

WIRELESS, incorporating 'Wireless Weekly,' OCTOBER 9, 1926.

WIRELESS



INCORPORATING
WIRELESS WEEKLY

2^D
WEEKLY

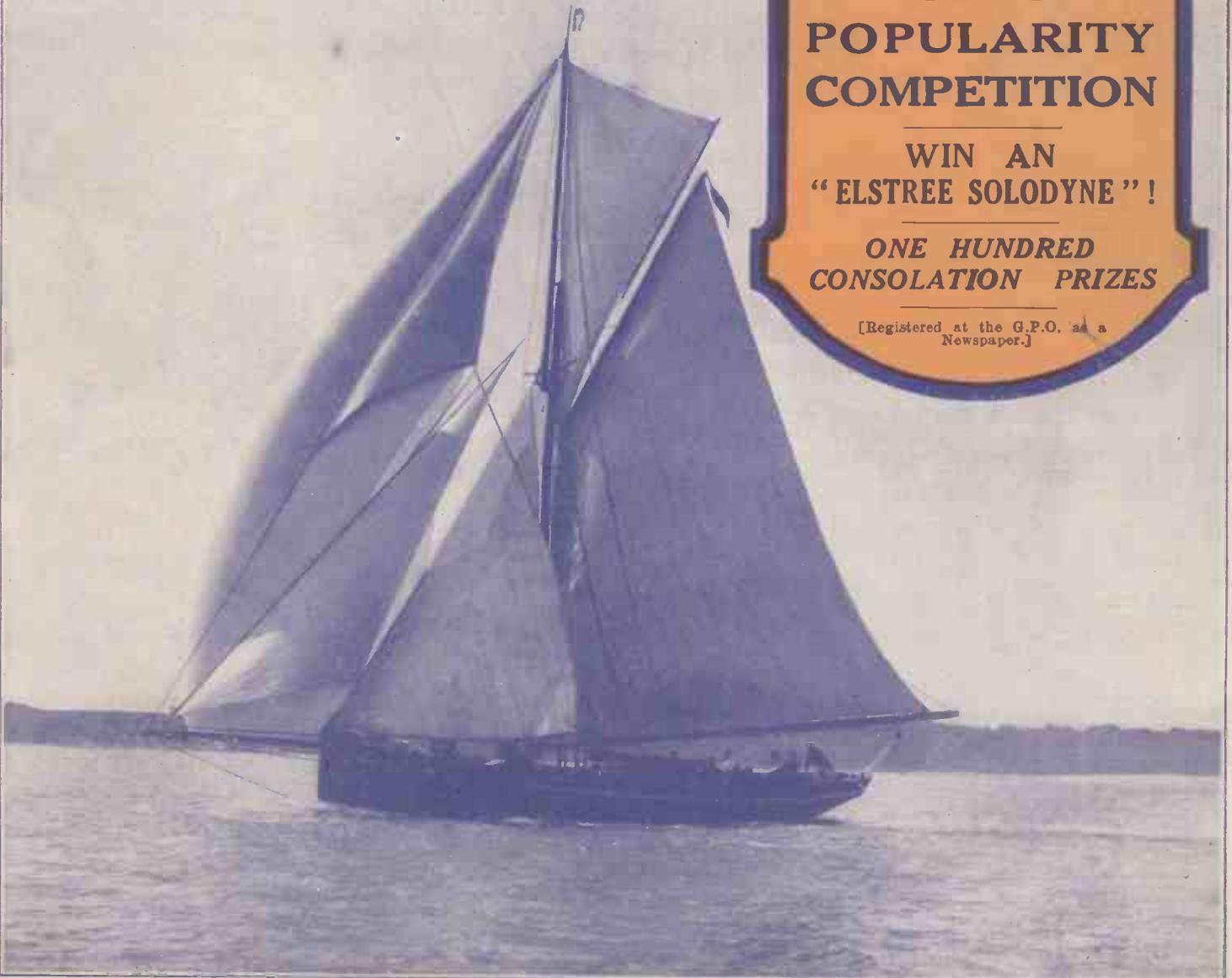
Vol. V. | OCTOBER 9, 1926 | [No. 8

**GREAT
POPULARITY
COMPETITION**

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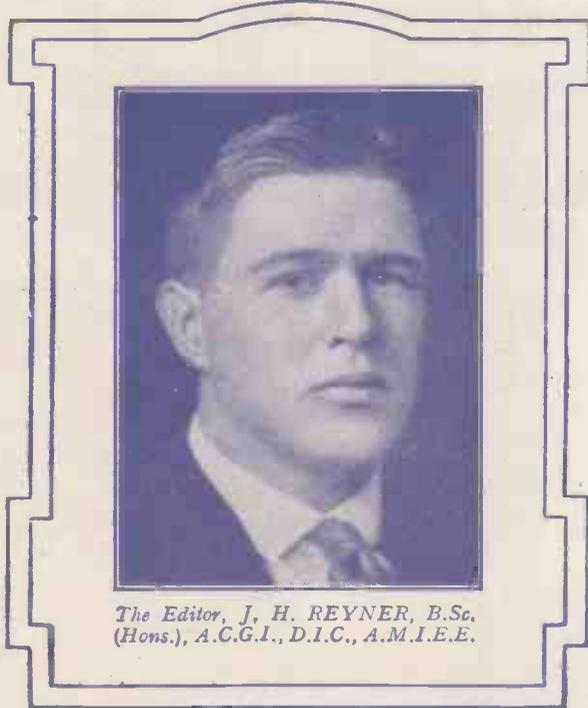
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WITH ISSUE
NOW ON SALE

A WONDERFUL FREE GIFT BOOKLET, THE RAPID STATION GUIDE, will be presented with every copy of the October issue of MODERN WIRELESS, now on sale at all Newsagents, Bookstalls and Booksellers to-day. The wavelength redistribution of European stations, which comes into operation on October 15th, will make this presentation booklet extremely useful to everyone.

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MONTHLY



The Editor, J. H. REYNER, B.Sc. (Hons.), A.C.G.I., D.I.C., A.M.I.E.E.

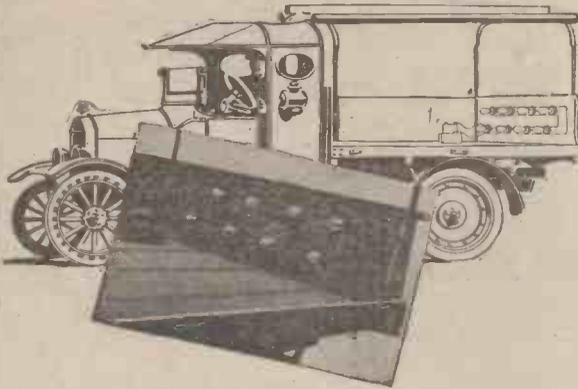
- The Contents for the October issue include:
- MORE ABOUT THE ELSTREE "SOLODYNE"
HOW TO BUILD AN EIGHT-VALVE
SCREENED-COIL SUPERHETERODYNE
By G. P. KENDALL, B.Sc.
 - MODERN DESIGN IN SIMPLE SETS
By J. H. REYNER, B.Sc. (Hons.), A.C.G.I.,
D.I.C., A.M.I.E.E.
 - AN H.T. CHARGING UNIT FOR HOME USE
By the Staff of the Elstree Laboratories.
 - FURTHER HINTS ON THE "MEWFLEX"
REPRODUCING THE LOW TONES
By CAPT. H. J. ROUND, M.I.E.E.

MODERN WIRELESS

Obtainable from all Newsagents, Booksellers or Bookstalls, or direct from the Publishers, Radio Press, Ltd., Bush House, Strand, London, W.C.2. Subscription Rates 15/- per annum (13/6 per annum Canada and Newfoundland), Lesser periods pro rata.



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Shock and is
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EIGHT 'Lotus' Valve Holders fitted with large power valves and fixed to tailboard of a Ford motor lorry, driven over rough roads for 30 miles, survived the test.

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Pat. No. 256833.

Made from best bakelite moulding with springs of nickel silver and phosphor bronze valve sockets.

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The New
SIX-SIXTY POINT ONE VALVES



Make your accumulator charges last a long time

WEARLY journeys and tiresome delays caused by run-down accumulators can be almost eliminated by using the new SIX-SIXTY Point One Valves.

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Then, again, with the special filament used in the new Six-Sixty Point One Valves, it is unnecessary to heat this element to incandescence to produce the requisite electronic emission for perfect results. It is a well-known fact that alternate rapid heating and cooling, accompanied by the corresponding expansion and contraction, quickly produces brittleness. Now, Six-Sixty introduces valves which work at such a low temperature that there is absolutely no "glow" whatever from the filament when operating at the rated voltage. There are no valves on the market to-day which can boast of a longer life, because there are no valves that operate at a lower temperature.

Lastly, every advantage of the special filament is utilised to the highest degree possible by the new Six-Sixty Duo-Triangular system of Suspension to produce the perfect valve.

After exacting and exhaustive tests, Messrs A. J. Stevens (1914), Ltd., have decided to standardise Six-Sixty Valves in their famous "Symphony" Range of Receivers.

Descriptive leaflet S.S. 9-26, giving full particulars of complete range, free on application.



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D.E., 3.7 volts, .1 amp., Power Amplifier .. 18/6

S.S.8.

