which forms the coil FG, the point of the soldered connection being F of diagram (b), Fig. 2.

The Result of Experiment

The writer has carried out a series of experiments, using flex coils connected as shown in circuit diagram (b), Fig. 2, and the results have been decidedly encouraging. Flex coils with the five-point connections A, E, R, F, G have been constructed to cover the usual wavelength ranges, and various proportions of length of flex to length of d.c.c. wire have been tried with interesting results.

This new type of coil has been found under independent test to give a particularly high degree of selectivity. The coil is equally good with regard to volume and range, while the reaction control it gives is excellent.

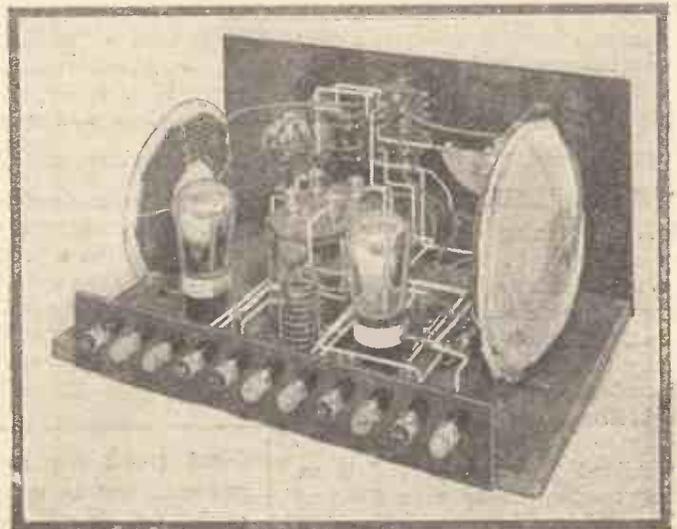
A two-valver incorporating two of these coils is illustrated in this article, the complete circuit diagram being shown as Fig. 3.

As the diagram Fig. 3 shows, long- and short-wave flex coils are connected to either

List of Components

- Ebonite or bakelite panel, 14 in. by 7 in., and strip, 12 in. by 2 in. (Beopl, Ebonart, Paxolin, Pertinax).
- B. seboard, 14 in. by 9 in. (Pickett, Camco).
- .0005-microfarad variable condenser with slow-motion movement (J.B., Polar "Ideal," Burndept, Igranic, Burton, Ormond).
- .0003-microfarad variable condenser with slow-motion movement (J.B., Polar "Ideal," Burndept, Igranic, Burton, Ormond).
- Variable rheostat, 7 ohms (Lissen, G.E.C., Igranic).
- Five-pole change-over switch (Utility).
- Two anti-microphonic valve holders

- (Trix, W.B., Benjamin, Wearite).
- .0003-microfarad fixed condenser and grid-leak holder (Lissen, Graham-Farish, Trix, Dubilier, C.D.M.).
- 2-megohm grid leak (Lissen, Graham-Farish, Trix, Dubilier, C.D.M.).
- High-frequency choke (Wearite, R.I. and Varley, Trix, Burndept, Watmel).
- Low-frequency transformer (3½-1) (British General, Philips, Lissen, Ferranti, R.I. and Varley, Igranic).
- Eleven terminals, marked: Aerial, Earth, L.T.+ , L.T.- , G.B.+ , G.B.- , H.T.+1, H.T.+2, H.T.- , L.S.+ , L.S.- (Belling-Lee, Eelex, Igranic).
- Connecting wire (Glazite).



Construction is particularly simple

“THE CHAPMAN-REINARTZ 2” (Continued)

side of a five-pole change-over switch, the five points involved in the switching being the aerial, earth, grid of detector valve, filament of detector valve, and reaction

condensers: that for tuning on the right and that for reaction on the left. The change-over switch and filament rheostat are mounted one above the other between the condenser dials, as shown.

on the base between the coils as shown. The terminal strip at the back of the baseboard carries aerial, earth, loud-speaker, and battery terminals in the order indicated.

The free blueprint will be found invaluable in the wiring up of the components. The wiring of the components on the panel



Above: The complete Chapman-Reinartz Receiver
Below: A plan view of the set

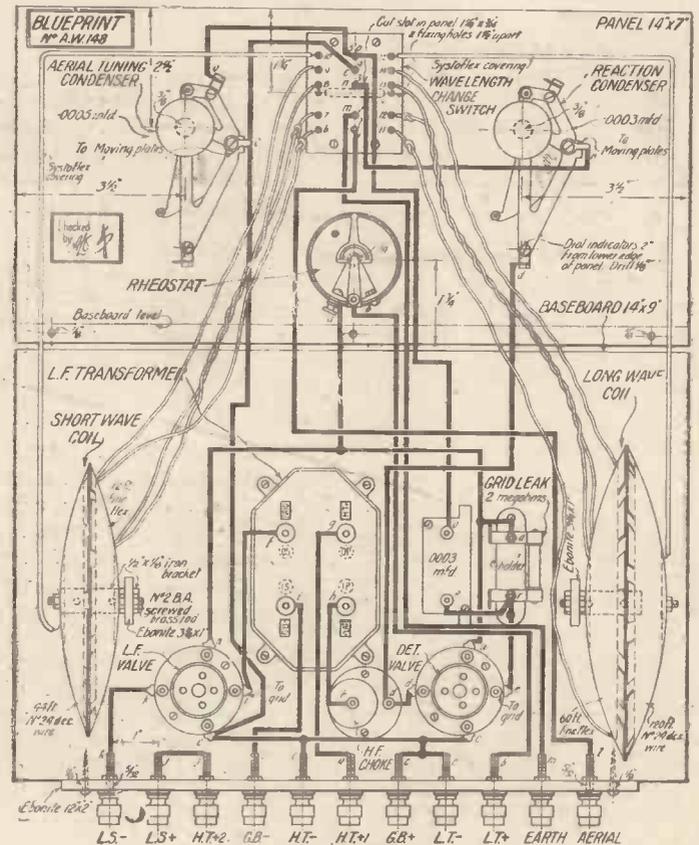
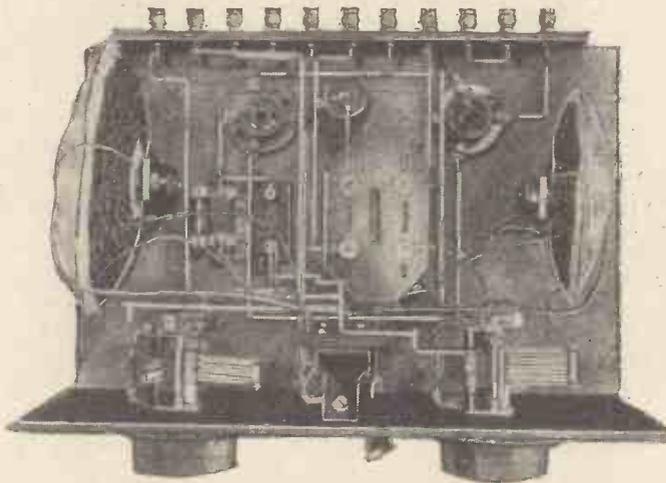


Fig. 4—The wiring diagram. A free full-size blueprint with all coil details is given with this issue

condenser. The detector valve is coupled to a low-frequency amplifying valve through a low-frequency transformer.

The blueprint given free with this issue shows the panel and baseboard layouts as well as the method of mounting the long- and short-wave flex basket coils, Fig 4.

by the two flex coils, the short-wave one behind the tuning condenser and the long-wave one behind the reaction condenser. The method of coil mounting is clearly shown on the blueprint. The L.F. transformer, H.F. choke, two valve holders, and grid leak and condenser are fitted

and baseboard and the terminals on the terminal strip is carried out before the coils are fitted in position.

Next week full winding details will be given of the two coils, which can then be mounted and connected up to the two sides of the five-pole switch.

“BAND” AMPLIFIERS

WHEN the tuning of a multi-valve receiver is made too selective, the quality of reproduction suffers because some of the essential modulation “side-bands” are cut out, and fail to reach the detector. At the same time for selectivity the tuning must be made sufficiently sharp to prevent overlap between one transmission and another.

The Vreeland “band amplifier” is an interesting compromise between the two limits. By suitably adjusting the inductance value of the H.F. transformer windings, and by introducing definite capacity values either as a shunt across the windings, or in

the form of extra fixed or variable condensers, the resonance curve of each intervalve coupling is given a “filter band” characteristic. In other words, the tuning curve is flat-topped so as to include all necessary side-bands, but has steep sides so as to ensure a sharp cut-off, thus preventing “over-lap.”

B. A. R.

Next week we are making a presentation of a novel device to assist you in getting that distant station. Full particulars appear on page 595.

THE HAUNTS OF LIGHTNING

INVESTIGATIONS made in France have proved that lightning has a predilection for striking over certain types of ground. Compact chalky areas enjoy a definite immunity in comparison with ground composed of silicious rocks, or of soils containing a heavy mineral deposit. It further appears that the regions most frequently visited by lightning discharges are characterised by the fact that the layer of air near the ground is more highly ironised than elsewhere. It is possible that the explanation of well-recognised “dead areas” in broadcast reception may be found in the same phenomenon. M. B.

YOU are the best judge of which TRANSFORMER to use

and Lissen believe you want to be free to choose your own parts and to replace them in a free market and not be forced to pay any more than the price you choose when you come to renewals or alterations.

LISSEN OFFER YOU TWO TRANSFORMERS.

There is the famous 8/6 Lissen Transformer which has sold by the hundred thousand and has been used, it is safe to assert, in almost every known radio circuit during the two years since it was introduced. When Lissen introduced this transformer, it was as good for every purpose as any transformer, however high in price. That is why it enjoyed such a huge popularity. Even now you cannot do better than try

for general use the famous model 8/6

Ratio 4 to 1

In a different field altogether is the new Lissen Super Transformer. If you want music on a background of utter silence, if you particularly require constant amplification over the whole band of audible frequencies, if you have a fancy to get the best value in transformers in this price field—in fact, wherever in your opinion a SUPER TRANSFORMER is called for, there it will pay you to use a

LISSEN *super transformer 19/6*

Ratios $3\frac{1}{2}$ to 1 and $2\frac{1}{2}$ to 1

Obtainable at all radio dealers

LISSEN LIMITED
FRIARS LANE, RICHMOND, SURREY

(Managing Director : THOS. N. COLE)

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

MATCHED REACTANCE GANGING

A New System of Single-dial Control

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

ONE-DIAL control has always exercised a fascination for the wireless enthusiast, but so far little has been done in the application of this principle to simple circuits. As long ago as 1926, I linked three circuits together so that the two high-frequency stages and the detector could be tuned by a single dial.

The tests made in designing that particular receiver, however, showed that there was a certain inefficiency in the method, and that the circuit did not remain accurately in tune over the full wavelength range. The practice was to balance up the circuits at some suitable point and then to rotate all condensers together, assuming that the circuits would continue to be tuned.

The method operated satisfactorily, owing to the reserve of amplification obtainable from the circuits used, but tests showed that there was quite a distinct falling out of step at the ends of the scale, and any unusual conditions tended to aggravate this defect. Thus, in some cases, the receiver did not give as good results as in others. Furthermore, attempts to apply the method to two circuits only (one H.F. stage), where the amplification was much less, was not very successful, owing to this falling out of step at the ends of the scale.

An Undoubted Advantage

I have been conducting experiments at the Furzehill Laboratories for some time with a view to producing a better system of gang control. There is no doubt that the use of one tuning control instead of two is a great advantage, and this fact is undoubtedly responsible for the present-day preference for simple detector circuits rather than circuits employing high-frequency amplification.

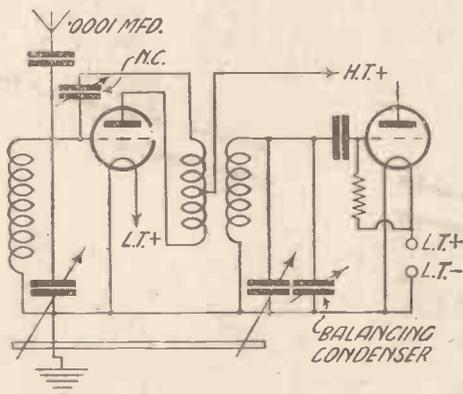
If single control tuning, however, can be made as simple to adjust as the ordinary detector circuit, then a great deal of the difficulty disappears and this, coupled with the use of modern circuits, brings single control definitely nearer to practicability. What systems must be used, therefore, in order to avoid the defects associated with the older methods?

It is clear, on examining the matter, that any attempt to balance the circuit by tuning the condensers individually and then rotating them together is not really a correct solution to the problem. We have various stray capacities associated with the circuit. The principal effect is that of the aerial itself, which is always connected across the first circuit, while across the other circuits we have various valve capacities and other circuit capacities which vary with circumstances. The only scientific

method is to arrange to balance up the various circuits so that their effective capacity is then exactly the same.

The Latest System

This is the method used in the latest system of gang-control. The reactance of the circuit is matched by balancing up the various capacity effects, after which the circuits can be tuned as one without any difficulty. To be successful, this method requires that the tuning circuits shall be identical, but with modern production this is not a matter involving great difficulty.



A skeleton matched-reactance circuit is shown above. The aerial is coupled direct to the first grid through a .0001 condenser, while the anode circuit of the valve contains the split-primary transformer coupled to the second valve. This was one of the circuits used in the experiments, "Q" coils being employed for the tuning. The modern "Q" coil is an accurately made product, and two coils by the same maker can be assumed to be of the same inductance within very small limits.

Associated with the first coil we have the capacity of the aerial which will be reduced by the presence of the .0001 condenser, the effective capacity being of the order of 60 or 70 micro-microfarads. Across the

second circuit there is a small capacity effect, due to the presence of the detector valve and to the capacity coupling between the primary and secondary windings of the transformer, which introduces an effect equivalent to a small capacity across the secondary. The net capacity across this circuit is of the order of 30 or 40 micro-microfarads; so that if we connect a small balancing capacity across this coil and make the value of this equal to the difference between the two parallel capacities, we then balance the circuit up exactly.

Results of Tests

Tests were made with two independent condensers, first of all. These were both set at exactly the same value, so that the readings on the dials were the same, and the circuit was tuned in accurately by means of the balancing condenser. This was then left set and the circuit was tuned in to various other wavelengths. It was found that the tuning condensers rotated absolutely together, there being less than one degree difference on the dials at the end of the scale.

This indicates, therefore, that the ganging is correct as nearly as it can be made, and in practice this is found to be the case. A receiver was constructed on this principle using a dual condenser instead of an ordinary two-gang condenser, all balancing being carried out by the small parallel capacity shown. Although only one stage of high-frequency amplification was present, over thirty stations could be obtained with great ease on the loud-speaker by rotating the simple tuning dial. The reaction control, of course, was adjusted in each case to give the best results, but the balancing capacity once set did not require to be readjusted, indicating that the ganging was absolutely true.

Further details of this new method and circuits embodying it will appear in future issues of AMATEUR WIRELESS.



Where the "A.W." sets are developed. Furzehill Laboratories by night

Installation of experimental radio television apparatus in South Africa is under consideration. The local press states that a British television company is offering broadcasting television apparatus to radio stations in South Africa at a price between £500 and £600.