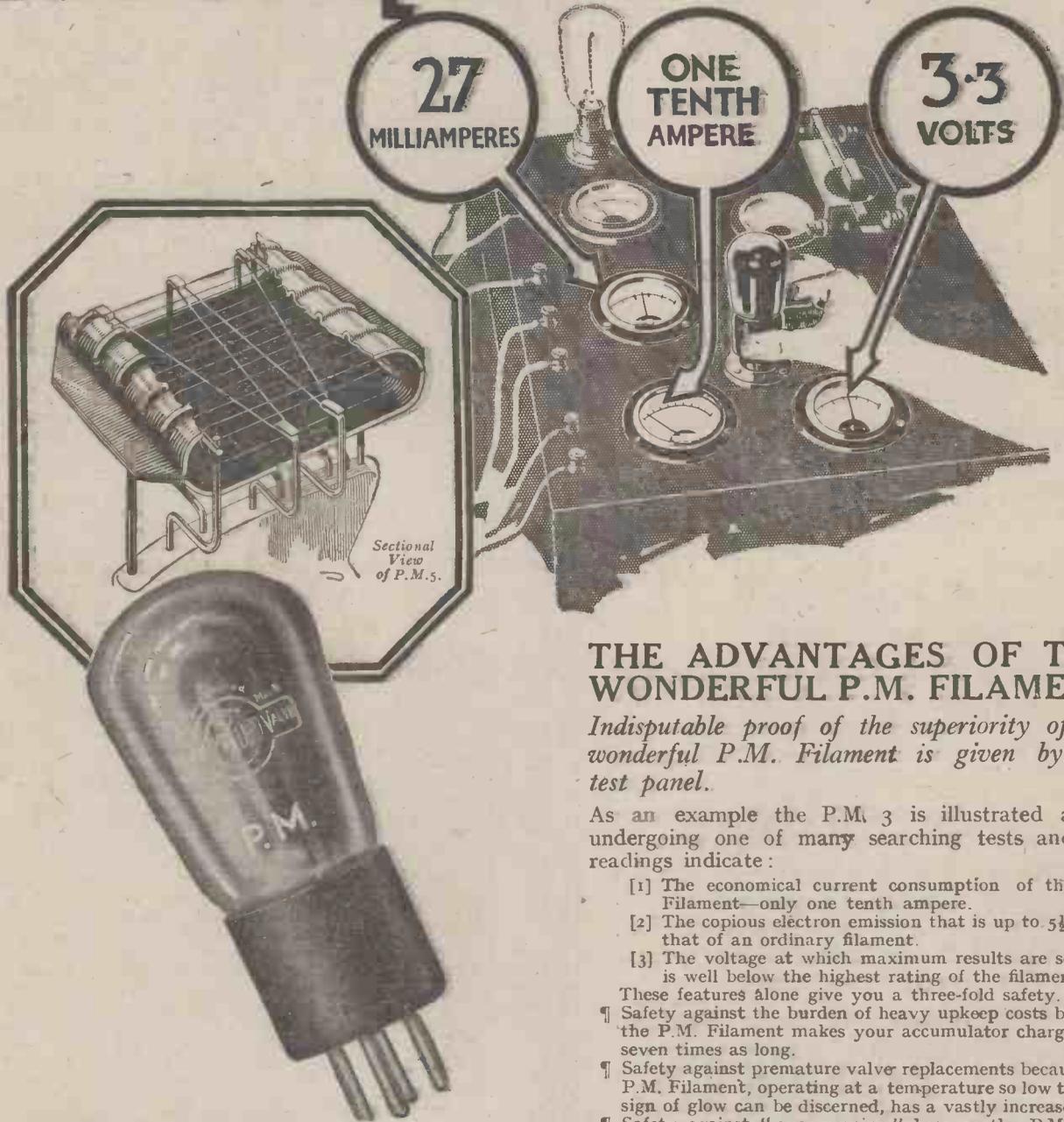
D.E., 3-4 volts, .1 amp., General Purpose .. 14/-

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THE ADVANTAGES OF THE WONDERFUL P.M. FILAMENT

Indisputable proof of the superiority of the wonderful P.M. Filament is given by the test panel.

As an example the P.M. 3 is illustrated above undergoing one of many searching tests and the readings indicate:

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These features alone give you a three-fold safety.

- † Safety against the burden of heavy upkeep costs because the P.M. Filament makes your accumulator charges last seven times as long.
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NEW REDUCED PRICES

For 4-volt accumulator or 3 dry cells

THE P.M.3 (General Purpose) 0.1 amp, 14/-
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WIRELESS

INCORPORATING
WIRELESS WEEKLY

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THIS WEEK'S NOTES AND NEWS

Air Experiments

TWO French Army lieutenants are to make an experimental journey from Paris to Rabat with a view to registering observations on the subject of wireless apparatus on aeroplanes. A transmitter working on 650 metres will be taken, and constant communication will, it is hoped, be maintained with Orly, Bordeaux, Toulouse, Algiers and Casablanca. These distances are well in excess of any covered in the general way by aeroplanes.

More Wireless on Trains

WIRELESS telephony is being introduced on Italian trains, according to an announcement from the Ministry of Communications. The Milan-Bologna express is being used for the preliminary experiments. As in the recent British experiments, the usual method will be employed, telegraph lines along the side of the track receiving the transmissions from the aerials on the roofs of the coaches.

"Symphony v. Foxtrot"

I AM glad to see that the B.B.C. has arranged another programme on the "Classics v. Jazz" lines. It is arranged for October 11, and Mr. Sebastian Brown, lecturer in music at the Chelsea Polytechnic, will endeavour to prove that there are really three ways of looking at music, and that appreciation of jazz or the classics depends entirely upon the view-point of the listener and on the way in which he listens. The "Symphony v. Foxtrot" programme will be illustrated by an orchestra and the London Radio Dance Band.

Radio in Cuba and Mexico

I HEAR that the Governments of Mexico and Cuba have combined in an arrangement to connect their respective telephone systems by means of wireless. The revenue derived is to be equally divided between the two States. I rather think the real purpose of the proposed installation is to make quite sure that each State obtains Stop Press News of any revolution in the other without any loss of time!

Loud-Speakers at Brooklands

THE loud-speaker installation at Brooklands was so eminently successful during the British Grand Prix that I hear that a similar installation may be used as part of the standard equipment at the track on many future B.A.R.O. race days.

In Czecho-Slovakia

THERE are at present some 115,000 listeners in Czecho-Slovakia, about 80,000 being situated in Prague.

A Puzzle

IN Long Stanton, Cambridgeshire, there are two "congregations" every Sunday evening. One attends the Parish Church and the other the "Black Bull," where the broadcast service is listened to most closely. What, I wonder, does the Rector really think about it?

More Welsh Wanted

AT Llandrindod Wells the Executive of the Gorsedd of Bards passed a resolution requesting the B.B.C. to consider the possibility of a better scheme of Welsh broadcasting during the coming winter. This was occasioned chiefly, I believe, by the rumour that the B.B.C. intends to cut down the fortnightly Welsh hour to a monthly affair. Strong remarks were passed upon the unfairness of compelling Welsh listeners to listen night after night to "English dialect"!

A Pity, if True!

IS 2LO's refined accent having any effect upon the speech of Farmer Giles? It seems to be the opinion of (Continued on next page.)



In some tests conducted recently at Colorado it was found that a concert broadcast from Chicago could be received quite distinctly in this cavern 2,000 feet underground.

Did You Hear It?

INCIDENTALLY, did you pick up any news of the big fight? As luck would have it, the 32-metre transmission from WGY was nowhere near up to scratch on the night. I managed to get most of it, but I have heard much better.

This Week's Notes and News—continued

several that the accents of rural England are becoming more "towny." I must listen to Paris and acquire that refined French accent in readiness for my next visit to Monte Carlo!

Will It Score?

A SPECIAL programme compiled by a professional footballer will be broadcast from London and Daventry on October 23.

The SOS Extraordinary

AN "SOS" call recently broadcast in America took the following form:—"If Henry Smith, who deserted his wife and baby 25 years ago, will return home, said baby will knock all the stuffing out of him."

Further Afield

MR. J. L. BAIRD is experimenting on the transmission of moving pictures over a longer range. The receiver at Harrow has been supplemented by receivers at Hull and Manchester. A new transmitter is being built, however, and the transmissions from 2TV will be interrupted for a week or so.

A Strange Story—

EXPERIMENTS are, I understand, well on the way in Japan to determine whether it is possible to predict earthquakes, eruptions, typhoons, etc., by means of radio apparatus. A new radio seismograph, as it is called, is said to measure the slightest sound.

To Appease the Ladies

THE B.B.C. now denies the mere existence of a ban on women



During the recent London to Brighton relay race the positions of runners along the course were received "via radio" by the Royal Corps of Signals.

announcers, and has issued the statement that in the future more microphone work than ever will be done by women.

In Advance

ON October 20 the B.B.C. hope to broadcast the speeches by the Prime Ministers of Australia and New Zealand, on the occasion of the Empire Press Union dinner to members of the Imperial Conference.

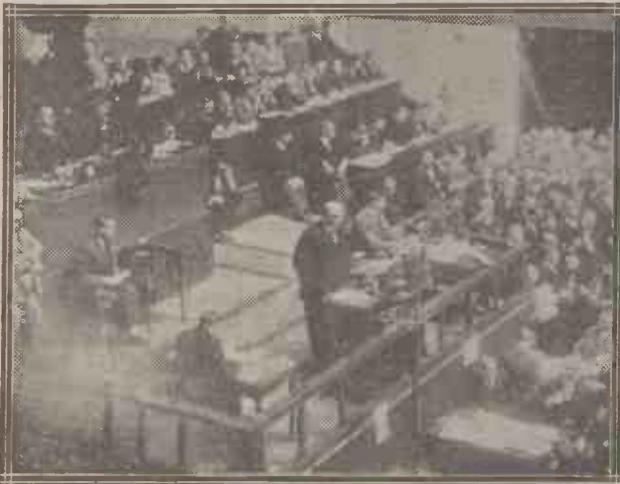
The B.B.C. series of Chamber concerts, arranged for the first Tuesday of each month, is as follows:—October 5, Hungary. November 2, Italy. December 7, Germany. January 4, France. February 1, Czecho-Slovakia, March 1, Holland.

"Faust" is to be performed in the London Studio on October 15. Miss Mignon Nevada is to be "Marguerite."

On October 16, 18 and 20 the String Band of the Royal Air Force will be relayed from Holland Park Hall between 6 and 7 p.m.

A Possibility

THE "voice-controlled" electric trains, recently on show at the Model Engineers' Exhibition at the Horticultural Hall, gave one a glimpse of the future possibilities of wireless. If model electric trains can be so perfectly controlled by wireless, it does not seem at all improbable that railways, shipping routes and "airways" will all come under radio control sooner or later.



The scene at Geneva on the admission of Germany to the League. The microphones are situated on the table in the centre of the picture.



Did you hear GX-6MU? Mr. Eric Megau, who has just returned from a voyage to America, maintained short-wave communication with Ulster during the entire voyage.

occurring in the strata beneath the surface of the earth.

—and Another

I HAVE heard more than one suggestion to the effect that the "big flash" seen in Yorkshire on September 6 was an attempt on the part of Mars to establish radio communication with the Earth. Once more, no comments!

Our Cover Picture

ON our cover this week appears a picture of the yacht *Saladin*, which participated in the ocean yacht race recently. The owner had on board with him the "Relays-to-Daventry" receiver described in WIRELESS by Mr. John Underdown, on which he received weather forecasts, etc., while the race was in progress.

Silent Vera Cruz

A DRAMATIC incident of the tornado which struck the Mexican city of Vera Cruz was the sudden cutting off of all communication.

The telegraph office had just reported that the water was a foot deep on the floor; when the message broke off abruptly and silence reigned!

CALL-SIGN.

THE BUGBEAR OF RADIO

CAN ATMOSPHERICS BE ELIMINATED?

Captain H. J. Round, M.C., M.I.E.E., discusses on these pages one of the most difficult and fascinating of the problems of radio.



IN England we are very lucky in that atmospheric only intermittently trouble us. In a great many other countries, such as the United States, summer atmospheric are such a constant phenomena that broadcasting reception, except from the local station, becomes extremely difficult.

My own experience, however, is that in the United States during the colder seven months of the year they were altogether free from this radio weed, whereas we tend to get them more uniformly all the year round.

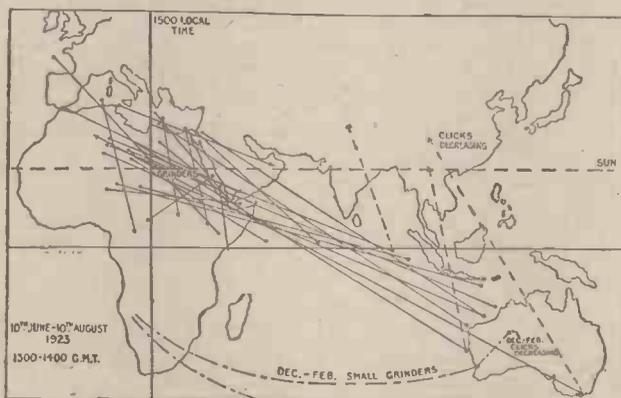
Their elimination has been a problem right from the beginning of the art, and the answer so far is no, but by choosing one's conditions very carefully in certain circumstances they can be dodged.

Early Observations

Some little time before Marconi, a Russian named Popoff erected what must have been the first long-distance receiver for the deliberate purpose of receiving these atmospheric or X's. I

waves, Lodge and others had repeated the experiment and improved the sensitiveness of the apparatus, but surely it was a very important step to conceive the idea that natural storms would produce these Hertzian waves—and with sufficient power to work apparatus over long distances.

of Planchette out of that coherer receiver. The advent of telephonic reception gave us a better idea of what the X's sounded like, and it did not take radio-engineers very long to invent the first method of reducing the effect of these interfering sounds.



The map produced by Captain Tremellen to illustrate the reception of "X's" originating in Africa.

First Personal Experiences

My own first experiences of radio in 1901 were with an apparatus for receiving very like Popoff's—a coherer, a relay and an inker—out of which spouted the tape—and on this tape was printed sometimes the signal sent by the transmitter, and sometimes a mysterious lot of dots and dashes, which we called X's, for want of a better name. It was quite a game to watch these signals coming from space, sometimes sending strings of dots, sometimes a long dash, and at other times almost sending Morse. More than once we got a real word spelt out by accident. Superstitious people could have easily made a kind

The First Attempt

Practically everybody nowadays has heard what they sound like, so there is no need to describe them. The first attempt to avoid them consisted in producing a sound from the transmitter entirely different to the sound of the X.

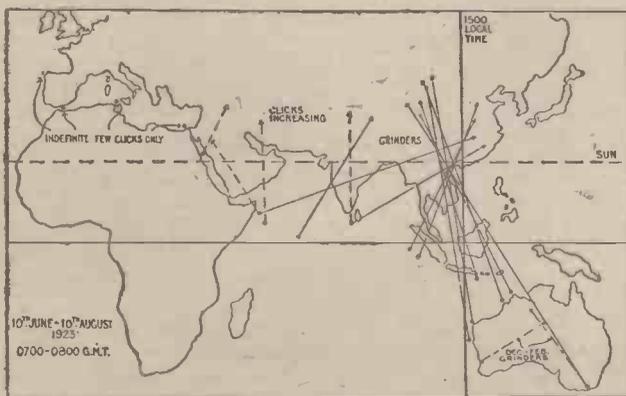
Clean, sharp, high musical notes such as one still hears from stations such as North Foreland (GNF) increased our power of working through atmospheric very much indeed.

There seemed, however, to be no limits to the demands for distance working, and promptly on the strength of good working with these musical notes we were asked to work over greater distances. Greater distances weakened our signals, and the X problem began to get troublesome. We tried all sorts of schemes, some of them partially successful, but always with a little improvement came the demand for more and more distance, and the problem never seemed to be nearer solution.

Directional Methods

The great advance in atmospheric reduction came in about 1914, when we began to recognise that these atmospheric came from definite directions, and Franklin in England and Beverage in America developed methods of receiving which localised one's reception to the one direction from which signals were arriving, and this method was very successful, providing, of course, atmospheric did not come also in that direction.

By a curious piece of luck both in England and the U.S. atmospheric arrive in the opposite direction from which signals are wanted, and to this lucky chance the success of trans-



Captain Tremellen found that the main area of atmospheric origin travels round the earth daily.

always consider this effort of Popoff as a remarkable stroke of genius. Certainly, Hertz had demonstrated the artificial transmission and reception of

(Continued on next page.)

The Bugbear of Radio—continued

Atlantic wireless telegraphy is chiefly due.

Continuous Waves

The next great advance in atmospheric reduction came by use of continuous waves instead of the old spark waves. Exactly why this reduces the effect of atmospherics is hard to describe here, but really it comes to this. Atmospherics are very discontinuous waves—the old musical note signals were more continuous, and due to that they were different to the atmospheric and could be recognised from it. A fully continuous wave, such as given by a valve, exhibits the maximum difference of quality possible from an atmospheric, and consequently gives us the best chance of recognising one from the other.

So far we have seen that the great strides made in atmospheric reduction have been made by making our signals have properties different to the atmospheric.

Increase of Transmitting Power

What may be called a third method was rather obvious right from the beginning, and that was to increase the power of the transmitter, but very soon the practical limit of power was reached, and we began to look out for other ways, because with all these inventions, atmospherics were still preventing smooth, easy working over long distances, particularly when we had to work in the direction from which atmospherics came.

In broadcasting reception directional reception is not of much use to us, for the obvious reasons that we usually want to get stations from all sorts of directions, but of course we have the full advantage of continuous waves.

Ingenious Attempts to Stop X's

Many ingenious suggestions have been made in the past for apparatus for eliminating X's, but they all depend either on the directional properties or the continuous character of the waves we receive.

An X acts on all "tunes" of our receiver equally, whereas the continuous wave only acts on one "tune." This looks likely to contain a wonderfully simple solution of the X problem. You will at once say why not have two receivers—one tuned to the signals and atmospherics, and the other only to atmospherics, and then balance them out?

Well, the first time I saw this suggestion was in 1902, and I should think there have been thousands of attempts to do it since. I have made many myself, but only with very par-

tial luck. There are certain definite reasons which we know of now which prevent us doing this apparently simple operation in practice:

Where They Come From

Of course the directional partial solution of the atmospheric problem is all right in certain cases, and it introduced the very interesting question: What is the chief source of atmospherics? To solve this problem a friend of mine three years ago took a trip round the world with a lot of receiving apparatus, some of which enabled him to determine the direction at any time of the X's as well as signals.

The results are extremely interesting, and can approximately be classified as follows:—

(1) X's are mainly produced over land and not over water.

(2) Their main source travels round the world each day, following the sun three hours late, and mainly in the latitude in which the sun is travelling.

I give three of the diagrams which

atmospherics is, not known. Captain Tremellen noted that although all his directional experiments pointed to the Egyptian area as a very bad source of X's, when he got to Suez he never saw a single lightning flash. There are probably some kinds of electrical discharges which are either so high up that they are invisible, or they occur without actually producing light, at least light visible in full daylight.

The great tropical areas also produce X's at night, but these are always visible to the eye, as the phenomena called "summer lightning."

Although every night in the heart of Brazil summer lightning was visible in every direction, almost continuously, accompanied by violent atmospherics in my receivers, I never once experienced a thunderstorm at night during five months. This always mystified me, and I had a strong idea that what is called summer lightning, which looks like a discharge on the horizon, is actually a very feeble discharge quite near, and low down, and one can see it edgewise, but if it occurs right over one it will not be noticed.

The Last Great Step

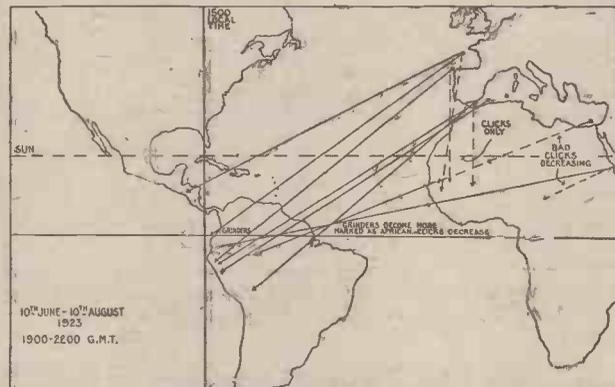
In the last decade of radio, which might be called the "ultra short-wave era," it has been discovered that Nature does not produce these very short waves in such profusion as it produces long waves, so that the fourth great dodging scheme is now in the course of being developed, and wavelengths are being used on which the atmospherics are very weak, and fortunately it has been found that these short waves have got great travelling power.

So now the engineer has still his continuous waves, and his directional methods which he can use, and directional receiving becomes easier and easier the shorter the wavelength. Directional transmission (really equivalent to great increase in power) also becomes possible, thus giving a further advantage. He also has the advantage of much weaker atmospherics to contend with.

For Broadcasting

Very unfortunately, at the moment, for political and technical reasons, these very short waves are no use for normal broadcasting.

Our chief weapon in broadcasting, for some time to come, is going to be increased power in the transmitters, because up to date nothing like the great power of the commercial station has been used in the broadcasting services, and it is only a question of money to build these big stations.



This map illustrates Captain Tremellen's record of "X's." originating in South America.

Captain Tremellen produced on this radio expedition, and they should clearly show how he obtained this law of X travel.

These main sources of atmospherics are far enough away from us here not to trouble us much on our broadcasting, unless we try to receive over very long distances. There are local storms, but they fortunately occur only seldom in this country.

The Americans, who have a great area of tropical land near to them, are great sufferers in the summer time from X's, which they have very curiously named "static," about the last word I should think one should use for the effect of lightning, but in their winter months the sun retires below the equator, and then their troubles almost vanish.

Invisible Discharges

What exactly produces the tropical

FOUR VALVES, ONE DIAL

A Daventry or Local Receiver which all the family can use.

Designed and constructed by John W. Barber, this set is intended to provide a reliable and easily operated instrument for giving a regular, every-evening service of broadcast with good quality of reproduction.



WIRELESS, from the broadcasting point of view, has at least two separate and distinct appeals. First, there is the enthusiast who is happy only when building and testing new sets, and when he is engaged in searching for distant stations, and secondly, there is the "family" aspect, in which case a receiver is usually required simply and solely for the reception of music and other forms of entertainment from the local station. In this latter case, the receiver should be as simple as possible, and capable of being set into operation by each and every member of the family, excluding possibly the youngest children.

Requirements

The "home" set should not be too large, as regards its physical dimensions, as in the average home the difficulty of finding room for it would otherwise arise, and the advantage of having broadcast music available might be outweighed by the opposition to the presence of the set! I have, therefore, borne these considerations in mind in designing the four-valve receiver illustrated in these columns, and feel sure that the finished product, which gives every satisfaction as far as results are concerned, will provide readers with a set worthy of a place in their household.

The appearance of the completed set is such that even the most timid of the family will not hesitate to essay controlling it, especially when it is pointed out that the on-and-off switch is the only control, in general, that will need to be operated. There can be no doubt that the operation of the set is as simple as switching on the electric light, and nowadays few are hesitant about that!

As regards results, on test on a poor aerial eight miles from 2LO full loud-speaking of very good quality was obtained from that station, and from 5XX, with extremely simple manipulation.

A Simple Circuit

Let us have a look at the circuit diagram. We have a coil L_1 connected across aerial and earth, coupled closely to another coil L_2 , which, together with the variable condenser C_1 , form the only tuned circuit in the receiver. This form of aerial coupling is referred to generally as a "tight-coupled aerial," upon which arrangement much work has been done by Mr. G. P. Kendall. The first valve acts as a high-frequency amplifier, the transfer of signals to the detector valve being

excepting that it is wound with resistance wire instead of copper wire, in order that it shall respond as evenly as possible, over a wide range of wavelengths.