The first television drama broadcast by WGY, Schenectady, and its associated short-wave stations, was received in Los Angeles. A letter from Mr. Kenneth Ormiston there says: "Results only fair. Voices very strong with occasional glimpses of faces."

HOW TO USE YOUR GRAMOPHONE

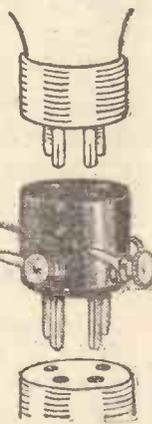


AS AN ORCHESTRA FOR REAL DANCING!

Use the Lissen Electrical Pick-up on your gramophone and you can amplify the music, adjusting the volume with the round milled nut provided until it fills the largest room or hall. You can dispense with an expensive orchestra and yet enjoy real dancing to the finest bands.

The Lissen Electrical Pick-up helps your gramophone to reproduce the low notes of the music more perfectly than ever you have heard them—it takes the needle scratch from old records and makes new records last longer.

LISSEN ELECTRICAL PICK-UP 15'



INSTRUCTIONS:

Replace your sound box with the Pick-up, connect from Pick-up to Grid Terminal of the Lissen Pick-up Adaptor and to one filament terminal of the Adaptor. Plug the Adaptor with valve fitted in it into the Detector Valve Socket of a two or three valve set.

Full particulars included in every Adaptor Carton. Obtainable at most dealers, but if any difficulty, send direct to factory (post free or C.O.D.). Pick-up 15/-, Adaptor for same, 1/6.

LISSEN LTD., FRIARS LANE, RICHMOND, SURREY

(Managing Director: Thomas N. Cole)



What to See at the Manchester Exhibition



MANY wireless enthusiasts who were unable to visit the Radio Exhibition recently held at Olympia, London, will have an opportunity of acquainting themselves with latest wireless developments when the fifth Manchester Radio Exhibition opens at the City Hall, Deansgate, Manchester, on Monday, October 22.

Organised by the Manchester *Evening Chronicle*, the Radio Manufacturers' Association, and Provincial Exhibitions, Ltd., the show opened on October 22 will continue until November 3.

The Exhibition will be officially opened at 3 p.m. on October 22 by Mrs. Philip Snowden, supported by many well-known broadcasting authorities. Captain Eckersley, the chief engineer of the B.B.C., will be among those present at the opening ceremony.

Several attractions have been arranged to add to the interest of the exhibitors' displays. Constructional competitions, for example, have been organised by the Manchester *Evening Chronicle*, who are providing £250 in prizes.

Another feature will be the concerts arranged as a nightly event in the Concert Hall. The Manchester broadcasting station will radiate some of these concerts.

Wireless Pictures, Ltd., in conjunction with the Association of British Radio Societies, have arranged a demonstration of great interest—the transmission and reception of pictures by the Fultograph system of picture broadcasting.

Exhibitors who manufacture or market powerful amplifying equipment will be able to demonstrate the progress made in the radio



Dubilier Triple Gang Condenser

reproduction of gramophone records. These demonstrations will take place in the Concert Hall during the intervals of the orchestral performances.

Many of the exhibitors showing their products at Manchester were seen at Olympia. Space prohibits lengthy descriptions of individual displays, but among those that should on no account be missed by visitors are those given below. The references are necessarily brief, but readers can obtain fuller particulars on application to the firms concerned.

Wet H.T. batteries fitted in wooden containers, giving a 32-cell bank of 48 volts, made by the Standard Wet Battery Co., 184 and 188 Shaftesbury Avenue.

An entirely new Exide H.T. battery of 10,000 milliampere hours, produced by the Chloride Electrical Storage Co., Ltd., Clifton Junction, near Manchester.

An improved design of pintless six-contact coil former, shown by the British Ebonite Co., Ltd., Nightingale Road, Hanwell, W.7.

The 1929 Ediswan R.C. Threesome, shown by the Ediswan Swan Electric Co., Ltd., of

123 and 125 Queen Victoria Street, E.C.

The new Six-Sixty pentodes and screen-grid valves, marketed by the Electron Co., Ltd., of 122 Charing Cross, W.C.

The Winner type H.T. battery, a popular line of the Ever Ready Co. (G.B.), Ltd., of Hercules Place, Holloway, N.7.

Model 35 receiver, incorporating a screen-grid valve, detector valve, and pentode power

See "A.W.'s" Stand at Manchester

The original "Chapman-Reinartz 2," described in this issue, will make its first public appearance at the "Amateur Wireless" stand at the Manchester Show, where readers, and indeed all interested in wireless, will find a cordial welcome.

Members of the Technical Staff will be in attendance to answer, free of charge, any wireless queries that visitors would like to have settled.

Some other receivers that have been recently described in "Amateur Wireless" and its monthly contemporary, "Wireless Magazine," will be on show.

Copies of the current issues of these journals, as well as a useful range of technical books, complete a display that no wireless enthusiast who visits the Show can afford to miss.

valve, and which can be worked entirely from the mains, manufactured by the Marconiphone Co., Ltd., of 210 Tottenham Court Road, London, W.1.

Mains units for working the receiver partly or entirely from the mains, conforming in every detail with I.E.E. regulations, made by E. K. Cole, Ltd., of London Road, Leigh-on-Sea.

The new type J low-frequency transformer added to the Igranic range of components, manufactured by the Igranic Electric Co., Ltd., 147 Queen Victoria Street, E.C.4.

The new aperiodic tuner, 200-600 metres and 1,000-2,000 metres, an Anti-Mobo unit, and an improved gramophone pick-up, shown by R.I. & Varley, Ltd., 103 Kingsway, London, W.C.2.

Lissen variable condenser and super low-frequency transformer recently introduced as additional attractions to the already wide range of components manufactured by Lissen, Ltd., Friars Lane, Richmond, Surrey.

Climax Galby earth, made by Climax Electrical, Ltd., of Quill Works, Putney, S.W.15.

An eliminator for H.T. supply with a total output in the neighbourhood of 200 volts 100 milliampere, just introduced by Ferranti, Ltd., Hollinwood, Lancs.

The new and extensive range of Mazda valves introduced and marketed by the

British-Thomson Houston Co., Ltd., Aldwych, W.C.2.

Mullard Pure Music loud-speakers, in two models, shown by the Mullard Radio Valve Co., Ltd., Nightingale Works, Balham, S.W.12.

The Philips low-frequency transformer with the new iron core, shown by Philips Lamps, Ltd., 145 Charing Cross Road, W.C.2.

Drum control models of the well-known K.C. variable condensers manufactured by the Dubilier Condensers Co., Ltd., Ducon Works, Victoria Road, North Acton, W.3.

The Dominion Three-valver made by Brownie Wireless Co., Ltd., Nelson Street Works, Mornington Crescent, N.W.1.

Polar Ideal variable condensers with slow and quick motion dials, made by Wingrove and Rogers, Ltd., 188 and 189 Strand, W.C.2.

The N.S. non-spillable range of batteries produced by C. A. Vandervell & Co., Ltd., Acton, W.3.

A Lotus portable set incorporating screen-grid and pentode valves, marketed by Garnett Whiteley & Co., Ltd., Lotus Works, Liverpool.

Ebonart panels with the new moire water silk surface design, manufactured by Redfern's Rubber Works, Hyde, Cheshire.

Ten-volt high-tension accumulator blocks of 2,750 and 5,500 milliamperes capacity, recently introduced by Oldham & Sons, Ltd., Denton.

The Screened Dimic Three, manufactured by L. McMichael, Ltd., Wrexham Road, Slough.

Carborundum permanent detectors and resistance capacity units, made by the Carborundum Co., Ltd., Trafford Park, Manchester.

A wide range of variable condensers of all types made by the Ormond Engineering Co.,



Electron Turntable for Portables

Ltd., 199 to 205 Pentonville Road, London, N.1.

Keystone components, including the Copex Universal tuning coil, manufactured by Peto-Scott, Ltd., 77 City Road, E.C.1.

An all-mains receiver, complete with gramophone pick-up, produced by the Watmel Wireless Co., Ltd., High Street, Edgware.

A new range of Atlas battery eliminators, made by H. Clarke & Co. (Manchester), Ltd., Atlas Works, Eastnor Street, Old Trafford.

Permanent-magnet moving-coil loud-speakers, a speciality of A. Baker, 89 Selhurst Road, S.E.25.

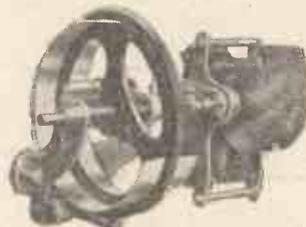
Exelex treble-duty terminals and kindred accessories made by J. J. Eastick & Sons, Bunhill Row, E.C.1.

Indicating terminal, greatly reduced in price, made by Belling & Lee, Ltd., Queensway Works, Ponders End.

"Q" coils produced by Wright & Weaire, Ltd., 740 High Road, N.17.

The new Cossor Melody Maker, incorporating a Cossor screen-grid valve, shown by A. C. Cossor, Ltd., Highbury Grove, London, N.W.

The B.B.C.'s exhibit at Manchester will be similar to that at Olympia, with the exception that the boat-race apparatus will not be shown.



Igranic Vernier Drum Control

THE FERRANTI -THE BIG TRANSFORMER



The Ferranti A.F.5 Transformer does a big job in a big way.

It is built to a standard and not to a price, and the Ferranti standard of Transformer performance is not likely to leave much to be desired!

The A.F.5 handles the sound-reproduction problems of modern broadcast programmes with an ease that is amazing. It makes possible a rendering of speech and music that is so nearly perfect as to verge on the uncanny.

FERRANTI LTD.
HOLLINWOOD
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TYPE A.F.5
30/-

"A.W." TESTS OF APPARATUS

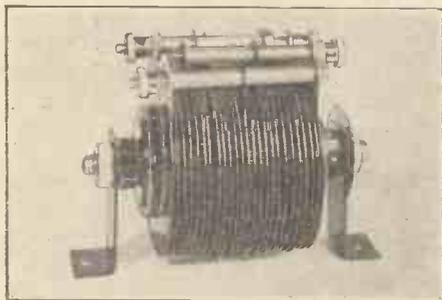
Conducted by our Technical Editor, J. H. REYNER, B.Sc. (Hons.), A.M.I.E.E.

Westinghouse Metal Rectifier for L.T.

EVER since its inception, the metal rectifier has caused much comment and interest amongst radio enthusiasts. This device, which is marketed by the Westinghouse Brake and Saxby Signal Co., Ltd., of 82 York Road, King's Cross, N.1, obtains its rectifying action by contact between a metal and a metal oxide enabling an alternating current to pass with far greater ease in one direction than in the other.

The applications of the metal rectifier are vast: of late it has been used successfully for lighting the filaments of valves and converting A.C. for use with D.C. receivers.

A special L.T. rectifier unit which has been submitted by the makers for test, is designed to pass a rectified current of approximately 1 ampere and in order to do this successfully, has been increased in physical dimensions. To reduce any risk of



Westinghouse Metal Rectifier for L.T.

damage through overheating the electrodes, an increased diameter of cooling fin is fitted. The set of A.C. and D.C. electrodes are taken out to bus-bars with terminals and notations. In conjunction with a correct step-down transformer and smoothing unit, it is therefore, simple to connect the unit up.

We recently tested this type of metal rectifier in a low-tension eliminator giving one amp. In conjunction with a 2-ohm smoothing inductance and two electrolytic condensers excellent results were obtained when supplying the filament current of a multi-valve set. Hum was hardly noticeable even when broadcasting had temporarily ceased.

There is undoubtedly a future for this useful device which eliminates the necessity for an L.T. accumulator.

Graham-Farish Grid-leak Holder

A GRAHAM-FARISH resistance-capacity-coupled unit has been recently tested and reported on in these columns. This unit utilises the Graham-Farish grid

leak and anode resistances which have a form of spring connector both simple to fix and electrically efficient.

The makers, whose address is 17 Masons Hill, Bromley, Kent, have recently submitted for test a special holder for these resistances. Two terminals with clips are



Graham-Farish Grid-leak Holder

mounted on a neat insulated moulded former. The clips have spade terminations so that the holder can be fitted with ease. A central hole in the moulded base suffices for screwing the component to the base-board.

Harlie Neutralising Condenser

THE chief requirements in a neutralising condenser are capacity range, low minimum capacity, and freedom from backlash in the movement.

The neutralising condenser made by Harlie Bros., of Balham Road, Lower Edmonton, N.9, which has been submitted for test, possesses all these qualities to a satisfactory degree. The capacity range extends from 2.3 to 31.3 micro-microfarad, and is adequate for all types of valve in



Harlie Neutralising Condenser

existence. Since seven revolutions of the red insulated knob are required to vary the capacity from minimum to maximum, the required adjustment may be obtained with ease.

The component consists essentially of a small metal plunger attached to a screwed rod which rotates with the insulated knob, that may be let down inside a metal screen,

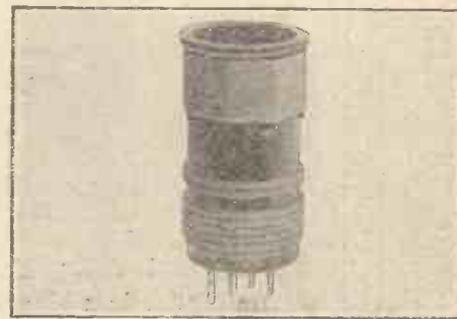
which is protected by an insulated covering. The motion is pleasantly smooth and free from backlash.

Two terminals and soldering tags are provided for connection purposes, and a single-hole fixing device is also incorporated.

Formo Double-waveband Coil

A QUICK change-over from the high to the normal broadcasting wavelengths is desirable in present-day receivers. Although coil-changing forms a ready means of tuning from one wavelength range to another, it is a somewhat tedious process and therefore unpopular with the broadcast listener.

A double-range coil consisting of two windings on the same former is marketed by the Formo Company, of 22 Cricklewood Lane, London, N.W.2. The ends of the



Formo Double-waveband Coil

windings are taken to four pins on the base of the former which fit into the standard six-socket base. The coil may, therefore, be placed in the aerial circuit of sets hitherto employing the normal six-pin coil. Change-over from one wavelength range to another is accomplished by the use of a simple short-circuiting push-pull switch. In the low-wave position the high-wave winding is short-circuited, while in the high-wave position, the two coils are placed in series.

The short-wave winding is wound on an octagonal former affording a substantial air dielectric. The long-wave winding comprises a number of steps of banked self-supporting sections having a low self-capacity. The reaction winding is placed between the short and long wave inductances.

We tested this coil in a valve circuit with a series condenser of .0001 in the aerial and obtained good results on both wavelength ranges, which extended from 215 metres up to 610 metres and from 911 metres up to 1,760 metres, thus covering the chief English and European broadcasting stations. The reaction control was satisfactory over the whole range.



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RIPAULTS Chosen for the New Cossor Melody Maker

RIPAULTS' SELF-REGENERATIVE H.T. DRY BATTERIES

Give 50% Longer Life

Standard Capacity	Double Capacity	Treble Capacity
60 volts .. 10/6	60 volts .. 15/6	60 volts .. 19/6
99 volts .. 16/6	90 volts .. 22/6	90 volts .. 29/6
9-volt Grid Bias .. 1/9	18-volt Grid Bias .. 3/6	

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Get a copy of our 24-page Booklet.