Between the secondary winding and the grid of the second valve is interposed the usual grid condenser and leak, in order to cause the valve to act as a rectifier upon the popular principle. It may be argued that this system of rectification is not so satisfactory as other forms, but in view of the fact that simplicity is the present keynote, and that in the form adopted only the simplest of apparatus is needed to produce the desired results, the "leaky-grid" method has been adopted.

L.F. Coupling

The third valve, which acts as a note magnifier, is coupled to the detector valve by means of a low-frequency transformer, while the coupling to the last valve is effected by means of an iron-core choke coil, a stopping condenser and grid leak being employed in the usual manner. In a receiver of the present type, "knobs" are to be avoided as studiously as possible, and to this end the variable type of filament rheostat has not been used, their places being taken by fixed resistances of the screw-in variety, in order that suitable resistances may be provided for the valves in use. It will thus be seen that, upon the panel there are

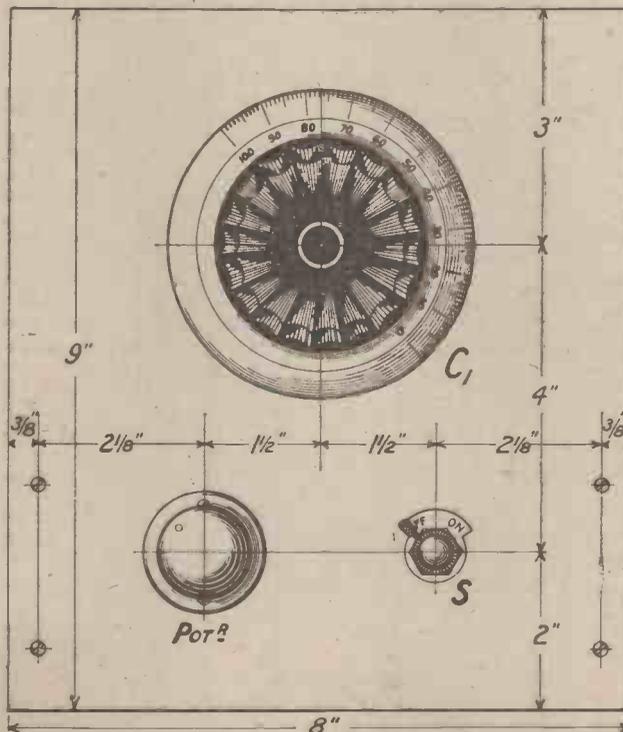


Fig. 1.—The drilling dimensions, few as they are, can be obtained from this figure.

effected by means of the aperiodic transformer L_3 L_4 , which follows the design of the ordinary barrel type, plug-in, high-frequency transformer,

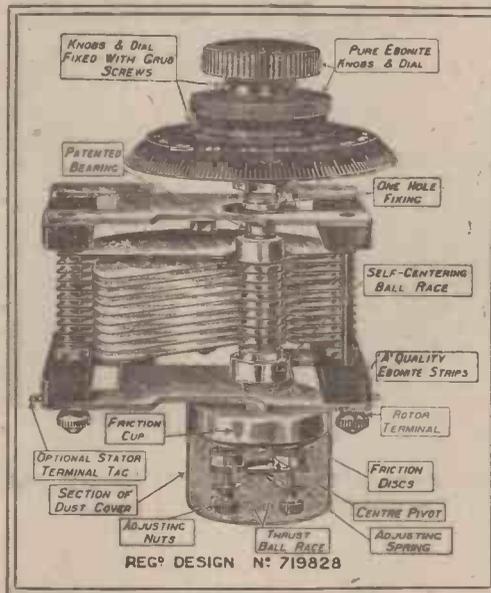
suitable resistances may be provided for the valves in use. It will thus be seen that, upon the panel there are

(Continued on next page.)

As used in the ELSTREFLEX Receiver!

ORMOND LOW-LOSS CONDENSERS

Straight Line
Wavelength
(SQUARE LAW)



SLOW MOTION DIAL RATIO 55-1

This Condenser and the
Ormond Twin Model are
used in the
ELSTREFLEX receiver

The Ormond LOW LOSS Condenser illustrated above and also the Ormond Twin Model were chosen for use in the ELSTREFLEX receiver (described in "Wireless," Sept. 25th) because of their "slow motion" movement so desirable in this type of receiver.

ORMOND LOW LOSS CONDENSERS

Straight Line Wave Length (Square Law). The world famous slow motion friction control movement is incorporated, ideal RATIO 55-1, similar to that fitted to the ORMOND S.L.F. Condenser. This ratio is high enough for finest tuning and low enough for easy searching. Direct drive provided for rough setting. Fitted with ball bearings to ensure smooth action. Rigid construction, the moving vanes being connected to the heavily nickelled and polished brass end-plates. Negligible losses. Fixed vanes supported on best quality ebonite strips. No gears, absolutely silent in action on the shortest wave lengths. Terminals and soldering tags for connections. One-hole fixing. Complete with 3" Knob and Dial and slow motion knob.

Capacity Prices :

.00025	- - -	13/6
.0003	- - -	14/6
.0005	- - -	15/-

All condensers when NOT fitted with the Slow Motion movement retail at 7/- less.

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Four Valves, One Dial—Continued from page 264

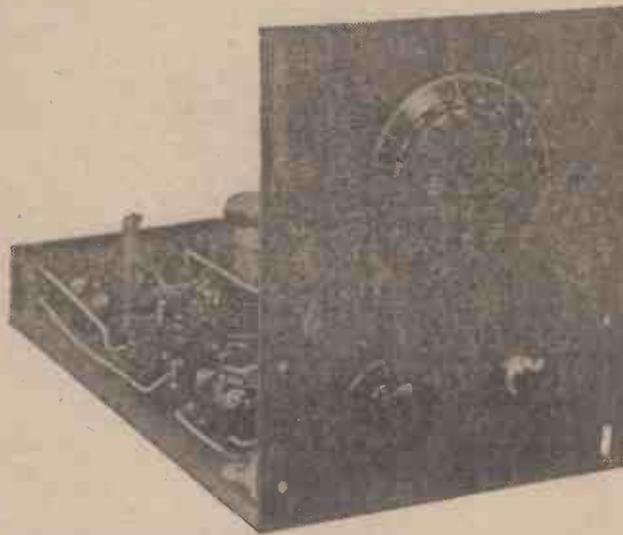
of their respective valve-holders, thus simplifying the wiring somewhat.

Transformer Connections

It will be noticed that the connections to the iron-core transformer are marked P, H.T.+, G, and G.B.—, but should another make of component be used here, which employs the more conventional markings, the equivalent connections will be IP, OP, OS, and IS respectively, but should the makers, however, indicate any special method of wiring up their product, their instructions should in all cases be adhered to. Leaving the panel away from the baseboard at first, wiring should be commenced by joining the grid-leak and condenser to the "grid" socket of the H.F. transformer holder. The connections to this holder will be clear from the drawing given, and no difficulty should be experienced in this respect.

Wiring Order

Next join up the positive filament lead to the valve-holders, "plate" socket of H.F. transformer, and L.T.+ terminal, which latter is to be bridged across to H.T.—. The potentiometer is to be joined up to this lead later on, and a place should be bared on the wire for the connection to be made. Next join up the fixed resistors to one contact of the switch, the panel being just rested in position to enable this lead to be bent to shape. The actual



All filaments are extinguished by the operation of the switch on the right of the panel.

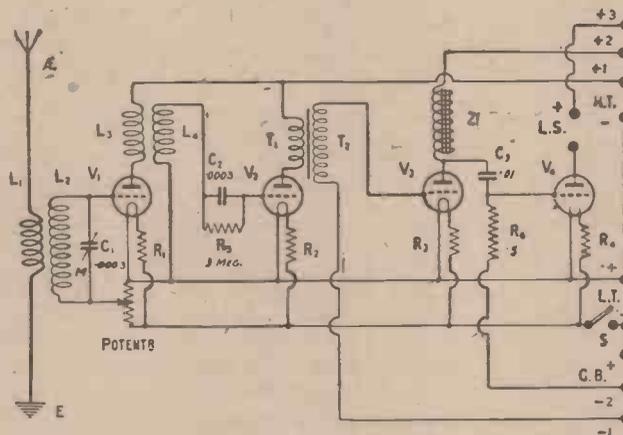


Fig. 3.—An aperiodic coupling, L3, L4, is used to couple the H.F. valve to the detector valve, as may be seen from this circuit diagram.

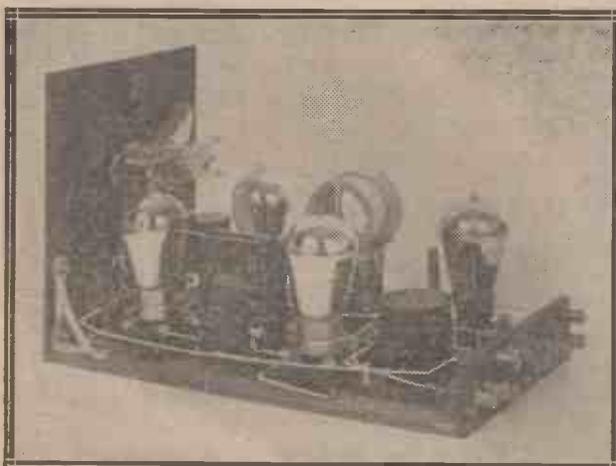
soldering to the switch will be accomplished later. This completes what we may term the first layer of wiring—that is, the leads nearest to the baseboard.

Next join up grid coil to grid of first valve, H.T. + 1 to L.F. transformer and H.F. transformer, anode of detector valve to P of L.F. transformer, the G.B.— of which is joined to G.B. negative 1. G of this transformer is connected to grid of third valve. Now complete the plate connections of the third valve to choke and condenser, and join the latter and the grid-leak to the grid of the last valve, taking a lead from the grid-leak to G.B. — 2. This completes the second layer, and the remainder of the wiring may now be put in, the leads to the variable condenser being bent to shape and soldered to the condenser lugs before the panel is secured to the baseboard.

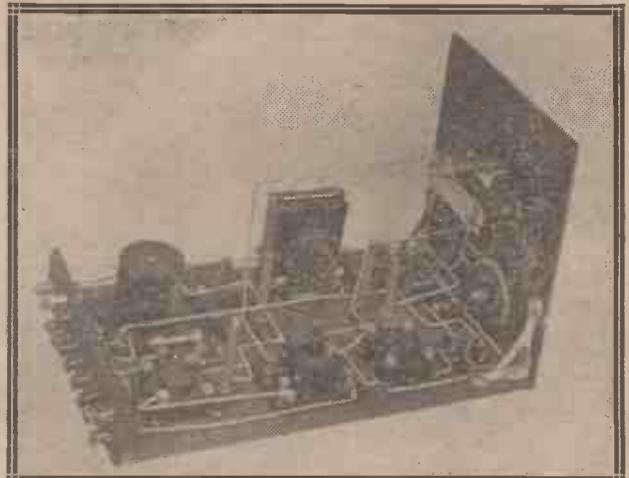
Coil Sizes

The aerial coil L₁ may consist of a No. 25 or a Gambrell "A," while with the .0003 condenser employed a Gambrell "C" will cover the broadcast band in the tuned circuit. The coils for Daventry may be a D for L₁, while an E or E1 will be required in the tuned circuit. The equivalent coils in the numbered series, Nos. 100 and 250 respectively, may, of course, be employed.

Further details of this receiver will appear in our next issue, when notes on operating will be given.



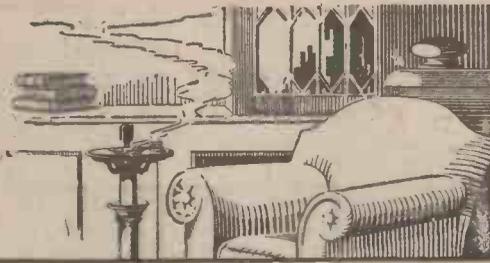
A rear view with coils and valves in position. Notice the position of the L.F. transformer and choke.



The available space on the baseboard is utilised in the most efficient manner possible to ensure simple wiring.

From my Armchair

BY EARL RUSSELL



In these columns Lord Russell expresses each week his own personal views on matters of interest to "Wireless" readers.

A New Aerial

About a year ago I was told that prolonged and extensive experiments had shown that eight wires in a sausage aerial, separated by four-inch wooden rings, gave the actual maximum collection for the broadcast waveband. Full of enthusiasm, I constructed this aerial last summer, and ever since my tennis court has been littered with it, because I was waiting for a wonderful mast to fix it to. Now at last, in despair, I have slung it between two chimneys, with a horizontal length of about forty-five feet and a down lead of all eight wires of about twenty-five feet. I have already been experimenting with it, and find it certainly more selective than the longer aerials I have been using, but not more powerful for the nearer stations.

And the Results

For more distant ones, however, it

certainly seems to get very good reception, and has enabled me to separate stations with the same set which could not be separated on a long single wire aerial. I have already had, for example, Milan, Barcelona and San Sebastian, while all the broadcast stations were in full blast. Equidistant as I am from London and Bournemouth, I have not yet managed to get Manchester while these two are on, but I think I shall. After all, the set I am using is rather out of date, and its condensers turn with stiff jerks, which makes fine tuning difficult.

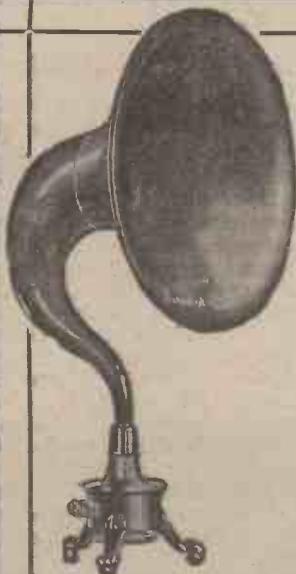
Modern Receiving Sets

The change both in the appearance and the method of construction of receiving sets has been very great in the last two years, and I should not wonder if it was even greater in the next year. Screened coils, neutralising condensers, and two H.F. stages are

among the principal electrical changes, while the system of baseboard construction has replaced the overloaded panel. Variable condensers are an immensely improved component in both their practical and their theoretical construction, and are furnished with much better dials, which move much more easily than those we had to use a year or eighteen months ago.

Near and Far

Reading between the lines of what I see in the wireless papers in descriptions of what sets will do, in inquiries from correspondents and the like, I have come to the conclusion that there are two quite different kinds of broadcast listeners, viz., those who live near to a B.B.C. station and those who are fifty miles or more away. Their whole outlook on receiving is different, for while the latter are comparatively free to search for distant stations, the former are much more largely concerned with how to cut out their nearby station when they are seeking for anything within a hundred metres of it. It is this latter class in particular who want to know about loose coupling, wave traps and other selectivity devices. Perhaps there is a third class, to which most of us on the South Coast belong, whose trouble is Morse, loud, continuous and inescapable. Of course, fortunately for a good many manufacturers, a large number of people are fairly satisfied if they can receive their local station and Daventry.



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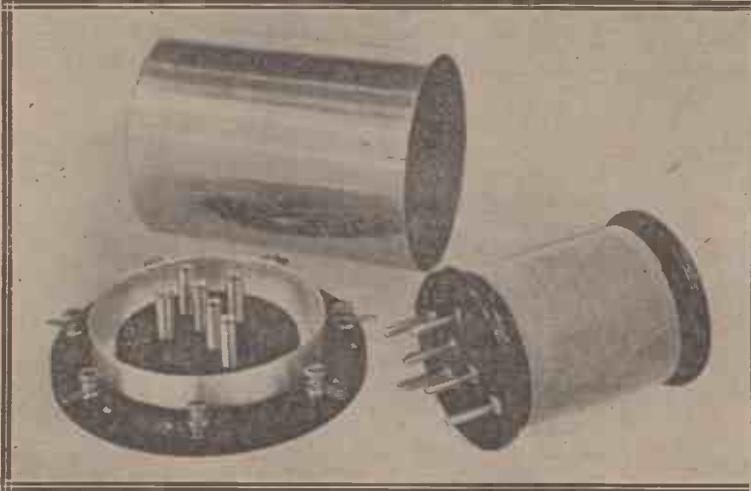
F B

MORE SECRETS OF MODERN RADIO EFFICIENCY

By

**J. H.
REYNER,**

*B.Sc. (Hons.),
A.C.G.I., D.I.C.,
A.M.I.E.E.*



In continuing his disclosures upon the secrets of modern efficiency in wireless receivers, Mr. Reyner includes in this article the question of interaction between H.F. stages



LAST week we discussed the general methods by which stability was obtained in high-frequency amplifiers, and dealt with some of the difficulties which had to be overcome in designing such circuits. There are still two points on which a little further discussion is of interest.

Neutralising

Neutralising a wireless receiver is accomplished by increasing the capacity of the neutralising condenser or condensers until the circuit is stable over the whole of the range. This point is reached when the capacity of the neutralising condenser is approximately equal to that existing between the anode and the grid of the valve, taking into account such other capacities due to valve holders, leads, etc., which may be associated therewith.

Indeed, one of the most satisfactory methods of neutralising consists in rendering the valve inoperative by extinguishing the filament, but still leaving it in its socket, so that the capacity effect remains, and then definitely adjusting the neutralising condenser until no signals are heard. With such an arrangement we then obtain a bridge formation, any energy passing through the valve being neutralised by that passing through the neutralising condenser, and in such a condition the circuit is neutralised.

"Unneutralisable" Circuits

Now, many of my readers will have experienced cases in which a circuit, although giving a perfectly crisp zero

when balanced up by this method, nevertheless still bursts into oscillation at some point. It may be that this oscillation could be checked by reducing the capacity of the neutralising condenser, but if this were done it would probably be found that oscillation would result at some other portion of the condenser scale.

It is well known that in the majority of cases if the capacity of the neutralising condenser is increased beyond the stable point oscillation again ensues. Many readers will have wondered why this is the case, because if the neutralising condenser is producing counter-reaction then one would

and opposite amount of energy through the neutralising condenser.

With the majority of circuits, however, the presence of the neutralising condenser allows of a certain measure of direct coupling between the anode and grid portions of the circuits and the circuit begins to partake of the nature of the ordinary Hartley circuit. If the neutralising condenser is increased beyond a certain value, therefore, oscillations of this second origin will set in.

Obtaining Complete Stability

Both these oscillations occur at the frequency to which the circuit is tuned, and what actually happens in circuits which are troublesome to neutralise is that the critical capacity above which the second type of oscillation occurs is smaller than the value required to neutralise the first mode of oscillation. We therefore obtain a condition of affairs where the circuit is unstable, since neither mode of oscillation can adequately be checked.

The problem is to design circuits such that this overlapping of the two modes of oscillation shall not occur, and thus to obtain a thoroughly stable circuit.

Recent investigations have shown that a large percentage of this trouble is due to capacity coupling between the primary and secondary winding of the transformers adopted. The information on this subject is as yet by no means complete, but it is found that provided care is taken to ensure that the capacity coupling between the windings is kept low, then a stable and easily neutralised circuit is the result. It is impossible to say more than this

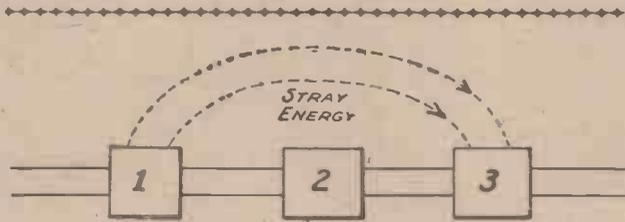


Fig. 1.—Direct coupling by stray fields leads to a loss of selectivity.

expect any increase beyond the neutralising point to produce a decrease in signals.

The Explanation

This was a problem which I investigated recently and explained in an article entitled "The Truth about Neutralising" which appeared in *Wireless*, Vol. 4, No. 9. The trouble is due to the fact that the ordinary type of neutralised circuit has two modes of oscillation. One of these is due to the capacity of the valve, and this mode is checked by feeding an equal

**MORE SECRETS
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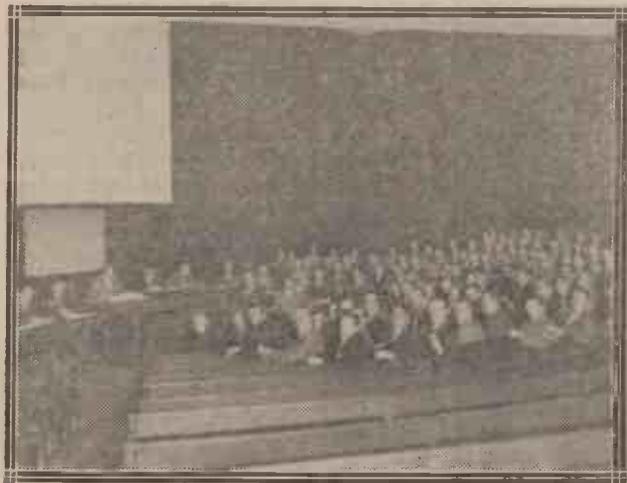
(Continued from previous page)

at the present moment, because, for one thing, the problem is too complex to enter into in a brief review such as this.

Stray Fields

There still remains one aspect of the question of radio-frequency amplification which has not yet been discussed, and is one of considerable importance, and that is the interaction between the various circuits and the direct pick-up of the coils themselves. This is a problem to which I myself have paid particular attention, and to-day the question of screening is becoming recognised as of increasing importance.

One of the first problems which confronts the designer of the high-frequency amplifying circuit is the discrepancy



The first British convention of amateur radio experimenters took place recently at the Institute of Electrical Engineers under the auspices of the Radio Society of Great Britain

between the actual results and those which would be expected. We may construct, for example, a receiver having two tuned circuits, and obtain from it a certain standard of efficiency. From the information obtainable on this circuit we may deduce a certain increase in signal strength coupled with a definite increase in selectivity from the addition of a third tuned circuit. When such a tuned circuit is incorporated, however, it is often found that the results do not come up to expectations, neither the signal strength nor the selectivity being as great as might be expected theoretically.