LIGHT ON THE H.T. BATTERY

We have spared no expense in producing this extremely interesting and easily understood 24-page Booklet on H.T. Batteries, specially written for us by one of the best known contributors to Radio publications, who is recognised as an expert on H.T. Dry Batteries.

All requesting a copy of this 6d. Booklet and who mention AMATEUR WIRELESS will have one sent them Post Free upon receipt of 2d.

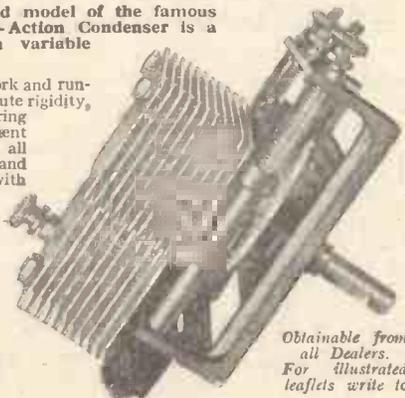
RIPAULTS' LATERAL-ACTION CONDENSER

The new improved model of the famous Ripaults' Lateral-Action Condenser is a great advance in variable condenser design.

The die-cast framework and runner plates give absolute rigidity, while the cam and spring method of movement entirely eliminates all signs of jerkiness and backlash. Tuning with the Ripaults condenser is a delight.

PRICES

- .0025, .0003, or .0005 without dial 10/6
- Slow Motion Dial 4/6
- Standard 4" Dial 2/3



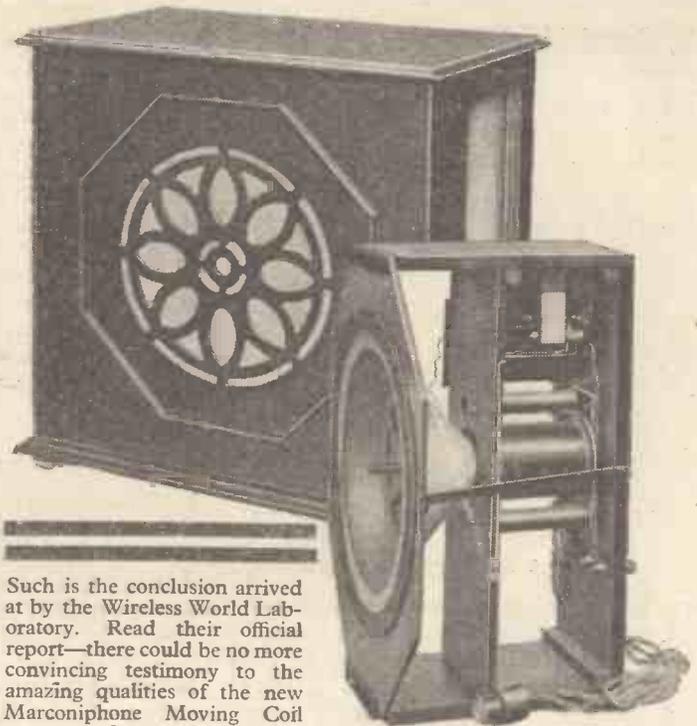
Obtainable from all Dealers. For illustrated leaflets write to

Ripaults

1 KING'S ROAD, LONDON, N.W.1

"As near perfection as one could wish"

"Wireless World"—September 5th.



Such is the conclusion arrived at by the Wireless World Laboratory. Read their official report—there could be no more convincing testimony to the amazing qualities of the new Marconiphone Moving Coil Speakers.

"The most interesting feature of this new loud-speaker is the method of suspending the cone. Parallel movement of the cone without side play is ensured, and in consequence the air gap has been considerably reduced, enabling the requisite flux to be produced with much less expenditure of power in the field magnet. The performance of this loud-speaker is as near perfection as one could wish. It is certainly impossible to detect any signs of resonance, high notes are reproduced with brilliance, the bass is present in natural and not overpowering volume."

Completely assembled Marconiphone Moving Coil Speakers in attractive cabinets, well built and of pleasing proportions, are available in models for Accumulator, D.C. and A.C. mains working. Prices 10 guineas to 17 guineas. The Moving Coil Unit alone, including output transformer, needing only a baffle for immediate use, costs only 6 guineas.

D.C. Mains Speakers and Units are easily converted for operation from A.C. Mains by the addition of a rectifying unit.

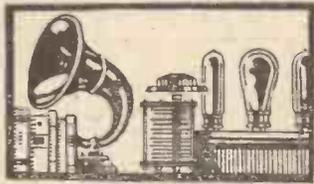
Send now, mentioning AMATEUR WIRELESS, for full particulars.

MARCONIPHONE MOVING COIL SPEAKERS & UNITS

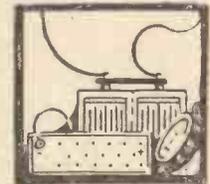
THE MARCONIPHONE COMPANY LTD.

(Dept. P), 210-212 Tottenham Court Road, London, W.1.

Showrooms: 210-212 Tottenham Court Rd., and Marconi House, Strand, London, W.C.2

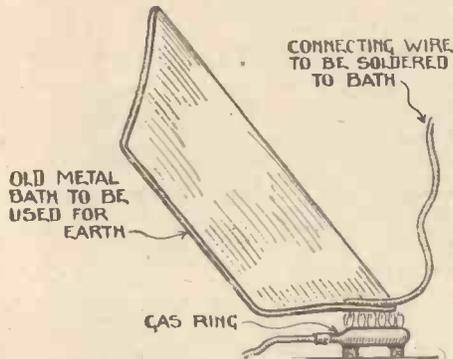


PRACTICAL ODDS & ENDS



A Good Earth

ONE of the best types of earth consists of a discarded metal bath buried in moist soil. A low-resistance connection must, however, be made to the bath, and to



How to Solder the Earth Lead

be this the connection must be sound and not liable to deterioration by corrosion, which is specially likely to be caused by the damp soil, if only a clamped contact is made between the bath and the connecting wire.

To solder a connection to a large metal object like a bath is not a very easy job and, in fact, is almost impossible if an ordinary soldering iron is used.

A simple means of making a good sol-

dered joint is fortunately available to every householder. The method is shown in the illustration. After cleaning the bath at the point where the wire is to be soldered, the bath is held over a lighted gas-ring. While the bath is heating, the end of the connecting wire, with small pieces of solder and a quantity of paste flux, are placed together on the heating part of the bath. When the solder melts it will run between the bath and the wire and on cooling a sound soldered joint will result. Needless to say, the bath should not be held with the bare hands while carrying out the work.

T. W.

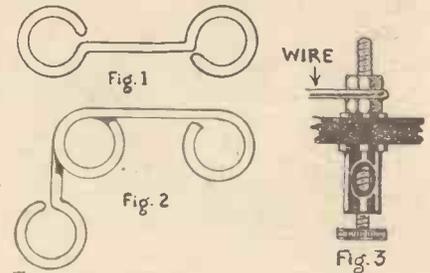
Solderless Connections

ALTHOUGH properly soldered connections are unquestionably a considerable asset in any receiver, inefficient soldering is generally worse than none at all. Unless, therefore, one happens to be an expert at the job, it is better to make the connections by means of nuts.

If this is properly done, good results will be obtained. It should be remembered, however, that wires cannot be joined to one another at intermediate points, and therefore all the wiring must be direct from terminal to terminal.

After cutting the wires to the correct

lengths, their ends should be formed into loops (Fig. 1) with round-nosed pliers. When several terminals are to be joined up in succession, a continuous length of wire can be used, loops being made at the intermediate points (Fig. 2). The wire should be flattened by lightly hammering the loops,



Making Solderless Connections

and then scraped clean and bright with a penknife. The importance of perfectly "clean" connections cannot be too strongly insisted upon.

In connecting the wires to the terminals, valve sockets, etc., the loops should be "sandwiched" (as in Fig. 3) between two nuts screwed up very tightly in opposition to one another. The wire will then be so firmly gripped between them that good contact will result and there will be hardly any risk of corrosion.

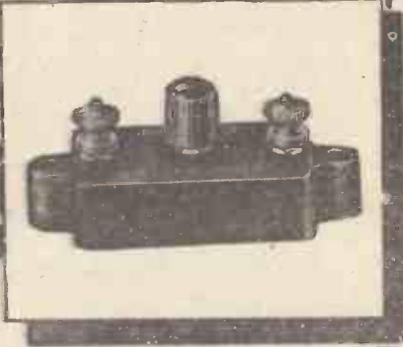
W. O.

THE TOUCHSTONE

Mr. W. James, the famous designer of sets, has just produced his best Four-valver, the TOUCHSTONE, a set which every home constructor will want to build.

Its performance is nothing short of phenomenal and you should not fail to read the complete constructional details given in the "WIRELESS MAGAZINE" for November, which will be on sale on Wednesday, October 24th, 1/-. This number contains over sixty features. Order a copy to-day!

DUBILIER
BUILT
IS
BETTER
BUILT



DUBILIER NEUTRALISING CONDENSER

This component is designed for baseboard mounting, and occupies very little space either vertically or horizontally. It has a minimum capacity of 5 micro-microfarads and a maximum of 50. At such an unusually low price it is sure to be a popular component.

If unobtainable from your dealer write direct to us giving his name and address.

DUBILIER
CONDENSERS

PRICE
3/6

Advt. of Dubilier Condenser Co. (1923) Ltd., Ducon Works, Victoria Road, N. Acton, W.3



STOP WASTING HOURS

£

There is Money
in Spare Time!

Here is a really genuine chance for making money in your spare hours which you must not miss. It is unique and quite dissimilar to all other schemes for making money at home.

Seriously and genuinely, a Golden Opportunity is now knocking at your door. The Coupon below is the latchkey which will open the door for you. Use it to-day.

In the hours you now spend just "passing the time away" you could be making money, producing a patented article, for which there is a constant demand. No cumbersome "plant" is necessary. Your own Kitchen Table can be your factory. Only a few simple tools which you can make are required. The work is simple and easy—even the children can help. The possibilities of making money are only limited by the time you spend on it.

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Think of the luxuries and comfort you could enjoy with £300 a year extra! Then send the Coupon below to-day for full particulars. For your own sake! For your family's sake! Only a restricted number of persons are allowed to manufacture under my Royal Letters Patent. This protection ensures a fair market for all. Arrangements will be made to take surplus output off your hands, thus guaranteeing your profits.

YOU can do it!

Seize your opportunity NOW. Don't say "I'll do it to-morrow"—for to-morrow never comes. The man who "wins" is a man of action—so "act" now. The posting of this Coupon is the first swing of the pendulum—the starting of the clock, ticking away, not WASTED HOURS, but GOLDEN HOURS—for YOU!

It is so easy to take the first step THIS MINUTE by simply sending the Coupon.

WILL YOU DO IT?

"MAKE-MONEY-AT-HOME"
COUPON

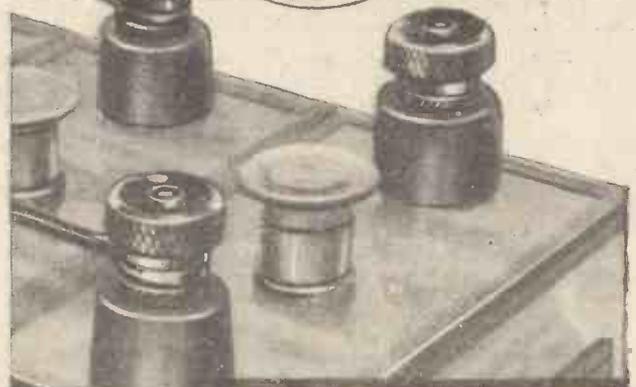
To Mr. V. ENGLAND-RICHARDS,
126, King's Lynn, Norfolk.

Sir,—Please send me at once, and FREE, full details as to how I can Make Money at Home in my spare time. I enclose 2d. stamp for postage.

Print your name and address boldly in capital letters on a plain sheet of paper and pin this Coupon to it.

"Amateur Wireless," 20/10/23.

EVERYTHING The G.E.C. ELECTRICAL
your guarantee



Accumulator Performance —and Value!

The "GEEKO" Type "B" full capacity Low Tension Accumulator will give entire satisfaction to all wireless users. It is *Guaranteed* to give long and perfect service. The plates are completely electrically formed. The container is made of thick celluloid of best quality and is fitted with non-spilling vents of adequate dimensions. There is ample clearance for sediment below the plates. All terminals are non-corrosive.

To these attractive features are added **REDUCED PRICES** which make the "GEEKO" L.T. Accumulator by far the best accumulator value on the market.

*For performance and value buy
"GEEKO" Wireless Accumulators!*

Cat. No.	Max'm Charge and Discharge Rate emfs.	Intermittent Capacity emp.-hrs.	PRICE each	
			s.	d.
* O 625	2	40	9	6
* O 626	3	60	11	6
* O 627	4	80	13	6
† O 632	2	40	19	0
† O 633	3	60	23	0
‡ O 639	2	40	28	6
‡ O 640	3	60	34	6

* 1 Cell, 2-volt. † 2 Cells, 4-volt.
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L.T. Wireless Accumulators

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AUTOMOBILE
Lighting and Starting
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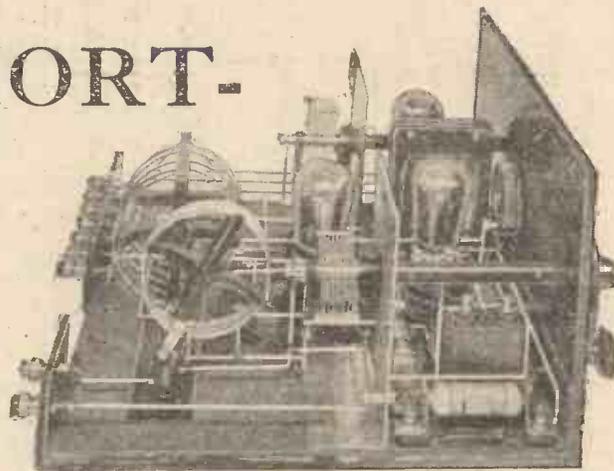
Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

THE ALL-PURPOSE SHORT-WAVE THREE

A Short-waver that can be used for the Broadcast Wavelengths, designed by

THE "A.W." TECHNICAL STAFF

The Theoretical Considerations of this Receiver were given Last Week



HAVING already discussed the theoretical requirements of an all-wave receiver, we can now turn our attention to the practical aspects of the problem. From the illustrations that accompanied the preliminary article last week the intending constructor will be able to gain a clear conception of the layout, which is rather different from usual.

Short-wave Requirements

Anyone who has had even a slight experience of short-wave reception will agree that a most important practical requirement is critical control of the reaction and tuning condenser dials. Hand-capacity effects are particularly troublesome on the short-waves. When the operator's hand is withdrawn from the dial a change in the capacity associated with either the tuning or reaction system is experienced and tuning or reaction, or sometimes both, are considerably modified by the position of the hand with respect to the condensers.