Effect on Selectivity

Let us view the selectivity problem first of all. If we have three tuned circuits and they are so placed that there is a certain small, though perceptible, coupling between them, then a certain amount of the filtering action which takes place in the circuit is going to be lost. This will be understood from the diagram shown in Fig. 1. Here we are passing a signal through

three successive tuned circuits, each of which is exercising its due filtering effect. The tuned circuits are so designed that at the end any interfering signal which we are endeavouring to eliminate is reduced to a certain definite proportion of the signal which we are receiving, and this proportion may be so worked out that it will give satisfactory reception without noticeable interference.

We have, however, a certain transfer of energy direct from circuit No. 1 to circuit No. 3, so that the filtering action of No. 2 circuit is lost altogether and the signal strength from the interfering station, instead of being of negligible proportions, is comparatively strong and sufficient to cause noticeable interference. This is simply a crude method of explaining how stray coupling between the various circuits can destroy selectivity.

A Fallacy

Until comparatively recently this argument would have been immediately countered by the answer, "Yes, but we can place the tuned circuits in

such positions that they do not couple to each other." Various arrangements of coils were in vogue, in which it was alleged that the coupling between any two of the circuits was zero.

Recent experiments, however, have shown that this is not the case. There is always a certain capacity coupling between the coils which has a two-fold effect. In the case of coils comparatively close together it is found that zero-coupling is obtained in positions quite different from what one would expect, and, moreover, that the actual zero position varies considerably with the distance between the coils. This is to be expected, since what is really happening is that a balancing-out effect is being obtained between the magnetic coupling and the capacity coupling, and the point at which these two effects cancel out is not only dependent on the distance between the coils, but is also extremely critical.

Unavoidable Couplings

If the distance between the coils is greater than a certain amount then the

(Continued on page 273.)

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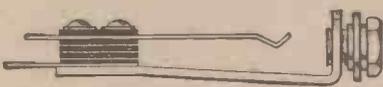
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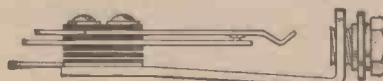


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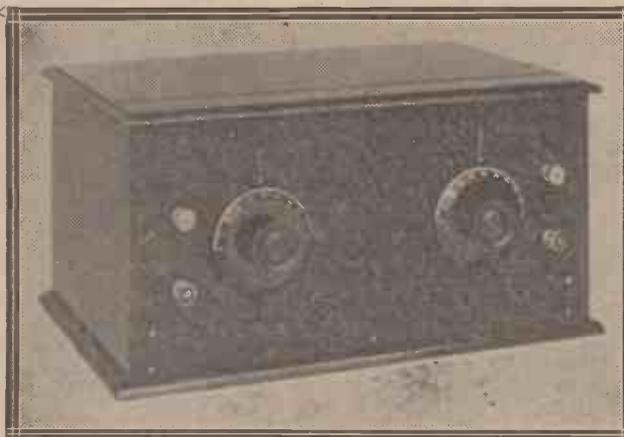
Ashley Radio

Ashley Wireless Telephone Co. (1925), Ltd.
Finch Place, London Road, Liverpool.

How to Obtain Long Range on Two Dials

Full operating instructions for the receiver which was described in detail last week

By STANLEY G. RATTEE, M.I.R.E.



HOSE readers who have constructed or intend building the three-valve receiver described in the last issue, will no doubt be interested in how

to obtain the best results, and for this reason the question of selectivity will form the first subject for discussion.

Coil Sizes

In the preliminary operating notes of last week it was recommended that for reception upon the broadcast waveband a No. 25 coil should be used for L_1 and a No. 60 or "B" centre-tapped coil for L_2 . At a distance of approximately ten miles from the London station the selectivity of the set, when using these values, is quite good, but it must be understood that at distances under ten miles it is possible that the selectivity will be less pleasing.

Where the set is used within a few miles of a main B.B.C. station the selectivity of the receiver can be improved by reducing the size of the aerial coil L_1 . Using too small a coil will, of course, not only reduce interference but will also reduce signal strength.

Another Test

The receiver under review has for a time been used at Clapham, S.W., which is something like three or four miles from 2LO, and it was there found that a No. 25 coil would permit of Bournemouth being received with slight interference from the local station. This coil was replaced by a Gambrell "a," when it was found that though there was a slight decrease in signal strength the gain in absence from interference compensated for the loss consequent upon the use of this smaller size.

On Long Waves

So far as long waves are concerned,

it is found that using a No. 75 coil for L_1 and a No. 250 centre-tap for L_2 will allow of 5XX being received in London without interference from Radio-Paris.

Valves

In regard to valves for this receiver, specimens of 2-, 4- and 6-volt types have been tried, using both special H.F. and general-purpose designs. As to results, each one gave satisfaction after some little care in the adjustment of H.T. voltage.

The high-tension voltage used ranged between 60 and 90 volts, while a 2-microfarad Mansbridge type of fixed condenser was connected across the battery outside the set in the usual way.

Searching

With regard to the actual operation of the set some brief details were given last week, and though, in fact, tuning will be found to be quite easy, it may be found that one does not know when the two circuits $L_1 C_1$ and $L_2 C_2$ are in tune unless signals are being received. The receiver is very silent in what are called background noises, and though when the local station is tuned in there is no indication of how fast the two dials should be turned relative to each other in order to keep the circuits in tune, it may be understood that the dials should be turned approximately at the same speeds.

Filament Current

A point which the operator should bear in mind is that the adjustment of the filament rheostat controlling the filament of V_f is somewhat critical in that too little or too much resistance in circuit will cause the valve to burst into oscillation. The correct adjustment is by no means difficult to find, but the fact is mentioned in case readers experience difficulty in stabilising this valve.

ANOTHER RADIO PRESS SUCCESS

Elstree Design Triumphs at Amsterdam.

“ELSTREE SIX” WINS

A MATEURS of all nationalities were invited to submit wireless apparatus constructed by themselves for competition at the International Radio-Amateur Festival, held in Amsterdam between September 18 and 26. The aim of the Amsterdam Radio Society, organisers of the Festival, was to encourage the spirit of

goodwill between Dutch radio amateurs and their friends in all countries.

The result of this international competition, open to the world, has gained for a Radio Press reader and a Radio Press design the first place. The gold medal of the competition, the highest distinction possible, has been awarded to an “Elstree Six” set, entered by Mr. R. W. Emerson, of 3, St. Ann’s Terrace, St. John’s

Wood, London, N.W.8. Mr. Emerson is interested in the construction of wireless sets purely as a hobby, being engaged in the fur business.

The “Elstree Six” entered for competition was identical in layout and construction with the original “Elstree Six,” the Radio Press Star set, of which a full description was published in the June issue of *Modern Wireless*.

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IMITATIONS

MORE ABOUT THE LOEWE VALVE

Further details of an important development

What happened in the Elstree tests



CONSIDERATIONS of space last week prevented our giving more than the

barest outline of the interesting tests carried out recently at the Elstree Laboratories on the new valve designed by Dr. Loewe. It will be remembered that the central feature of this new valve is that it contains within a single evacuated bulb a complete set of the necessary components in the way of coupling units to provide a complete amplifier of, say, two stages.

Compactness

Using these valves, it is obviously possible to construct some remarkably simple and compact receivers, and a remarkable example of such compactness was given by the smaller receiver shown us by Dr. Loewe. This employs a single "valve," equivalent to



Dr. Loewe explains his larger set to Mr. Kendall.

note-magnifying stages. A simple form of reaction circuit is used, and

equivalent of a five-valve set, using two of the new units. The first of these provides the equivalent of two stages of high-frequency amplification, upon the T.A.T. system.

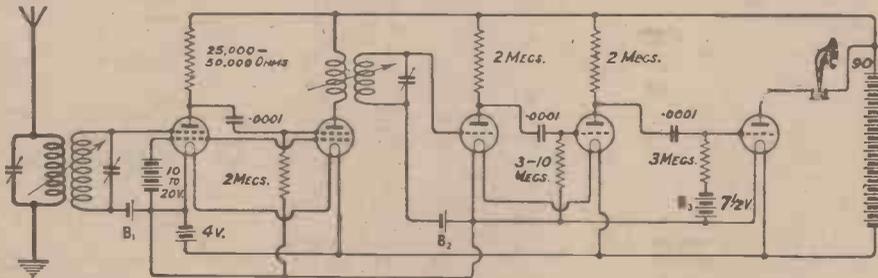
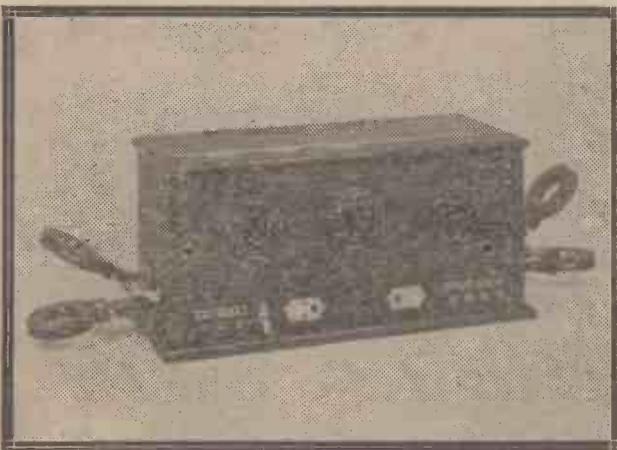


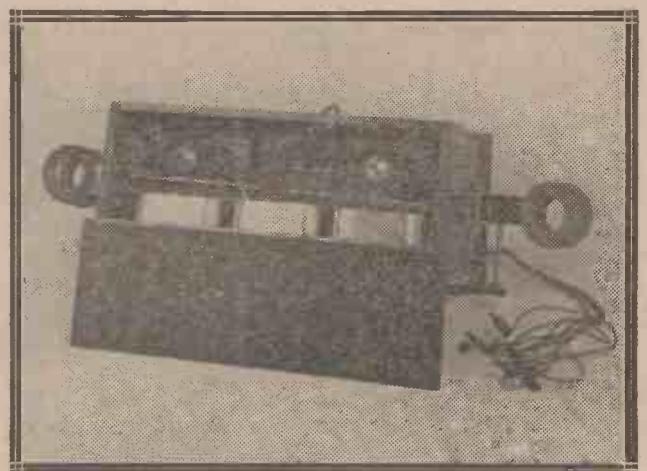
Fig. 1—It will be seen that the circuit employs T.A.T. high-frequency coupling. The first two valves and their associated resistances and condenser are contained in one vacuum, as is the case with the last three valves.

the results obtained from the local station are extremely powerful and of

appears to be quite a practical proposition. (Continued on page 291.)



It is possible to use this receiver with one "valve" (the detector and two resistance-coupled amplifiers), in which case only the coils on the right of the instrument are employed.



The inside of the receiver which was tested at our Elstree laboratories. Note the entire absence of components other than the three condensers.