As in theory, so in practice, we have given the short waves the chief consideration and have let the other wavelengths take care of

themselves. This accounts for the somewhat unorthodox appearance of the layout.

To overcome the effects of hand capacity, special short-wave condensers have been used, having extended slow-motion dials and aluminium shields between the condenser vanes and the dials themselves. The

short-wave coils, and for one or two other small components.

It is inadvisable to crowd the components together more closely than specified, otherwise short-wave reception will suffer. This is especially so with the short-wave coils, which are so placed that there is no damping influence in the vicinity of their magnetic fields.

The new short-wave coils employed have just been put on the market by the Marconiphone Co. Ltd., and deserve a short description. The complete set consists of two combined tuning and reaction coils, mounted on substantial ebonite low-loss formers. One covers the wavelength band of 16 to 29 metres, with a .0001-microfarad variable condenser, the other covering, with the same capacity, a wavelength band from 29 to 52 metres. Both are used in conjunction with a 5-turn aperiodic aerial coil.

These interchangeable short-wave coils have their connections for tuning and reaction brought out to substantial clip contacts, which are a good tight fit in the coil base.

The coil base, besides its four non-reversible clips for the interchangeable coils, carries two sockets for the insertion of the aperiodic aerial coil, which can be varied from a vertical position to one practically horizontal with the panel, thus giving a variation of aerial coupling between the aperiodic coil and the tuning coil.

Grid Coil

The grid-coil winding is well spaced and is of thick tinned-copper wire, whilst the reaction winding consists of a small closely-wound section of silk-covered wire.

The maximum wavelengths covered with these coils in the "All-purpose Short-wave Three" is slightly greater than those marked on the coils, because we have used .00015-microfarad condensers.

The sequence of operations in building
(Continued on page 626)

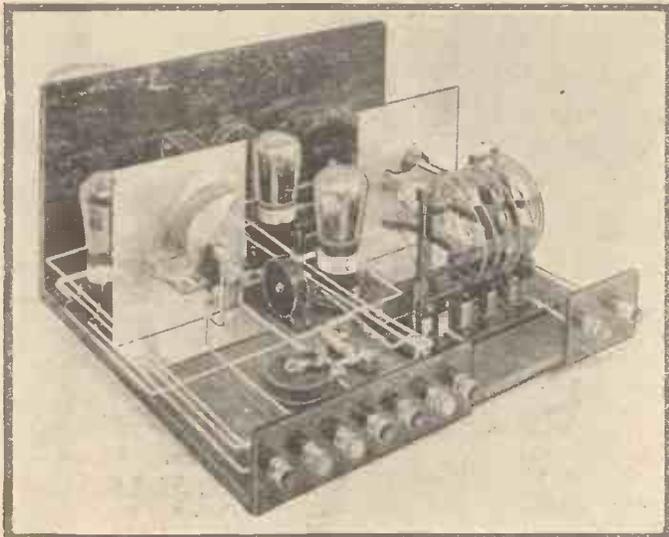
LIST OF COMPONENTS

- Ebonite or bakelite panel, 14 in. by 7 in. and two strips, 7 in. by 2 in. and 3 in. by 2 in. (Ebonart, Becol, Pertinax, Paxolin).
- Baseboard, 14 in. by 12 in. (Camco).
- Two .00015-microfarad short-wave condensers (Formo, Cyldon).
- 7-ohm rheostat (Lissen, G.E.C., Igranic).
- Two slow-motion dials (Igranic, Indigraph, Burndept, R.I. and Varley).
- Three anti-microphonic valve holders (Lotus, Benjamin, W.B., Formo).
- Two wire-wound resistances with bases, 50,000 ohms and 100,000 ohms (Dubilier, Ferranti, R.I. and Varley, Lissen).
- 2-microfarad fixed condenser (Dubilier, Lissen, C.D.M., Graham-Farish).
- 0.1-microfarad fixed condenser (mica) (Dubilier, Lissen, C.D.M., Graham-Farish).
- Two 2-megohm grid-leaks (Lissen, Dubilier, C.D.M., Graham-Farish).
- .0002-microfarad fixed condenser (Lissen, Dubilier, C.D.M., Graham-Farish).
- Two grid-leak holders (Lissen, Dubilier, C.D.M., Graham-Farish).
- Set of short-wave coils complete with base and adaptor (Marconiphone).
- Baseboard potentiometer, 400 ohms (Lissen, Igranic).
- High-frequency choke (Burndept, R.I. and Varley, Wearite, Polar, Trix).
- Low-frequency transformer (R.I. and Varley, Lissen, Ferranti, Igranic, Marconiphone).
- Nine terminals marked, Aerial, Earth, L.T.—, L.T.+, G.B.—1, G.B.—2, H.T.—, L.S.—, L.S.— (Belling-Lee, Eelex, Igranic).
- Connecting wire (Glazite).

centre illustration on pages 560 and 561 of last week's issue shows a plan view of the complete receiver, from which it will be seen that a fairly narrow but unusually

deep baseboard is employed. The two short-wave condensers are mounted so that between the shields associated with them and the panel carrying the slow-motion dials connected to the condensers through extension spindles, there is plenty of room for the components associated with the low-frequency amplifier.

Between the backs of the condensers and the terminal strips at the back of the baseboard is a clear space for the short-wave coil base, supporting the



A view of the Receiver ready for use

Your High-tension troubles will be banished for ever—



MODEL D.C. 10, for Direct Current 200/250 volts. Gives one variable tapping of 0/100 and a fixed tapping of 120 volts. Max. Output 20 m/A. Price £3 15 0.



MODEL A.C. 56, for Alternating Current. Gives all the H.T. required for a one or seven-valver. Suitable for 200/250 volts A.C. Mains. 30/120 Cycles. Max. Output 50 m/A. Price £8 15 0, including royalty.

when you run your set off a Clarke's "Atlas" Battery Eliminator.

An "Atlas" Battery Eliminator works the receiver off the mains and provides instant, unvarying high-tension current that gives the greatest degree of radio efficiency. Any set can run direct from the mains with an "Atlas" Battery Eliminator. Just plug in and there you are.

There's an "Atlas" Battery Eliminator for every purse and purpose. Two are shown here; the remainder are fully described in our Brochure No. 32. Write to-day for a copy, post free.

CLARKE'S "ATLAS" BATTERY ELIMINATORS

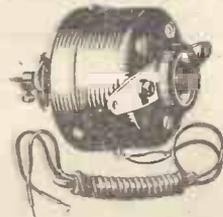
H. CLARKE & CO. (M/CR), LTD., "Atlas" Works, Old Trafford, Manchester



Type A1

A kit of moving coil parts complete with cone and transformer, Electro magnetic type. Supplied for 6-volt accumulator or any mains voltage between 110 and 240. Consumption .6 amp. and 50 m/a respectively,

£5 : 0 : 0



Type A

This is the popular Hegra Cone Unit as widely used by manufacturers. It gives excellent tone, is totally enclosed and its price places it beyond competition

12/6



Type N

Handsome, highly polished mahogany cabinet model incorporating the famous 4-pole balanced armature Type C Unit. Full round volume, magnificent reproduction

£4 : 10 : 0

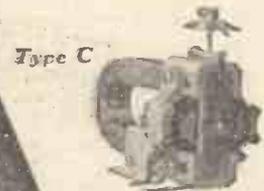


Hegra Loud-speakers for all

THE successful outcome of the Royalty question now enables you to enjoy the wonderful reproduction in your home which Hegra Loud-speakers and Units alone can afford. Hegra Loud-speakers and Cone Units are famous not only in this country but throughout the civilised world. Ask your dealer to-day to show you a Hegra Cone Unit or demonstrate a Hegra Loud-speaker; you will be astonished at the value they offer.

All Hegra Cone Speakers and Units are now fully licensed under various British Patents

OBTAINABLE OF ALL GOOD DEALERS



Type C

A 4-pole balanced-armature cone unit. Superb workmanship. Even response to all audible frequencies, will handle great volume without distortion.

21/-

"THE ALL-PURPOSE SHORT-WAVE THREE"

(Continued from page 624)

this receiver is not of great importance, but as a matter of convenience we recommend that the panel and terminal strips first be drilled, to take the spindles of the variable condensers, the filament rheostat, and the terminals. Then the filament rheostat can, with its one-hole fixing nut, be fitted to the middle of the panel and the latter screwed to the baseboard by means of three substantial wood screws.

To ensure smoothness of operation it is necessary to see that the extension spindles of the variable condensers are correctly aligned. If the drilling instructions given in the blueprint are accurately followed, there will be no difficulty about this. Mount the two aluminium shields holding the variable condensers in position, but before finally fixing them make sure that the spindle moves freely in conjunction with the slow-motion dials, which can also be fitted.

The constructor will now be able to see just what space is available, between the shields and the panel, for the components shown in the illustrations. For example, between the panel and the shield of the reaction condenser has to be fitted the low-frequency transformer and second low-frequency valve holder. Between the shield of the tuning condenser on the panel are fitted

the anode resistances, grid leak, filter condenser, and coupling condenser. The low-frequency valve holder is fitted about an inch from the panel, almost immediately behind the filament rheostat.

The coil base is fitted about half-way between the tuning condenser and the small terminal strip carrying the aerial and earth terminals. It is mounted so that the aperiodic coil is nearest this terminal strip, thus providing a short connection between the aerial terminal and the aperiodic coil.

The high-frequency choke, detector valve holder, grid leak, and condenser and potentiometer are disposed in convenient wiring positions around the coil base. With the fitting of the battery terminal strip, the layout is completed and the constructor can turn his attention to wiring.

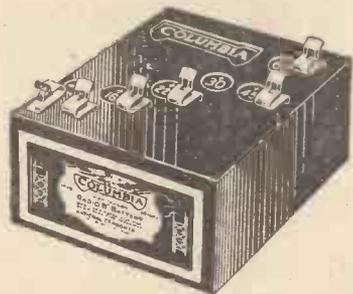
It is here that the full-size shilling blueprint will be of inestimable value in preventing mistakes. Special care is required in the wiring process to see that grid and anode leads are kept well separated and as short as possible. High-frequency losses due to bad wiring are especially prominent when short-wave reception is involved.

Having checked the actual connections made with those specified by the blueprint, the constructor can proceed with the pre-

liminary tests. The most satisfactory way of doing this is to try the receiver on the broadcast band of wavelengths. The Marconiphone Co. have provided for this by their thoughtful production of an adaptor which, taking the place of the short-wave coils, plugs into the coil base and makes provision for ordinary plug-in coils such as every constructor has available.

For the tests a No. 40 coil in the aperiodic coil socket, a No. 60 in the grid coil socket, and a No. 60 or No. 75 in the reaction coil socket will be needed. The choice of valves is a fairly wide one. In general, an R.C.-type detector valve, a moderately low-impedance first L.F. valve, and a power or super-power valve are needed.

A 120-volt H.T. supply, suitable grid bias (16 volts with a super-power valve), and a 2-, 4-, or 6-volt accumulator will complete the power supply. No difficulty should be found in tuning in the local station at full loud-speaker strength. Absolute freedom from hand capacity effects will make a big difference to the capabilities of the receiver in tuning in more distant stations, which, once tuned in, will "stay put." If reaction is at all "ploppy," adjust the potentiometer slider until perfectly smooth reaction is obtained.



The World's Best Battery

The new 10/6 60-volt Columbia brings the world's most famous battery into your home. Columbia is definitely the world's best H.T. Battery and every discriminating Radio enthusiast uses them.



J. R. MORRIS, Imperial House, Kingsway, London, W.C.2
SCOTLAND: J. T. Cartwright, 3 Cadogan Street, Glasgow

HEAT DAMP OR COLD

will not harm
GRAHAM-FARISH
Ohmite
ANODE RESISTANCES

An Ohmite can be boiled or frozen without affecting its performance; but what is more important, it is guaranteed to carry 10 milliamperes on voltages up to 500 volts D.C. They are

*Better than
Wire Wound!*
PRICE
ANY SIZE
UP TO
1/2 MEG **2/3**

GRAHAM-FARISH OF BROMLEY KENT

A HIGH MAST IS EQUAL TO TWO EXTRA VALVES

THE JOY OF SURPLUS POWER



Everybody knows that to have a high aerial is to get extra powerful signals. The difficulty of fixing up a high aerial is banished if you fit a

P.R. PATENT STEEL WIRELESS MAST

DAMP PROOF!

ROT PROOF!!

GALE PROOF!!!

26 Feet high. In 3 sections of 1 1/4 in. Steel tube tapering to 1 in. Carriage, London, 1/6; Midlands, 2/6; elsewhere, 3/6. Weight 24 lb. Two masts for 28/6 **15/-**

34 Feet high. In 4 sections of 1 1/4 in. Steel tube tapering to 1 in. Carriage, London, 2/-; Midlands, 3/-; elsewhere, 4/- Weight, 34 lb. Two masts for 49/- **21/6**

The "Super" MAST

42 Feet high. In 5 sections of heavy 1 1/2 in. Steel tube tapering to 1 in. *A real bargain.* Carriage, London, 2/6; Midlands, 3/6; elsewhere, 4/6. Weight, 46 lb. Two masts for 55/- **29/6**

NO HOLES TO DIG—ONE MAN'S JOB

Any intelligent man can assemble and erect a P.R. Mast in a couple of hours. Our patent Mast being tapered, it is easy for anyone to raise it from the ground into position. Ordinary tubular Masts require several hands and difficult rigging to do this. To help you the wire rope is sent **cut to size**—a saving of endless worry. Imagine sorting out 500 ft. of rope in your back garden.

P.R. are made of British Steel in 9 ft. lengths, from 1 1/2 in., tapering to 1 in., and are **MASTS** supplied with cast-iron bed plate, steel ground pegs, stay rings, galvanised steel flexible wirestays cut to lengths, pulleys, bolts and fullest erecting instructions. No further outlay necessary.

The easiest Mast to erect Minimum Radius 3 ft. 6 in.

GUARANTEE, Money refunded without question if not satisfied.

PAINTING.

Any protective coating applied before dispatch gets so damaged by the Carriers that it is essential to paint the Mast before erection. All P.R. Masts are sent out oxide-finished ready for painting. One coat of P.R. Colloid covering applied—a 10 minutes' job—to all parts of the Mast when ready to erect sets dead hard in an hour and protects it against all weathers.

PRICE OF ACCESSORIES

P.R. Colloid Covering sufficient for a Mast—with brush, 2/6. Halyard Log Line—Ryland's patent rot-proof:

For 26-ft. Mast, 1/6. 34-ft., 2/- 42-ft., 2/6. Per 100 ft. 3/-.

Note.—Double length supplied to make lowering of Aerial easy.

A HIGHLY EFFICIENT AERIAL.

P.R. Aerial is made of 14-28 High Conductivity Pure Copper Enamelled Wire—each strand insulated from its neighbour to give the highest signal strength obtainable. 100 ft., 4/3; 50 ft., 2/3.

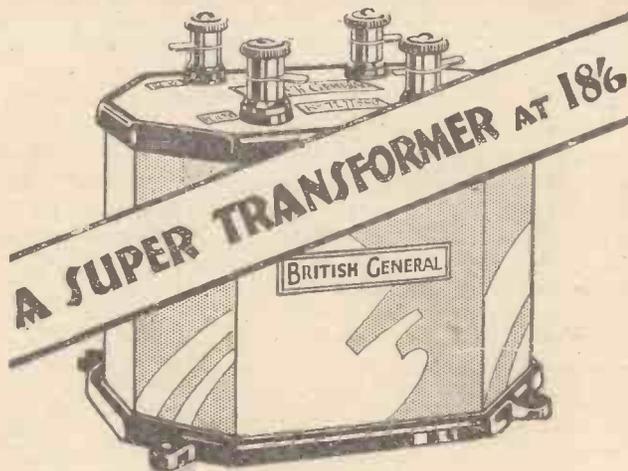
P. R. MASTS 17-10 PATERNOSTER SQUARE, LONDON, E.C.4

Opposite G.P.O. Tube.

IF YOU USE VALVES it will pay you to write to us for particulars of the famous 3/6 range of P.R. Valves. Each valve has a written guarantee of life and performance. See page 630.

In the famous Reinartz 2

described fully in this issue



The British General Super Transformer is unrivalled for maximum magnification, absence of distortion, absolute purity of tone and all-round reliability under all conditions.

For all modern circuits use British General and be sure of satisfactory reception.

PRICE
18/6

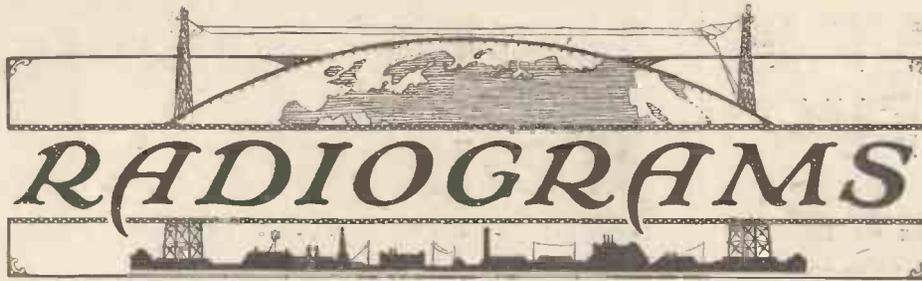
From all dealers of repute or direct from the manufacturers.



BRITISH GENERAL

Manufacturing Co., Ltd., BROCKLEY WORKS, LONDON, S.E.4.

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



ON the tenth birthday meeting of the League of Nations' Union at the Albert Hall, on October 26, the Prime Minister's speech will be relayed by 5GB.

The cast of Debussy's opera, *Pelleas and Melisande*, engaged for the broadcast from the London studio on October 31, is a particularly strong one, comprising such well-known names as Maggie Teyte, Evelyn Arden, Walter Hyde, Roy Henderson, Norman Allin, and Stuart Robinson. Between Acts 3, 4 and 5 listeners will be given an opportunity of hearing a reading of some passages of Mallory's *Morte d'Arthur*, by Mr. Oliver Baldwin, son of Mr. Stanley Baldwin.

On the closing down of the Nottingham relay transmitter on November 1 an hour's programme provided entirely by Nottingham artistes will be broadcast through Daventry 5GB.

Starting in November, on Wednesdays, 2LO as well as Daventry 5XX, will transmit dance music from 11 p.m. to midnight.

The 2LO vaudeville programme on October 29 will include turns by Dorothy Dickson and Geoffrey Gwyther, Arthur Prince and his sailor-boy Jim, Elspeth Douglas-Reid, Billie Hill and Horace Percival (the musical comedy duo), and last, but not least, the irrepressible Tommy Handley.

To the entertainment advertised for the 5GB programme on October 30 Reland

Pertwee contributes a nonsensical playlet entitled *Evening Dress Indispensable*, in the caste of which will be found Janet Eccles, a juvenile lead who has been on tour through the British Dominions with Irene Vanbrugh and Dion Boucicault.

Saturdayitis is the title chosen by Ernest Longstaffe for a new and original revue in preparation for transmission from the London studio on November 3.

Commencing on October 22, the Manchester Radio Exhibition opens its doors at the City Hall for a period of two weeks. The opening speech by Mrs. Philip Snowden, a member of the B.B.C.'s board of directors, will be relayed at 3.15 p.m. to the local transmitter. The Manchester studio is co-operating with the exhibition authorities in providing a number of concerts which will be relayed to listeners.

On November 2, in a programme entitled *Sea Pictures*, the Aberdeen station will include a very original playlet. Mr. Mannin Crane, the author, has tried to illustrate for his listeners a sound picture of how the crew of a tiny tramp steamer, battling for its life in a hurricane in the North Pacific on November 11, would endeavour to take part in the two minutes' silence.

Although it will retain its studio, Nottingham is to lose its transmitter, and listeners who have hitherto relied on that station will have to turn to 5GB for their wireless fare. To give these listeners an

opportunity of adapting their sets to the new conditions the Nottingham station will probably be silent on October 22, 24, and 29.

Now that the high-power Vienna Rosenhuelgel station is in regular operation, the Ravag Company proposes to erect a high-power short-wave transmitter to render the capital's programmes available to Austrian subjects overseas.

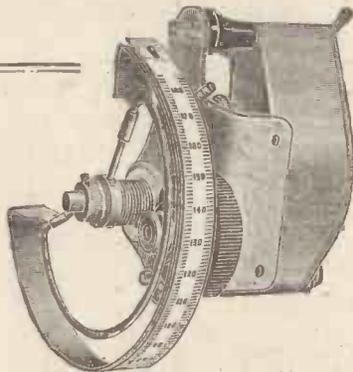
During the next few months the radio system of Switzerland will undergo re-organisation; every effort is being made to induce the authorities to close down the stations now operating and to erect two high-power stations to serve the entire country.

In Russia, for propaganda purposes, special railway carriages, designed to hold an audience of sixty, and equipped with wireless receivers and cinematograph apparatus, are attached to the trains that pass through the smaller towns. When halts are made the carriages are shunted into a siding and the population of the district crowds in to be "educated."

It is reported that a high-power short-wave station, to relay to Dutch subjects in the East Indies the Huizen and Hilversum programmes, is to be erected by the Zuyder Zee.

This is the way the American authorities see us: "The British listener who pays for his licence is freed from the curse of obligation to the broadcaster. Unlike the American listener, he is not being continually reminded that the great privilege he is enjoying is due to the goodwill and generosity of philanthropic merchants."

The first aerial broadcast in Canada was recently made on the occasion of a visit of twenty planes from Detroit to the Canadian National Exhibition at Toronto. Aircraft station G-CATO broadcast the event from 5,000 feet up.



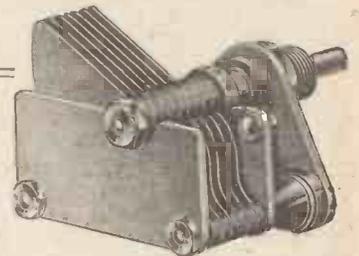
... WITH THUMB CONTROL TUNING
Our popular Logarithmic and Square Law pattern aluminium Condensers can now be supplied with Thumb Control Tuning. And the better panel appearance, the finer adjustment, are well worth the additional cost.

PRICES :	
No. 191—Capacity .0005	.. 13/-
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"Utility"

for Condensers too

You will be just as pleased with the performance and finish of "Utility" Condensers as with that of "Utility" Dials and "Utility" Switches. They're just as perfect—just as essentially right for their particular forte—and they are fully guaranteed. Ask your local Wireless Dealer to show "Utility" Components to you—there is one for each of your requirements. If any difficulty in obtaining, write direct—we can fill your orders by return post. May we send you a catalogue?



NEW "BABY" CONDENSER

If you are making a portable or small set, this Baby Condenser will save space for you. It is thoroughly efficient, the low loss features are marked, and the ball-bearing spindle provides delightfully smooth adjustment minus backlash. Made in three capacities.

PRICES :

Capacity .0005	.. 11/-
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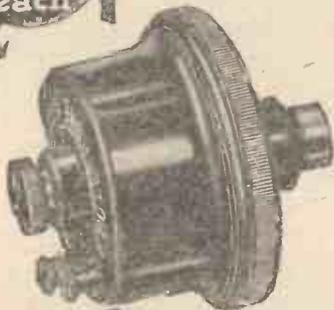
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15/- each

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50/- cash, or 5/- deposit and 11 monthly payments of 5/-

21 in. high with 14 in. Bell. Mahogany finished, with plated arm & stand.



BAKELITE SOUND CONDUIT & TONE ARM
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NIGHTINGALE CONCERT SUPREME SUPER

Guaranteed free from metallic resonance.

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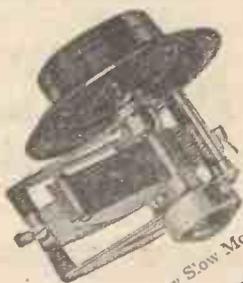
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NIGHTINGALE SPEAKERS



J.B. New Slow Motion

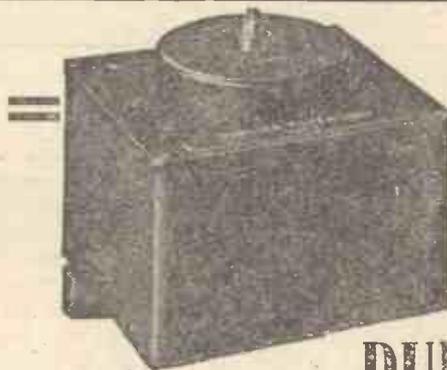
In Doctor Chapman's Reinartz Two!

Again and again you see J.B. specified by the leading authorities of the day. The Editor of "Radio for the Million," Mr. James, Mr. Harriss, and now Dr. Chapman, one of the greatest living authorities on the Reinartz type of circuit, specify the new J.B. Slow Motion Model. Be guided by the people who know, and always demand J.B.

Prices of J.B. Slow Motion:
... 00035 mfd. S.L.F. 13/6
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DUBILIER BUILT IS BETTER BUILT

DUBILIER FILTER UNITS

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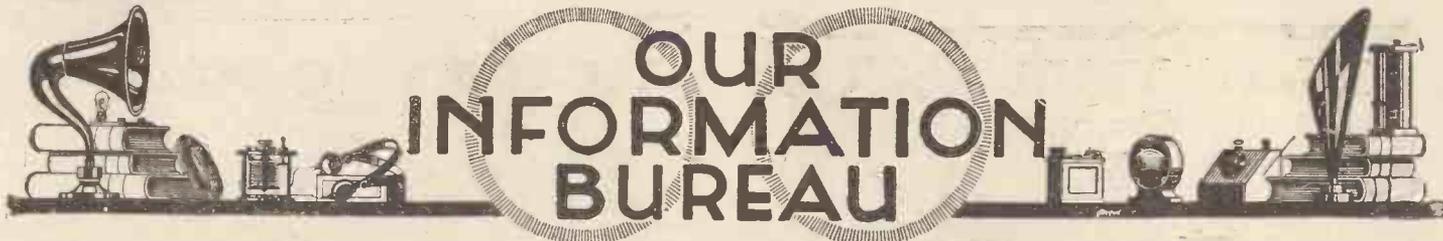
- Type A, Output, 12/14 mA at 150V. TAPPINGS, 1 maximum and 1 detector-valve tapping ... 28/6
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These are complete H.T. Battery Eliminators for use on D.C. mains, which, with the addition of an A.C. Rectifier, can be used with an A.C. supply. Four types are manufactured, having outputs and tappings as stated, and each incorporates an earth protection condenser.

If unobtainable from your dealer, write direct to us giving his name and address.

DUBILIER CONDENSERS

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RULES.—Please write distinctly and keep to the point. We reply promptly by post. Please give all necessary details. Ask one question at a time to ensure a prompt reply, and please put sketches, layouts, diagrams, etc., on separate sheets containing your name and address. See announcement below. Address Queries—AMATEUR WIRELESS Information Bureau, 58/61 Fetter Lane, London, E.C.4

Choosing H.T. Batteries.

Q.—I have a four-valve receiver, and as H.T. batteries appear to be causing me considerable expense, I should welcome any information you can give me regarding the most satisfactory discharge rates for the various types of dry-cell H.T. batteries. I might also mention that I, like many other amateurs, do not possess measuring instruments, and therefore cannot be sure of the amount of anode current being consumed by the valves in my set. Some information on this point also would, I feel sure, be of interest to others beside myself.—R. D. (Manchester).

A.—The question you raise is one that interests practically every amateur. Before investing in an H.T. battery listeners should determine the total current being used by their receivers. When measuring instruments are not available, the amount of current consumed by the receiver can be determined, approximately, by working on the assumption that an H.F. valve consumes about 1 milliampere, a detector valve with R.C. coupling to the L.F. valve 1 milliampere, a detector valve with transformer coupling 2 milliamperes, an L.F. valve 2 milliamperes, a power valve 5 to 7 milliamperes, and a super-power valve 12 to 18 milliamperes. Having calculated the cur-

rent consumed by the receiver, the next step is to get to know what is the safe maximum discharge rate of the battery to be used. Most battery manufacturers now give this informa-

When Asking Technical Queries

PLEASE write briefly and to the point

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

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

tion in their battery pamphlets, and the following data is taken from a list issued with a very well-known make of battery. Ordinary capacity battery, normal discharge rate 7 mil-

liamperes, maximum discharge rate 10 milliamperes; double-capacity battery, normal discharge rate 12 milliamperes, maximum discharge rate 15 milliamperes; treble-capacity battery, normal discharge rate 15 milliamperes, maximum discharge rate 20 milliamperes. The figures given for valve H.T. current consumption are based on the supposition that normal high-tension voltages are used.—A. C.

Screen-grid Valves.

Q.—In view of the great popularity of the new screen-grid valves and the apparent scarcity of information concerning them I would welcome a reply to the following: Seeing that a definite voltage is applied to the screen-grid in addition to the anode and that an anode-filament current flows through the valves, can it be assumed that a current also flows between the filament and the screen grid?—J. K. (Newcastle).

A.—You are quite correct in your assumption, a current does flow between the filament and the screen grid, and the amount of current varies according to the voltages applied to the anode, the screen grid and also to the control grid. Screen-grid valve practice and theory is fully dealt with in the "Amateur Wireless" Handbook, "The Shielded Four-electrode Valve," by Capt. Round, 2s. 9d., post free.

"THOSE 'AWFUL' PROGRAMMES"
(Continued from page 609)

It would appear, then, that Germany walks away with the prize for talks and America with that for time devoted to variety. But it must not be forgotten that the average listener to 2LO (or 5XX) has now at least one alternative of excellent quality in the shape of a local station or 5GB. On the night in question 5GB spent his time by giving an hour and a half of light music, followed by an hour and a half of promenade concert. Then came a quarter of an hour news and a further three-quarters of an hour of the concert. After this, dance music was played. Those who dislike talks could, therefore, find

relief, whilst those who are not fond of variety could again provide themselves with an alternative by merely changing the tuning of their sets.