**MORE SECRETS
OF MODERN RADIO
EFFICIENCY**

(Continued from page 269)

capacity coupling is greater than the magnetic coupling, and no zero position is possible, irrespective of the placing of the coil. This critical distance beyond which there is always a permanent coupling is only in the order of 8 in. or 9 in. with the average types of coil, which is of the same order of the usual distance between the first and third coils in a receiver.

These investigations, therefore, showed that any reliance upon careful placing the various coils in order to obtain zero coupling between any two of them was almost an impracticable proposition. Some other means had to be adopted in order to overcome this interaction between the various circuits, and these will be considered next week.

NEWS IN ADVERTISEMENTS

The attention of readers whose high-tension batteries are running down is drawn to the advertisement of Lissen, Ltd.

* * *

Messrs. Igranic Electric Co., Ltd., announce an interesting line in the Igranic - Patent Baseboard - mounting Rheostats, full information of which, in addition to the complete range of Igranic components, may be obtained from their catalogue No. S.32.

* * *

The new Ormond catalogue, which contains comprehensive descriptions of Ormond products, will be sent by the Ormond Engineering Co., Ltd., upon request.

* * *

The Burndept Balkite Trickle Charger is featured in the advertisement of Messrs. Burndept Wireless, Ltd.

* * *

Interesting information on H.T. battery charging is given in the literature of Messrs. A.F.A. Accumulators.

* * *

The Disc-Brown loudspeaker is the subject of the announcement issued by Messrs. S. G. Brown, Ltd.

* * *

Messrs. Collinson Precision Screw Co., Ltd., are advertising the Colvern screened coil.

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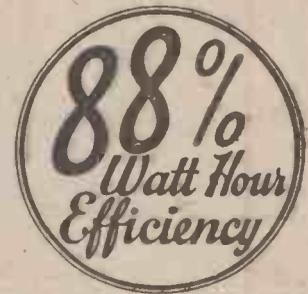
For example the very high and exceptional efficiency figures of the Amp. hour Electrical Current put into any Tungstone Starter or Wireless Battery by the Car Dynamo or Bench charged is efficiently and economically Stored by the Pure Lead Plates (used only by Tungstone) and 96% of the current put in is available for the future needs of Self-Starter, Lights, Ignition or Wireless purposes.

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T.A.73

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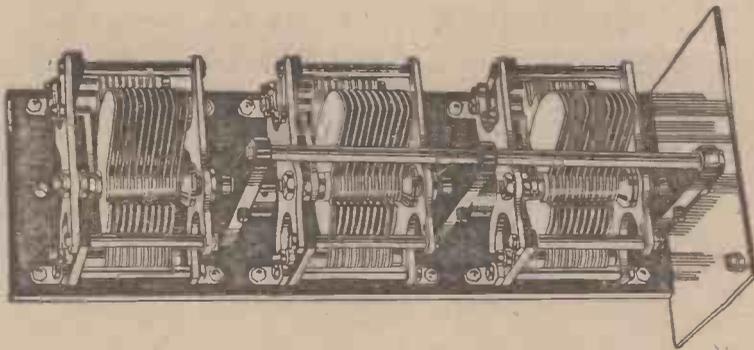
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Owing to the rapid growth of business in our REPAIRS Department, we regret that we find it temporarily impossible to maintain our 24-hours service. Pending extension and re-organisation, a delay of a few days may be unavoidable.

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**TRIPLE GANG
CONDENSER**
for use in the New Five-Valve
"Elstree SOLODYNE."

Price £3 . 10 . 0 (Without Dial)
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Get full particulars of all Cyldon Products from your dealer or write direct to the makers. Other Cyldon Condensers comprise Square Law, Square Law Dual Pattern, and the S.L.F. 4 in. Knob Dial, supplied free with Square Law and Dual Models, and 2s. extra with S.L.F. or Triple Gang.

**SYDNEY S. BIRD
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Telephone: Enfield 0672.

CONSTRUCTORS are giving this handsome new model a most enthusiastic welcome because of (1) Its absolute freedom from whip. (2) Independent adjustment of each Condenser by novel means, completely eliminating hand capacity.

OTHER attractive features are—each Condenser electrically separated. Anti-capacity plate supplied. Operation of all three condensers as "silky" as if only one was used. Whole instrument perfectly rigid. Supplied ready for immediate fitting. Construction and finish are well up to the fine Cyldon standard.

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The best means of valve control. British-Made and delivered from stock immediately. Can be supplied in correct resistance for any Valve. State resistance (ohms) required, when buying, or be sure to give name of Valve and voltage of Accumulator supplying current to the Valve.

Cyldon Temprytes each 2/6
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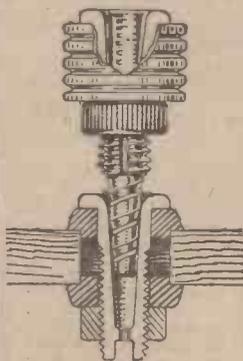
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**CLIX TAPER
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Other Clix fittings include Clix Wander Plugs, Clix Pin Terminals and Clix Parallel Plugs and Sockets.

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By simply connecting the "Ulinkin" with your accumulator and a direct electrical current in use in your home for lights, heaters, etc., your accumulator can be automatically charged free of cost. The standard "Ulinkin" model costs 42/-. There is a Junior model at 12/6 and a Senior model costing 52/- which is constructed for use in garages, workshops, etc.

Write for leaflet fully describing this ingenious invention. Money returned in full to any purchaser who is not satisfied.



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Makes short circuit impossible

The "Peerless"
JUNIOR
Rheostat



An OFF position is provided, while definite stops make short circuit impossible. Resistance element is immune from damage. Will safely carry current of two valves. Complete with nickelled dial and one-hole fixing. Three types: Size 1 1/2" diameter, 1/2" high, 6, 15 or 30 ohms. Price only

2/6

From all dealers or direct:
THE BEDFORD ELECTRICAL & RADIO CO., LTD.,
22, Campbell Road, Bedford.

GREAT POPULARITY COMPETITION

MANY VALUABLE PRIZES

WIN AN "ELSTREE SOLODYNE"!

RULES AND CONDITIONS OF ENTRY

1. The acceptance of these rules and conditions is a condition of entry for the Competition, and the decision of the Editor upon all points must be considered as FINAL and legally binding.
2. On the next page are set out the sixteen circuits which form the subject to this Competition. Select the one which you consider most popular and record your vote in Space A on the form overleaf. These votes when counted will deter-

mine the order of importance of the circuits.

Then in Space B record what you consider will prove, as a result of the votes, to be the TWELVE most popular circuits out of the SIXTEEN. Place in the FIRST square the distinguishing number of the circuit which you think will get the greatest number of votes.

In the square marked 2nd, place the distinguishing number of the circuit you consider will get the second largest number of votes, and so on up to number 12.

3. The competitor whose list agrees or most nearly agrees with the order of importance as defined above, will be awarded the FIRST PRIZE, apart from his own vote in Space A. The next nearest will receive the SECOND PRIZE, and so on.
4. Your name and address must be clearly written in ink in the space provided, and the voting paper sent

in a stamped envelope (1½d. stamp) addressed to:—

Competition Editor,
"Wireless,"
Radio Press, Ltd.,
Bush House, Strand,
London, W.C.2.

5. Votes will be counted and lists checked under the supervision of a firm of Chartered Accountants, none of whose employees will be allowed to compete.
6. The Editor will not undertake any correspondence in connection with the Competition, nor be responsible for any letters lost in transit, or delayed. Proof of postage cannot be accepted as proof of delivery.
7. Only the VOTING NUMBERS must appear on the Ballot Papers. No other marks should be made.
8. The closing date is October 12, 1926.
9. The list of the principal prize-winners will be published and every prize-winner individually notified.

Three Special Prizes and One Hundred Consolation Prizes, Each Consisting of a Valve.

FIRST PRIZE

A ready-built "Elstree Solodyne," the famous "Modern Wireless" five-valve set with single-dial tuning. Ready for use, but without valves or other accessories.

TESTED BY
OUR LABORATORIES



SECOND PRIZE

A ready-built "Elstreflex Two," the special "Wireless" reflex receiver. Ready for use, but without accessories.

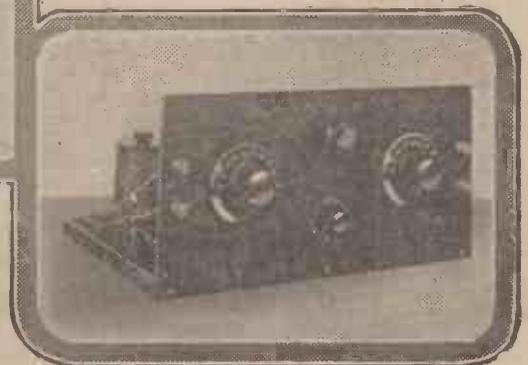
TESTED BY
OUR LABORATORIES.



THIRD PRIZE

A ready-built "Razorsharp" wavemeter, designed by Mr. J.H. Reyner. Complete with all necessary coils.

TESTED BY
OUR LABORATORIES.



POPULARITY COMPETITION BALLOT PAPER

NOTE THESE POINTS

1. Read carefully the rules on the other side.
2. Vote in Space A for the circuit you consider the most popular.
3. Vote in Space B for what you consider will be the result of the votes.
4. Fill in name and address and post in a closed stamped envelope addressed to :-

Competition Editor,
"Wireless,"
Radio Press, Ltd.,
Bush House,
Strand, London, W.C.2

NAME (Mr., Mrs. or Miss)
.....
Address.....
.....

No mark must be made in this space



SPACE A

I record my own vote for
No.
as of greatest popularity.

SPACE B. I estimate the result of the voting as follows:—

1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.
No.	No.	No.									

HERE ARE THE CIRCUITS:—

CIRCUIT.	Ref. No.	CIRCUIT.	Ref. No.
Detector with reaction and one transformer-coupled L.F. amplifier.	1	Two H.F. valves, detector and one transformer-coupled L.F. amplifier, neutralised and screened.	9
Detector with reaction and two transformer-coupled L.F. amplifiers.	2	Two H.F. valves, detector and two transformer-coupled L.F. amplifiers, neutralised but not screened.	10
One H.F. valve and detector, neutralised.	3	Two H.F. valves, detector and two transformer-coupled L.F. amplifiers, neutralised and screened.	11
One H.F. valve, detector, and one transformer-coupled L.F. amplifier, H.F. stage neutralised.	4	Two H.F. valves, detector and two L.F. amplifiers, one transformer-coupled and one resistance coupled, neutralised but not screened.	12
One H.F. valve, detector, and two transformer-coupled L.F. amplifiers, H.F. stage neutralised.	5	Two H.F. valves, detector and two L.F. amplifiers, one transformer-coupled and one resistance-coupled, neutralised and screened.	13
One H.F. valve, detector, and two resistance-coupled L.F. amplifiers, H.F. stage neutralised.	6	Two H.F. valves, detector and two resistance-coupled L.F. amplifiers, neutralised but not screened.	14
One H.F. valve, detector and two L.F. amplifiers, one transformer-coupled and one resistance-coupled, H.F. stage neutralised.	7	Two H.F. valves, detector and two resistance-coupled L.F. amplifiers, neutralised and screened.	15
Two H.F. valves, detector, and one transformer-coupled L.F. amplifier, neutralised but not screened.	8	Three H.F. valves, detector, and two transformer-coupled L.F. amplifiers, neutralised but not screened.	16

In making a decision, remember that you are asked to decide upon the popularity of the circuits, not their efficiency; the views of your friends may help you. Another point: Do not forget that the use of screening in a set, although it confers important benefits, increases the cost, and so requires careful consideration.