Hardly anybody, with even a single valve, need be tied down nowadays to just one programme, and valve sets are so cheap to make and to run that the crystal is rapidly dying out. In America there are also, of course, alternative programmes; but many of these are sent out by low-powered stations which are not renowned for the quality, either of entertainment or of transmission. The Germans are, perhaps, rather better off than they, owing to the number of high-powered stations that they possess in a much smaller area. You will however,

find if you care either to examine them on paper or to listen to them by means of your receiving set, that the German stations do not provide anything like genuine alternatives. All of them go in for an enormous amount of talking on subjects that we, at any rate, should consider exceedingly dreary. Here are a few subjects of German talks during the week already mentioned: Medieval Peruvian Culture and its Decay, Talk for Parents, From the World of the Visible to the World of Speculation, World Economic Relations, German Medical Missionary Activity in South Africa, Women and the Evolution of Law.

On the whole, I don't think that we are so very badly off.

THE ONLY BRITISH VALVE WITH A WRITTEN GUARANTEE AS TO PERFORMANCE AND LIFE.

Why pay more P when P.R. VALVES will give you equal service for 3/6 P

Type	Fil. Volts	Amp.	Imp. Ohms.	Amp. Fac.	
PR 1	2	.095	30,000	14	H.F.
PR 2	2	.095	28,000	13	Det.
PR 3	2	.095	15,000	8	L.F.
PR 4	2	.095	120,000	32	B.G.
PR 8	3.5-4	.063	23,000	15	H.F.
PR 9	3.5-4	.063	18,000	14	Det.
PR10	3.5-4	.063	10,000	8.7	L.F.
PR11	3.5-4	.063	88,000	40	R.C.
PR16	5-6	.1	19,000	13	H.F.
PR17	5-6	.1	18,000	17	Det.
PR18	5-6	.1	9,500	9	L.F.
PR19	5-6	.1	80,000	40	R.C.
PR20	2	.15	7,000	6	Power
PR40	4	.15	7,000	6	"
PR60	6	.1	5,000	6	"

WHAT OTHERS SAY of P.R. VALVES

POPULAR WIRELESS, Sept. 8, 1928: "Has quite remarkably good characteristics, and should appeal to those to whom the price of the usual British valve is still too high."

AMATEUR WIRELESS, 14/9/28, says: "The characteristics of this valve compare favourably with many well-known makes."

"Unsurpassed for purity of tone and selectivity—the equal of any," is the opinion expressed in hundreds of letters from satisfied users—the originals can be seen at our offices.

Tell us your set—we will send correct Valves. Matched Valves 1/- extra.

NOW ONLY 3/6 C.O.D. Phone: City 3788
Post 4d.

2 Valves for 8/9 Post 6d.
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All orders executed by return of post.

GUARANTEE. All valves despatched under guarantee of Money Back in Full if not satisfied. All valves are carefully packed and breakages replaced.

7/6 Each Post 4d. P.R. VALVES

17/16, Paternoster Square, LONDON, E.C.4. Opposite Post Office Tube





EXCELLENCE OF DESIGN

Look at the base of the Vibrolder; Study its design from behind the scenes. Note the one-piece springs whose coils form the sockets for the valve leg—the self-aligning contacts; the celluloid “window” which excludes all dirt and dust: the ready tinned soldering tags.

Next time say “Vibrolder” and be sure of the best

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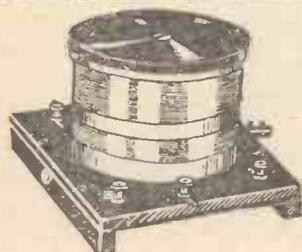
1,500,000 Benjamin valve holders are already in use



THE DRUMS DO ROLL OUT

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The “Q” Coil is a very efficient type of tuning inductance and gives exceptional results, covering a waveband of 250/550 and 1,000/2,000 metres.

The Finston “Q” Coil was recommended by J. H. Reyner in his “Ace of Twos” receiver, (Amateur Wireless,” September 22.)

AERIAL COIL 15/- H.F. TRANSFORMER 21/-
REINARTZ COIL 21/-

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Amateur Wireless HANDBOOKS

each **2/6** net.

- The Shielded Four-electrode Valve.
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Of all Newsagents and Booksellers or by post, 3d. extra, from Cassell & Co., La Belle Sauvage, E.C.4.

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The Answer is that it is one of the most efficient instruments ever devised for L.F. coupling. It stands to reason that if you can get from one instrument the amplification of a transformer plus the pure reproduction of a choke the result must be better than it would be from either of these instruments separately.

That is what you do get if you use the Watmel Auto-Choke, volume plus purity. And remember you get a Transformer, a Choke, a Condenser, and a Grid Leak all in one instrument for **18/6**

Ask your Dealer about it.

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LETTERS TO THE EDITOR

The Editor does not necessarily agree with the views expressed by correspondents.

Which are the Silent Areas?

SIR,—I wonder whether any of AMATEUR WIRELESS readers have experiences of silent areas? According to the B.B.C. schedule, Swansea and Cardiff stations ought to be received easily at Merthyr Tydfil on a three-valve set. Not a few three-valvers fail to get either; others get Cardiff occasionally and Swansea never; others again get the stations with good volume at times, only to lose them again. On the other hand, most three-valvers can get 2LO and 5XX, and even 5GB, at any time.

There are mines between Merthyr and the latter stations, as well as the former. On the other hand, the latter stations are east and north-east, whilst the former are south and south-west. Have your readers the same difficulty in other areas?

—E. E. R. (Merthyr Tydfil).

The "Best-Yet" Cone Loud-speaker

SIR,—Having seen in AMATEUR WIRELESS about somebody having made the "Best Yet Cone" and that it chattered, I wish to say that I have made up the speaker, using everything as stated—

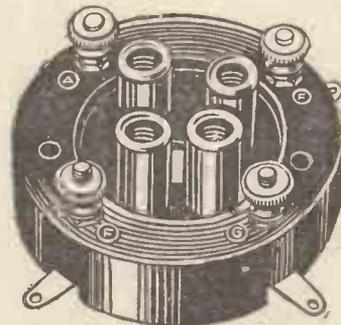
Goodman paper, Blue Spot unit, etc.—and I may say I am greatly pleased with it; the way it brings out the bass is fine, and it is a great improvement over a 60s. horn which I have been using.

Also, in AMATEUR WIRELESS, September 22, regarding the "New-style Baffle Three," it says that, having decided on anode rectification, there was no choice but to use resistance coupling after the first valve; so I would like to tell you of my experience with my set. I have a three-valver (detector and two L.F.), with two AF3 transformers, swinging-coil reaction, and up to about three weeks ago was using grid-leak rectification; but, thinking I would like to try anode-bend, I took out the grid leak, disconnected the H.T. and L.T. negative from the earth, made a connection from the earth to 1½ volts on the G.B. battery, and twisted a strand of bare wire across the grid-condenser terminals. On switching on, I found a great improvement in quality; not so loud as the other way, but I can get Manchester, Liverpool, Dublin, 5XX, and 5GB at good loud-speaker strength.

In conclusion, I wish to thank your paper for enabling me to build such a fine speaker as the "Best Yet," which I am sure I could not have bought the equal of for pounds; also for the many valuable hints which I get from it from time to time.—B. (Southport).

(Continued on page 634)

CIRCULAR MOTION

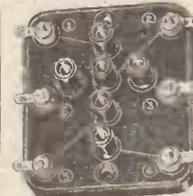


THE GREATEST ANTI-MICROPHONIC VALVE-HOLDER DISCOVERY

Made under an entirely new process. Guaranteed to be only the highest grade mouldings, insulated parts and springs.

No matter how much you may jar your set, the circular motion of vibration of the NEW CASON VALVE-HOLDERS guarantees safety to your valves. They will not swing sharply to and fro, but will rotate smoothly and without the least strain. This wonderful device is so finely sprung that it ensures perpetual valve motion, a necessity to the best reproduction.

ANTI-MICROPHONIC VALVE-HOLDER 1/6
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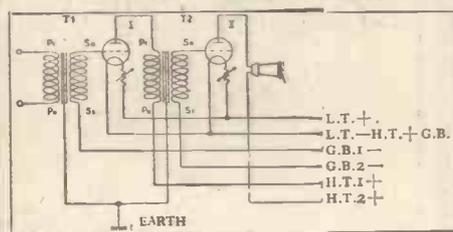
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FROM HIGH TO LOW WAVE WITHOUT CHANGE OF COIL

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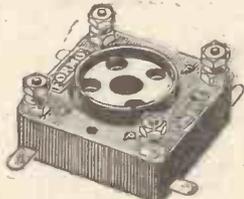
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BAKELITE throughout, including BASE PLATE.

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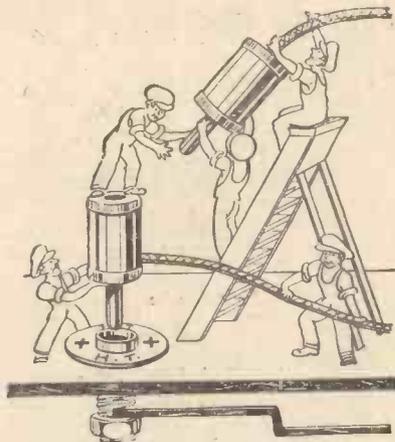


The springing is such that even rough usage will not affect its liveliness. The "float" is recessed on top, thus making easier the manipulation of valve when plugging into holder.

As illustration shows, Terminals are provided as well as soldering tags.

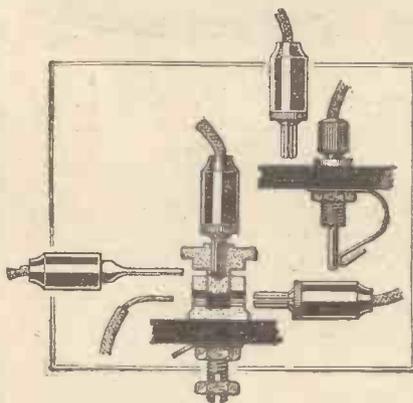
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The diagram above shows the use of a spring jack attached to a socket for use with phone or loud-speaker tag ends or plugs. Also the famous



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with its multiple uses. There are 40 different indicating tops and six colours available.

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LETTERS TO THE EDITOR

(Continued from page 632)

Loud-speaker Reproduction

SIR,—I am very much obliged to each of the correspondents who have dealt with my remarks and I have derived much useful information from them. I am inclined to think that we shall yet have much better methods of sound reproduction. This is the chief point in wireless, that, and better and cheaper H.T. for country people.—W. J. F. (Redruth).

The Modern Mariner

SIR,—Seeing that Mr. Moseley's idea of a seaman is confined to the W. W. Jacobs type, I would point out that while it may be possible to judge character by voice, yet the character of a seaman may not greatly differ from that of a scholar.

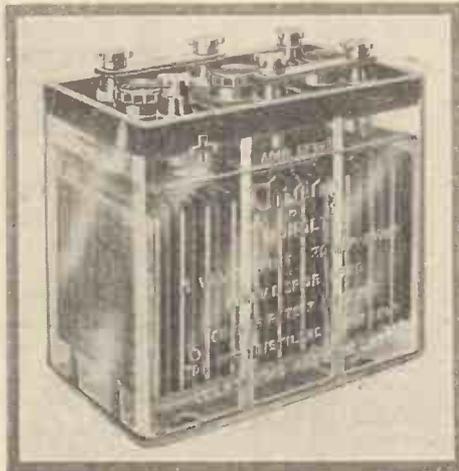
In actual fact, a great many seamen are indeed scholars, although the converse cannot reasonably be held to apply.

Maybe he was not at his best during the Channel crossings which may have brought him into contact with nautical folk.

—“MASTER MARINER” (Penzance).

MONOLT L.T. ACCUMULATOR

THE Monolt L.T. accumulator, made by the Tudor Accumulator Company, is quite a new development in low-tension storage battery design in this country. This six-volt thirty-ampere-hour battery is assembled in a one-piece three-compartment



Tudor Monolt Accumulator

ment moulded-glass box and incorporates a detachable carrier and integral charge indicators. It includes the usual Tudor features—wood board separators, grease-chamber, non-corrosive terminals, ebonite lids and vent plugs, and 5 mm. positive plates—and at the price of 40s. complete, which compares favourably with that of ordinary batteries in wood crates, is really an attractive proposition.

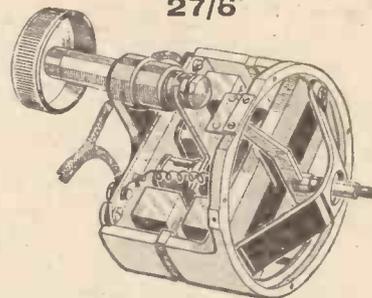
Have You Seen the Special Gift Announcement on page 595?

THE DRIVING UNIT IS THE PART THAT REALLY MATTERS

The “Movement” is the part that really matters—if that is good, you can be certain of the best results.

Goodman's P.G. 3 unit is Four Pole and Double Acting, adjustable, ultra-sensitive, yet handles huge volume and gives unsurpassable pure and undistorted reproduction. Price complete in Bronzed Case with fixing screws,

27/6



SUPER MODEL P.G.5

Used in the “Linen Diaphragm Loud-speaker” described in “Amateur Wireless,” September 29th.

This new Super Model, constructed on the same principles as the P.G. 3 is a real revolution in Loud-speaker Unit design. It combines maximum sensitivity with power to handle enormous volume, and ensures actual Moving Coil Quality on the lower registers. Price Complete

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PRICES.

To work off 6-volt accumulator or Trickle Charger from A.C. Mains, including step-down Transformer

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PERMANENT-MAGNET TYPE, including step-down Transformer

£9 10 0

The Permanent-magnet type can be worked direct off any standard set. It will give volume approximately equal to a cone speaker from the same input, and is guaranteed not to lose its magnetism.

“Zampa” Regenerative Aerial Tuner

Simplicity, Efficiency, and Selectivity are the keynotes of this excellent Tuner, which has been designed to meet the requirements of the Home Constructor. The method of reaction ensures perfect balance and smooth and efficient control over the whole waveband (250/2,000 metres) Price 13/6

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White Horse Place, Market Street, Wellingborough

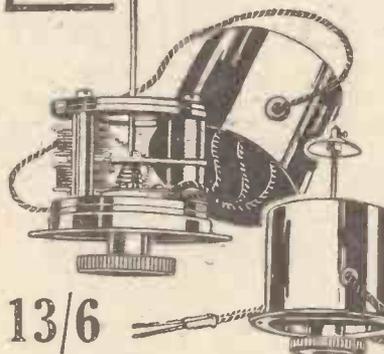
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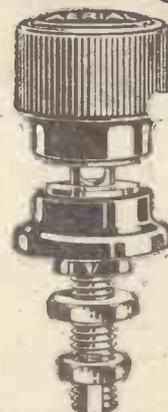
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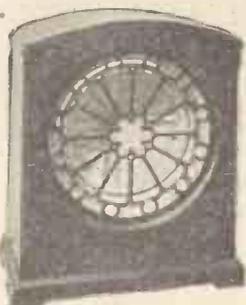
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Success with SUPRECISION Power transformers and chokes is a guaranteed certainty. Specify them and you follow the lead of thousands of satisfied Customers.

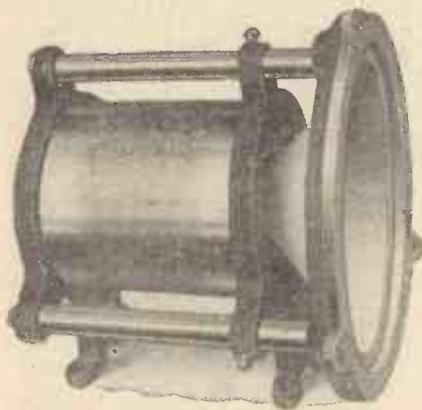
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Wavetrap	WM64
"Junior" Moving-coil Loud-speaker	WM81
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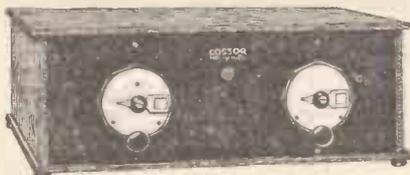
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B.T.H. ... 50/-

J.B. CONDENSERS

T.T. Friction Ver. .0005, 16/3; .00035, 16/-; .00015, 15/9.
S. L. F. .0005, 11/6; .00035, 10/6; .00025, 10/-; .00015, 10/-; Neutralising ... 3/6

FOR MASTER 3 STAR Log .0005, 11/6. .0003, 10/6.

EBONITE PANELS GRADE A. MATT OR POLISHED

3/16, 1/4 sq. in.; 1/2 in., at 1/6. This is absolutely best quality.

Authorised Dealer for BRANDES

L.F. 3-1, 12/-; 5-1, 12/6. Matched Headphones, 8/- pair. .0005 Variable, 12/6. .0003, 12/-
BRANDES TABLE TALKER, 30/-
BRANDOLA HORN TYPE, 50/-
THE ELLIPTICON CONE SPEAKER, 77/-

ORMOND

No. 3 CONDENSERS .00025, 5/6. .00035, 5/9. .0005, 6/- (With 4-in. Dial). Friction Geared, .0005, 15/- .0003, 14/6. .00025, 13/6. Straight Line Frequency Friction Geared, .0005, 20/- .00035, 19/6. S.L.F. .0005, 12/-, .00035, 11/- Log .0005, 13/-, .00035, 12/6. .00025, 12/-, S.M. Dial, 5/-
All Components Stocked.

ORMOND Latest .0005 Log for the NEW COSSOR KIT

6/-

R.I. & Varley H.F. Choke, 9/6. R.C.C. Unit, 20/- Type B, 22/6; Tuners Model A, 47/6; Model B, 37/6; Standard, 39/6. Straight Line Super L.F., 25/-; with 4 terminals, 22/6. General Purpose L.F., 15/- Push Pull Output Transformer, 22/6. Filter choke, 21/- Wire-wound resistances, all capacities. ALL PARTS STOCKED

LISSEN

Valve-holders, 1/-; Fixed Con., 1/-, 1/6; Leaks, 1/-; Switches, 1/6, 2/6; Latest 2-way Cam Vernier, 4/6; Rheostats, 2/6; B.B., 1/6; Lissicola, 13/6; L.F. Transformers, 8/8; Coils, 6/8; 6/4; 250X, 9/8; 60-v.H.T., 7/11; 100-v. 12/11; Super 60-v., 13/6; Grid Bias, 1/6; 4.5. 5d.; Super L.F. 19/-; Variable .0003, 6/- .0003, 6/6.

BULGIN Short-wave Chokes, 8-80 metres, 3/-, post 6d. Bulgin Reaction, .0001, 5/6; Neutralising, 5/-; Grid Bias Clips, 6d.; 2-volt Bulbs, 6d. (with holder, 1/-). All Bulgin parts stocked.

BRITISH GENERAL Aerial Tuning Unit, 250/2,000 metres, 18/6.

CLEARTRON Valves, 2 volts, 4 volts, 6 volts, made for every purpose in radio, each, 4/- (Power, 6/-).

CYLDON Condensers, Twin Thumb Control, for Inceptor 3, etc., 47/- each. Bebe, .0001, 7/6; .00015, 8/-; .0002, 8/6; .00025, 9/6; .0003, 11/- Complete with 2-in. Knob and Dial.

CLAROSTAT Vol. Control, 8/6. Table Top, 13/6.

GAMBRELL Neurovernia, 5/6. Voluvernia, 6/9.

M.P.A. Popular Plaque, 29/6. De Luxe Plaque, 47/6. Mahogany Table Cabinet Speaker, 5 guineas.

MULLARD Permacore L.F. Transformers, special winding, 25/-.

ORPHEAN Loud-speakers, "De Luxe" Cone, 40/-, all models. "Gem," 30/-.

Panel Brackets, Aluminium, 1/-, 1/6; Magnum, small, 1/6; Master 3, 2/6.

PHILLIPS Seven-cornered Loud-speaker is new in value. A first-class article at the low price of 50/-.

PYE L.F. Chokes, 20 or 32 henries, 12/6. L.F. Transformers, 17/6. Valve Holders, 2/-, etc., etc.

R.C.C. Units, various, Lissen, 4/-; Cosmos, 3/6 (with V.H.), 10/6; Magnum, 7/6; Carborundum, 8/6; Dubilier, 7/-.

SIFAM New Model Pocket Voltmeter, H.R., 4,000 ohms, heavy nickel case, 7/6.

Standard Wave Traps, made to specification of G. Kendall, Esq., 11/9. Magnum, 15/-; Lewcos, 13/6.

Short-wave Coils, mounted, set of 4, 5/11. By post, 6/6.

TELSEN L.F. Transformers Radlograd, 12/6. Telsen Ace, 8/6. Ratio 3 or 5 to 1.

TRIOTRON Valves, 2-volt power, 6/9; 2, 4/6; .05, 4/9; 4-volt power, 6/3; G.P. 4/3; .05, 4/6. Post 6d. each (20/- worth post free).

Valve Holders, all with terminals, Lotus, 1/3, W.B. 1/6; Formo, 1/3; Benjamin, 1/6; Millgate, 1/3; Marlie, 1/-; Bowyer-Lowe, 1/9; Lissen, 1/-.

HYDRA CONDENSERS Tested on 500 volts D.C. (working voltage 240 d.c.) 1 mfd., 2/6; 2 mfd., 3/6; 4 mfd., 5/3.

CONE SPEAKER CABINETS take 12 in. cone (will take Blue Spot unit), handsome design, all enclosed, 9/11, 10/11, 12/11 each.

OAK FINISH. 2/- each more by post.

"A.W." "P.W." & "M.W." LOADING CO-LS. 7/6

EELIX Terminals, Plugs, and Spades Stocked.

K. RAYMOND

27 & 28a, LISLE ST., LONDON, W.C.2

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C.O.D. Orders despatched same day as received where possible. Send ORDER with instructions and pay Postman. C.O.D. APPLIES TO UNITED KINGDOM ONLY.

WE ARE OPEN ALL DAY SATURDAY ALL DAY THURSDAY ALL DAY EVERYDAY Hours 9 a.m. to 8 p.m. Sat. 9 a.m. to 9 p.m. Sunday morning 11-1

QUOTATIONS for SETS OF PARTS Special Prices on lists of 25/- and over (other than those advertised). CALLERS OR POST

COUPON No. 4

This Coupon entitles you to Handsome 4 in. Black Slow-motion Dial (3 apertures), actual value 3/-, for 3d. on an order of 20/- upwards.

Just mention NUMBER 4 on your Order

RED DIAMOND 2-way Coil Holder, parallel working, fine adj., worm drive, perfect working, 4/- Permanent Detector, 2/- Push-pull Switch, 1/3.

EXIDE L.T. BATTERIES
2-v., 40 Actual ... 13/6 Double these Prices
2-v., 50 " ... 15/6 for 4-volt actual
2-v., 60 " ... 17/6 hour capacity.

OLDHAM (Glas) L.T. BATTERIES, 2-v., 20, 5/6; 2-v., 45, 9/-; 2-v., 80, 14/- Sent C.O.D. only carriage forward.

BURNDEPT S.G. Valve Holder, 4/- Ethovernier Dial, 6/-, H.F. Choke, 3/6; Variable Condensers, Sq. Law, .00007 or .0001, 13/6 each. Log Law, .0003, 15/-; .0005, 15/6.

COLVERN Dual Coil, as used in Mullard 3 "Star," 17/6.

IGRANIC Dual Impedance Unit, 30/- L.F. Transformer, Type "J," 17/6. Megostat, 6/- Wire-wound Var. Res., 50,000 ohms, 15/-; 250,000, 17/6. Dual Res. Cap. Coup. Unit, 17/6. All parts available.

BROWNIE New Model Dials, 3/9.

LOTUS New Variable Condensers, .0005, 5/9; .0003, 5/6; .00025, 5/3; .00015, 5/- Lotus Vernier Dial, 4/9.

ECKO 1929 MODELS. Model D.C.2 F10, 29/6; D.C.4 F60, 72/6; A.C.2 F10, 73/6. Trickle Charger, 52/6. Supplied on easy terms over 50/- value.

ASTOUNDING BARGAIN IN THREE-VALVE LOUD-SPEAKER SETS

Receives London, 5GB, 5XX, and many Continental stations.

D. & 2 L.F.

Call and hear one demonstrated.

NO OBLIGATION TO Purchase



AS SHOWN £5 - 12 - 6

SPECIFICATION Tax Paid Carr. & packg. 5s. Beautifully finished cabinet with hinged lid, all parts enclosed—3 British Dual Emitter Valves (1 Power), Latest Type Condenser, S.M. Dial, distant stations are easily obtainable with standard aerial. High Tension Battery 100 volts. L.T. 2 volt Exite or Oldham. All Aerial Equipment, Earth Switch and wire. Tunes 250 to 2000 metres. A REAL set, at a price within anyone's reach. TRY ONE. 2 VALVE SETS exact to above complete Carr. and Pack. 5s. Tax Paid. £4 17s. 6d.

KITS of parts for all CIRCUITS. Make out LIST for keen quotation. DON'T worry, if it's Wireless WE HAVE IT.

BROADCAST TELEPHONY

(Broadcasting stations classified by country and in order of wavelengths)

Metres	Kilo-cycles	Station and Call Sign	Power Kw.	Metres	Kilo-cycles	Station and Call Sign	Power Kw.	Metres	Kilo-cycles	Station and Call Sign	Power Kw.
GREAT BRITAIN											
24	12,500	Chelmsford (5SW)	20.0	273	1,098	Lunoges (PTT)	0.5	319.1	940	Dublin (2RN)	1.5
252.1	1,190	*Bradford (2LS)	0.2	280	1,068	Rennes	0.5	401	748	Cork (5CK)	1.5
273	1,099	*Sheffield (6FL)	0.2	288.2	1,041	Bordeaux	0.5	ITALY			
275.4	1,089	*Nottingham (5NG)	0.2	291.5	1,029	Radio Lyon	1.5	104	2,885	Milan	0.4
277.8	1,080	*Leeds (2LS)	0.2	299.4	1,002	Vitus (Paris)	2.0	315.8	946	Turin (test)	0.5
288.7	1,039	*Edinburgh (2EH)	0.2	299.7	1,007	Agen	0.5	334	898	Naples (Napoli)	1.5
294.1	1,020	*Stoke-on-Trent (5ST)	0.2	303.5	969	Marseilles	0.5	408	735	Genoa (testing)	
294.1	1,020	*Swansea (5SX)	0.2	340	882	Le Petit Parisien, Paris	0.5	449	668	Rome (Roma)	3.0
291.4	1,020	*Dundee (2DE)	0.2	353	850	Algiers (PTT)	2.0	512	586	Bolzano	0.3
294.1	1,020	*Hull (6KH)	0.2	370	811	Radio LL, Paris	1.0	544.4	551	Milan	7.0
297	1,010	*Liverpool (6LV)	0.2	388.6	772	Toulouse (Radio)	5.0	JUGO-SLAVIA			
306.1	980	Belfast (2BE)	1.5	400	750	Mont de Marsan	0.4	309.5	965	Zagreb (Agram)	1.25
312.5	960	Newcastle (5NO)	1.5	416	721	Grenoble (PTT)	1.5	580.2	517	Ljubach	5.0
326.1	940	*Bournemouth (6BM)	1.5	430	698	Lille (Radio Flandres)	0.25	LATVIA			
353	850	Cardiff (5WA)	1.5	460	652	Paris (Ecole Sup., PTT)	0.7	526.3	570	Riga	2.0
361.4	830	London (2LO)	3.0	478	628	Lyons (PTT)	1.0	LITHUANIA			
384.6	780	Manchester (2ZY)	1.0	1,500	200	Carthage (Tunis)	2.0	2,000	150	Kovno	15.0
400	750	*Plymouth (5PY)	0.2	1,765	170	Radio Paris	8.0	LUXEMBURG			
405.4	740	Glasgow (5GC)	1.2	2,650	113	Eiffel Tower (FL)	8.0	217.4	1,980	Luxemburg	0.25
491.8	610	Daventry EX (5GB)	24.0	GERMANY				NORWAY			
500	600	Aberdeen (5BD)	1.5	14,84	20,210	Nauen (AGAI)	20.0	370.4	810	Bergen	1.0
1,604.8	187	*Daventry (5XX)	25.0	37.65	7,968	—	—	400	750	Aalesund	1.0
*Relay stations. **Relays 2LO.				41.45	—	Doeberitz (AFK)	5.0	412	728	Notodden	0.7
AUSTRIA											
253.3	1,184	Linz	0.5	67.65	4,434	Bergedorf (AFL)	3.0	435.4	689	Fredrikstad	1.0
272.4	1,101	Klagenfurt	1.5	51	5,832	Stettin	0.75	448	670	Rjukan	1.0
277.8	1,080	Salzburg (under const.)	0.5	236.5	1,268	Nurnberg	3.0	461.5	650	Oslo	1.5
294	1,020	Innsbruck	0.5	242	1,239	Muenster	1.5	500	600	Porsgrund	1.0
356.7	841	Graz	0.5	250	1,200	Cassel	0.7	566	350	Hanar	0.7
517.2	580	Vienna	15.0	251.8	1,191	Kiel	0.7	2,041	142	Bergen	5.0
576.9	520	Vienna	0.75	254.6	1,178	Danzig	0.75	POLAND			
BELGIUM											
220	1,360	Chatelineau	0.25	273	1,099	Bremen	0.75	270.3	1,110	Lemberg (under construction) to c	
232	1,292	Schaerbeek	0.5	274.9	1,091	Dresden	0.75	342.5	875	Posen (Poznan)	1.5
265	1,130	Louvain (under construction)	7.0	279.4	1,073	Kaiserslautern	1.5	422.5	710	Katowitz	10.0
275	1,090	Ghent	0.5	283	1,060	Cologne	4.0	426.7	703	Wilno	1.5
508.5	590	Brussels	1.5	298	1,006	Hanover	0.7	567	529	Cracow	1.5
CZECHO-SLOVAKIA											
263.2	1,140	Kosice	2.4	303.6	988	Koenigsberg	4.0	1,111	270	Warsaw	10.0
300	1,090	Bratislava	0.5	322.2	931	Breslau	4.0	RUSSIA			
319.7	859	Prague (Praha)	5.0	329.7	910	Gleitwitz	10.0	1,000	300	Leningrad	10.0
441.1	880	Prague (Brno)	2.4	356.3	819	Leipzig	10.0	1,450	209	Moscow (Moskva)	30.0
DENMARK											
337	890	Copenhagen (Kjbenhavn)	1.5	379.7	790	Stuttgart	4.0	1,675	179	Kharkov	15.0
972	308	Soro	0.5	396.8	755	Hamburg	4.0	SPAIN			
1,680	178	Kalundborg	2.0	400	750	Aachen	0.75	272.7	1,090	Oviedo (EAJ19)	0.5
ESTHONIA											
408.5	735	Reval (Tallinn)	2.2	429	609	Frankfurt-Main	4.0	277	1,083	Barcelona (EAJ13)	2.0
FINLAND											
375.4	789	Helsingfors (Helsinki)	1.2	471.6	636	Langenberg	25.0	277.8	1,080	Cartagena	1.0
1,522.8	197	Lahti	2.5	483.9	620	Berlin	4.0	324.3	925	Almeria (EAJ18)	1.0
FRANCE											
40.2	7,463	Lyon (PTT)	10.0	536.6	559	Munich	4.0	345	870	Barcelona (EAJ1)	3.5
45	6,666	Agen	0.25	566	530	Augsburg	0.5	374.5	801	Madrid (EAJ7)	3.0
61.5	4,878	Radio LL (Paris)	1.0	574.7	522	Freiburg	0.75	400	750	San Sebastian (EAJ8)	0.5
158	1,899	Beziere	1.0	1,250	240	Zeesen	25.0	400	750	Cadiz (EAJ3)	0.5
176	1,700	Tourcoing	0.3	1,829	164	Norddeich	10.0	402.1	746	Salamanca (EAJ22)	0.55
210	1,428	Chambery	0.5	2,525	119	Berlin (News)	8.0	434.1	691	Seville (EAJ5)	1.0
212	1,414	Fécamp (Radio Normandic)	0.3	2,900	103	"	8.0	SWEDEN			
228.4	1,313	Biarritz	0.25	4,000	70	"	8.0	260.1	1,153	Malmö	1.0
230	1,304	Ste Etienne	0.25	HOLLAND				278.8	1,076	Trollhattan	0.4
235	1,260	Bordeaux (Radio Sud-Ouest)	2.5	18.4	—	Kootwijk (PCLL)	30.0 (Wed. 12.40 G.M.T.)	314	955	Falun	0.5
239.5	1,253	Nimes	1.0	31.4	—	Hilversum	—	416.7	720	Goteborg	6.0
244.7	1,220	Juan-les-Pins	0.7	340.9	880	Huizen (until 5.40 p.m.)	5.0	453.1	662	Stockholm	1.5
245.7	1,221	Toulouse (PTT)	2.0	1,071	280	Hilversum (ANRO)	5.0	545.6	550	Sundsvall	1.0
253	1,185	Montpellier	0.5	1,875	160	Huizen (after 5.40 p.m. and on Sundays)	5.0	720	416	Ostersund	2.0
263	1,118	Strasbourg	0.5	1,950	154	Scheveningen-haven	5.0	1,190	252	Boden	2.0
268.5	1,117	Lille (PTT)	0.8	HUNGARY				1,363	220	Motala	30.0
ICELAND											
333.3 900 Reykjavik 1.0											
TURKEY											
1,200 250 Stamboul 5.0											
1,818 165 Angora 7.0											

TRIX
H.F. CHOKES
represent the highest possible efficiency at the lowest possible price.

We want you to test the truth of this statement by using a TRIX H.F. Choke in your set. We want to convince you that it is not merely an advertising phrase. When you have tested the TRIX H.F. Choke on all circuits, mounted either horizontally or vertically—just as you please—you will realise that it is a plain straightforward, and perfectly honest claim that we are making. The TRIX H.F. Choke costs 5/6. It simply cannot be equalled for price and performance!



The TRIX PORTETTE, the smallest portable in the world, created a sensation at the recent Radio Exhibition. 5 gns. and 5½ gns., plus new royalties.
The TRIX PORTABLE FIVE, in Walnut or Mahogany, at 17 gns., and Solid Hide at 18 gns., plus new royalties, is easily equal in performance and appearance to sets nearly double the price.
Full particulars of these remarkable sets on application to the manufacturers:

ERIC J. LEVER (TRIX) LTD.,
8/9 Clerkenwell Green,
London, E.C.1.
*Phone: Clerkenwell 2014/5.

The BROWNIE WIRELESS



9/6

Transformer

The Brownie "popular" has been designed to meet the public demand for a general purpose transformer giving really good reproduction suitable for inclusion in home-constructed sets.

The remarkable results obtained on these "Popular" transformers are made possible by very careful attention to the windings and preparation of the core. The magnetic field is composed of special laminations of the softest iron procurable, and the accuracy of the windings on their moulded bobbins gives a resonance and reproduction unequalled by transformers costing twice the price.

This transformer is being used with great success in the "Simplicity Screen-grid Three" recently described in "Amateur Wireless."

The BROWNIE WIRELESS COMPANY (G.B.), LTD.
Dept. 23, Nelson St. Works, London, N.W.1

CHIEF EVENTS OF THE WEEK

- LONDON AND DAVENTRY (5XX)**
- Oct. 22 Vaudeville.
 - " 23 "Should Married Women Work," a discussion between Dame Beatrix Lyall and Mrs. E. D. Simon.
 - " 24 Michael, a play by Tolstoy.
 - " 26 B.B.C. Symphony Concert from Queen's Hall.
 - " 27 Viennese Dances.
- DAVENTRY EXPERIMENTAL (5GB)**
- Oct. 22 Selections from musical comedies.
 - " 23 Music of Haydn and Mozart.
 - " 24 Military-band programme.
 - " 25 The House with the Twisty Windows, a play by Mary Pakington.
 - " 26 Speech by the Prime Minister
- CARDIFF**
- Oct. 21 By the Fireside, a "home programme" arranged by Lewis Davies.
 - " 22 The Lady Lawyer, an operetta by John W. Ivinney.

- MANCHESTER**
- Oct. 22 Speeches from the opening of the Radio Exhibition at the City Hall.
- NEWCASTLE**
- Oct. 24 Electric Sparks Concert Party.
 - " 27 The Radiotunists.
- GLASGOW**
- Oct. 23 Half an hour of Kettelbey's music.
 - " 27 Music and humour.
- ABERDEEN**
- Oct. 22 The Complete Compromise, a dialogue by Edwin Lewis.
- BELFAST**
- Oct. 25 Round Leicester Square.

Yesterday - Today



and always

Player's please



REG. NO. 154011

"It's the
Tobacco that Counts"

10 for 6^D.

20 for 11^{1D}/₂

50 for 2^D/₅

100 for 4^D/₈

NCC 521

ELECTRADIX GEMS

FOR Power Amplifier Drive for R.K. Speakers on Public Address well—the 25/- Osram A.T.40 new and guaranteed, 8/6. Cosor A.U.3 and A.U.15 and H.T. Rectifier Valves, also guaranteed, only 8/6 each.
H.T. Accumulators, 60 volt, 90 volt Monobloc Units of 1 amp.-hour capacity at 3d. per volt, a 120-volt Accumulator for 39/6, brand new, with wander plug taps and bulb filler.
A.C. to D.C. Chargers, 2-4- or 6-volt cells, charged at up to 5 amps., only 50/6. Large Elladix for 12-volt 6 amps., output, 80/-. Rabdix Valve Chargers, output 1.3 amps., bargain, complete, 40/6. Combined H.T. and L.T. Chargers, L.T. 5 amps., H.T. 20 to 120 volts, 100 milliamps. to 400 milli-amps. The Ella Super Charger, 24. With thunder storms your aerial should be fitted with Vacuum Safety Lightning Arrestor, which by-passes all external charges, 3/6 each. Small model for fitting in Sets or across Earth-Aerial Switch, 2/6.



New Model Weston Relay, in mahogany case, with window; usual price, £3 10s.; sale at 27/6.
The Premier Eliminator, a Precision Meter with a resistance of 500 to 2,500 ohms per volt at will is the DIX-ONEMETER, its finely divided mirror scale and knife-edge needle, bakelite body and elastic range, in addition to its other well-known advantages, make it years in advance of anything else on the market. WE HAVE A WONDERFUL STOCK OF RADIO AND SCIENTIFIC APPARATUS.

Send us your inquiries for Dynamos and Alternators, Recorders, Relays, and Special Apparatus.

New Edition of 72-page Catalogue 4d.

ELECTRADIX RADIOS, 218, UPPER THAMES STREET, LONDON, E.C.4.



Don't Solder—Screw it!
Slotted Terminals Make Better Contact

AERMONIC Model "H" valve holder is the keenest Anti-capacity Valve Holder. Made from the best insulating material suspended on nickel springs. Has slotted terminals for screw-driver

tightening; no soldering needed, but soldering tags for these who prefer.
 Price 1/6. List Free

AERMONIC

If dealers can't supply we send post free on money-back guarantee.
JAMES CHRISTIE & SONS, Ltd. 246, West Street, SHEFFIELD.
 or London Agents: A. F. Bulgin & Co., 10, Cursitor Street, LONDON, E.C.4.

WET H.T. BATTERIES



Solve all H.T. troubles
SELF-CHARGING, SILENT, ECONOMICAL
JARS (waxed) 2 1/2" x 1 1/2" sq. 1/3 doz.
Zincs, New Type, 1 1/2 doz. 5 SACS 1/2 doz.
 Simple doz. (18 volts), complete with bands and electrolyte 4/3, post 9d. Sample unit, 6d. Illustrated booklet free. Bargain list free.
AMPLIFIERS, 30/-. 2-Valve Set, 24.
A. TAYLOR, 57 Studley Rd., Stockwell, London.

REPAIRS

Any make of L.F. Transformer, Loud-speaker or Headphones repaired and dispatched within 48 HOURS—TWELVE MONTHS' GUARANTEE with each repair. 4/- Post Free. Terms to Trade

TRANSFORMER REPAIR CO.

"Service" Dept.

214 High Street, Colliers Wood, London S.W.19

USE ETON & AVOID EATEN CELLS

Eton Primary H.T. Battery. Pl Porous Pot Cells, S1 and S2 Sac Cells. All complete for assembly.
 1-cell, 6-cell, 12-cell, 30-cell.
 P1 6d. ... 3/3 ... 5/9 ... 14/-
 S1 6d. ... 3/- ... 5/3 ... 12/-
 S2 4 1/2 d. ... 2/6 ... 3/10 ... 9/6

Send 1d. stamp for booklet giving full particulars to—
THE ETON GLASS BATTERY CO
 46 ST. MARY'S ROAD - LEYTON - E.10

OUR BLUEPRINT SERVICE

Constructors of receivers described in this journal should make full use of our Blueprint Service and avoid all risk of failure.

OPERATING THE "RANGER"

Owing to excessive demands on our space we have been obliged to hold over these particulars until next week.

Epoch moving-coil loud-speakers are already well known to our readers. Their construction is remarkably simple, and constructors who wish to erect the instrument themselves can obtain sets of parts. Readers should write to Epoch Radio Manufacturing Co., Ltd., of 53 Gracechurch Street, E.C.3, for full specifications and particulars.

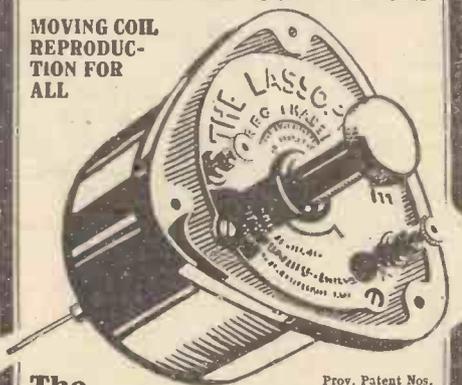
"Amateur Wireless and Radiovision." Price Threepence. Published on Thursdays and bearing the date of Saturday immediately following. Post free to any part of the world: 3 months, 4s. 6d.; 6 months, 8s. 9d.; 12 months, 17s. 6d. Postal Orders, Post Office Orders, or Cheques should be made payable to "Bernard Jones Publications, 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," 58-61 Fetter Lane, London, E.C.4.

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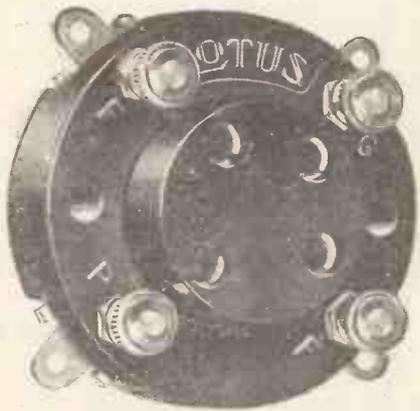
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Did you see all our new products at Olympia?



A.C. L.T. BATTERY ELIMINATOR
£10 : 8 : 0
Write for particulars of our new range of Battery Eliminators.

OUR new season's products created a big stir at Olympia this year. Time after time one heard the remark, "Have you seen the real engineering jobs R.I. and Varley are marketing this year?" To attempt to pick out any particular components which attract more attention than others would be a difficult task. It is only fair, however, to say that our new shrouded L.F. Intervalve Transformers and L.F. Chokes were singled out as being really high-class scientific jobs, quite on their own as regards design and construction.



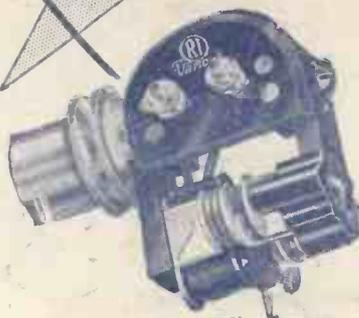
BI-DUPLEX L.F. INTER-VALVE TRANSFORMER
27/6

Our range of Bi-duplex Wire-wound Resistances and their companion products—R.C. Couplers, H.F. Choke, and the new Anti-mobo R.C. Couplers—are always the centre of attraction, for they are regarded in this country as the standard of high-class design in radio components.

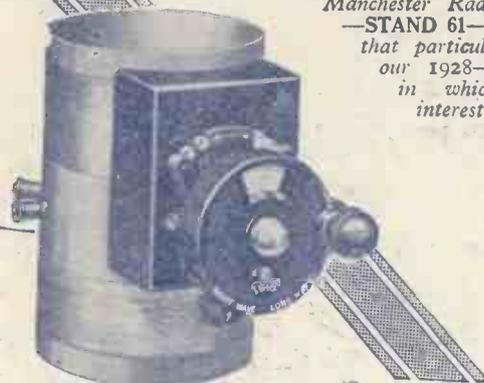
We have made considerable additions and improvements to our existing range of complete eliminators and eliminator components, and the Radio Exhibition at Olympia proved that the months of research spent in perfecting these products had not been in vain.

Lastly, everyone simply made a bee-line for our new Gramophone Pick-up. In conjunction with the rest of our Gramophone Electrical Reproduction Apparatus it eclipsed everything at the Show, and, owing to the enormous orders taken, we regret it will be a few days before fresh orders can be executed.

If you were unable to come to Olympia, see our Stand at the Manchester Radio Exhibition—STAND 61—or write for that particular section of our 1928-29 Catalogue in which you are interested.



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