I HAVE BEEN ASKED

I have a 4-valve Family receiver which, after giving two years of very satisfactory service, has developed crackling. I have changed the H.T. battery, but the trouble is still present, and I should be glad, therefore, if you would recommend me a later design in which I can incorporate my present parts.

It is not to be advised that you incorporate your present parts in a receiver of later design than the set you mention, since if a fault is present in one of them it is likely to give rise to difficulty with a new set. The best course to adopt therefore is to get your present receiver working correctly before thinking of making another.

Crackling of the type you mention is often due to an H.T. battery which has run down, but as you have tried a new one it is scarcely likely that this accessory is responsible. Try the effect therefore of replacing all flex leads in the set, whilst making certain that your switch contacts are in order, and that no joints in the set are loose.

In practice a breakdown in the primary winding of the L.F. transformer will often give rise to the noise of which you complain, and if it can be heard when one note magnifier is switched out of circuit it is to be advised that the L.F. transformer on the right-hand side of the panel be changed for another which gives silent working. If an intermittent break is present in the primary winding of this component, crackling and loss of volume will result, reception becoming spasmodic in nature. The same effect will, of course, be noticed if the primary winding of the L.F. transformer in the centre of the panel has broken down, but the noise, in this case, should only be heard when both note magnifiers are in circuit. Occasionally a breakdown in the loud-speaker windings, or in the leads to this component, is responsible, and this point should not be overlooked.

I have made the "Cut Him Out!" wavetrap described by Mr. Kendall, which works excellently in cutting out London, but is completely ineffectual in the case of Daventry. Why is this?

The wavetrap you mention is made to function on the lower broadcast band, and is not designed for Daventry, to cut which latter station out it will be necessary to construct a special coil to replace that in use at present. The coil should consist of 250 turns of 30-gauge enamelled wire, wound on a 3-in. diameter ebonite former which should be approximately 4 in. long. The coil should be tapped at 50, 75, 100 and 125 turns from the beginning of the winding. If this coil and the one at present in use are arranged on a plug-in base it will be a very simple matter to change over when necessary.

HOW OLD IS YOUR H.T. BATTERY WHEN NEW?

Has your H.T. Battery ever been stale when you bought it?

Have you ever thought it did not last as long as it should have done?

This is a risk you need not run. Insist on a Lissen New Process battery. These, thanks to our new direct-to-dealer distribution policy (which also cuts out all wholesale profits), are actually on sale in the London area within three days of being made in our Richmond factory.

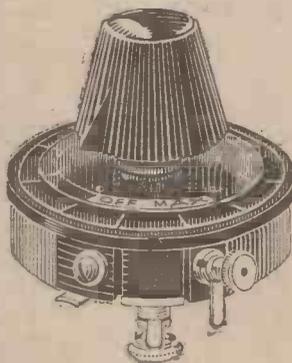
Every battery therefore is brimful of new energy when you buy it, and our secret new process causes them to retain this energy for an unusually long time and also yields far clearer loud-speaker reproduction.

Ask for it at your dealer's, or if any difficulty send direct. No postage charged, but mention dealer's name.

10/6

Price would have been 13/- but for our new policy.

Quality tells in rheostatic devices



Use a Lissen 35 Ohm Rheostat for the Elstreiflex.

Let your wire rheostat or potentiometer be a LISSEN—the wires cannot shift and short circuit—the contact brush moves firmly yet pleasantly—the heat resisting former cannot soften—there are accessible terminals—and the combined knob and pointer will fit flush with the neat photo-engraved dial when mounted. Lastly note the irresistible appeal of the new prices, made possible by our big production programme and our new direct-to-dealer distribution policy, which cuts out all wholesale profits.

Compare a LISSEN with any high-priced rheostat—remember that LISSEN rheostats have themselves been high priced—then think of the new LISSEN prices, and you will make a quick decision to buy a LISSEN.

7 Ohms	..	Previously	4/-	NOW	2/6
35 "	..	"	4/-	NOW	2/6
Dual "	..	"	6/-	NOW	4/6
Potentiometer, 400 ohms	..	"	4/6	NOW	2/6

Important to the trade: Orders for all LISSEN parts must now be sent to factory and not to usual wholesale dealers. Apply for particulars of new trading policy if not already advised. Every dealer in his own interest should be registered with us.

LISSEN LIMITED, 18-22, Friars Lane, Richmond, Surrey.
Managing Director: T. N. COLE.



THE recent suggestion discussed by Mr. J. C. Stobart, of the B.B.C., to the effect that "radio universities" may soon be established in this country is extremely interesting, but I must confess that I don't see how it's to be done. The idea, presumably, is to broadcast lectures corresponding to the standard courses for various degrees. How, though, will the B.B.C. check the activities of pirates, who don't pay their fees and get degrees for nothing?

* * *

WIRELESS is rapidly bringing the loneliest of outposts into touch with the world. The latest spot so equipped is Bache Peninsula, on Ellesmere Island, said to be the most northerly police post in the world. CNRV, one of the fine Canadian National Railway Stations, at Vancouver, is successfully received at Bache, 7,000 miles distant. This is the sort of thing that brings home to one the growth of broadcasting during the last four years!

* * *

YOU will see on another page in this issue full particulars of the latest Radio Press success. Radio Press receivers have, of course, always been in the forefront in this country, but it is a significant fact that after winning three international prizes in America a "Radio Press" design—the famous "Elstree Six"—should carry off the gold medal at the International Radio-Amateur Festival recently held in Amsterdam. This was organised by the Amsterdam Radio Society, and the gold medal is the highest distinction awarded.

The winners of these various competitions deserve the highest praise for the excellent workmanship of the sets they sent in. Their trouble has been well repaid! Congratulations!

* * *

I WONDER how many would-be enthusiasts have been almost, if not quite, induced to give up radio by such interference-factories as

electric trams and overhead electric railways? A friend of mine who is always wishing for something better



Above will be seen the trophies for which amateur constructors from all over the world competed at the World's Fair in New York.

in radio has recently constructed a superheterodyne. He finds distant stations come in at unbelievable strength, but are not in the least worth listening to on account of the terrible "atmospherics" caused by a railway at the end of his road. The only programme that he can enjoy is that of the local station, to which he listens with only one L.F. valve in use, thus cutting down the outside noises to reasonable dimensions.

* * *

NOT many seem to realise that the new high-powered station at Sydney is run by the Theosophical Society of Australia. It was opened by the Minister of Education for New South Wales, and the hope was expressed that it would soon make itself heard in India, America and Africa.

The number of broadcasting stations run by societies in this way is growing very rapidly, and they certainly seem to run very smoothly, on the whole. One cannot help wondering whether our own broadcasting service will do so when it is taken over by the State. I am rather afraid that some lubrication will be needed occasionally!

* * *



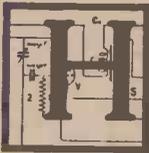
When it was learned that Mr. Black, the thirteen-year-old builder of a "Mewflex" receiver, had won a special award, the World's Fair authorities cabled for a portrait to be sent over by wireless. The photo "before and after" is seen here.

ON October 12 and 13 a conference on "Broadcasting and Scottish National Life" has been arranged in Glasgow. Among the subjects down for debate are "Religion and Broadcasting" and "Education and Broadcasting." Sir Walford Davies will also speak. Conferences of this description undoubtedly do much to popularise broadcasting; the only trouble is that there are not enough of them. It is well known that the average Englishman does not worry nearly so much about the education of his children as the Scot, so that it is hardly surprising that Scotland is setting the example in this way. May England follow as soon as possible!

WAVE TRAP.

PRACTICAL TOPICS

By G. P. KENDALL, B.Sc.



HAVING a considerable weakness for the plug and jack method of switching, it often happens that I find that all my available loud-speakers are fitted with plugs when I wish to try a new receiver provided with terminals for the output instead of a jack. Sometimes, too, it is desired to use several loud-speakers in parallel upon a receiver with a jack for the output, and a certain amount of difficulty sometimes arises in making the necessary parallel connections. Little difficulties of this sort make me wonder why it is that no one, so far as I am aware, has yet put upon the market a simple parallel-connection unit to overcome them.

A Remedy

Such a unit would simply be the equivalent on the plug and jack system of the telephone distribution boards which are sold for use with crystal sets, and would consist simply of a small box to stand upon the table,

HAVE YOU ENTERED THE COMPETITION ON PAGE 275 ?

containing three or four jacks, wired in series or parallel according to the requirements of the user, and with some provision for connecting it to the output terminals of the receiving set. For general convenience, this provision should probably consist of a flexible lead bearing a plug upon its end for use with receivers having a jack for the loud-speaker, and, in addition, a pair of terminals should be provided in parallel with this flex connection for connecting across to the output terminals of a set which does not employ the jack system.

An Alternative

An alternative method of paralleling loud-speakers with plug and jack connections would be to use the special plugs which I remember in Army days as having been used for tapping-in on telephone exchange switchboards. These plugs really consisted of a plug and a jack made up into one component, so that the plug was rather large and long, having at one end a hole into which another plug could be inserted, so that the operator could tap-in on the line without interrupting it. The socket in this special combined plug was wired in parallel across the contacts of the plug proper, so that, upon inserting another plug in it, the two instruments connected to their leads were placed in parallel, but, of course, it would be quite easy to arrange that they were connected in series if desired.

EXPERTS IN RADIO ACOUSTICS SINCE 1908

IS THIS WHAT YOU'RE LOOKING FOR ?

TESTING the new 2-valve receiver at our Works at Slough, on a standard P.M.G. aerial, we tuned in the two Paris stations, London, Daventry, Bournemouth, Birmingham and Newcastle on the loudspeaker. This despite bad screening set up by a large power station not more than 50 yards from the vicinity of the laboratory. We were testing on 66 volts only. You can expect even better from the 3-valve Brandeset.



THE BRANDESET II.

The new Brandes 2-valve set features simplicity of control and ingenious compactness. Condenser dial, filament rheostat, reaction dial and "throw-over" switch for long or short wave tuning complete the panel controls. Straight line frequency condenser tuning and grid-bias

is employed. The standard coil is suitable for Daventry and no "plug-in" coils need be purchased. The L.T., H.T., and grid-bias leads are plaited into one cable from rear of set.

£6 10

(Exclusive of Marconi Royalty and Accessories.)



THE BRANDESET III.

The new Brandes 3-valve receiver employs the same ingenious characteristics as the Brandeset II, except that an extra stage of Audio Frequency is employed. It has straight line frequency condenser tuning, grid-bias, and is adapted to long and

short wave tuning. Both receivers give most excellent loudspeaker reproduction on a number of stations, and are specially designed for this purpose.

£8 10

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From any reputable Dealer.

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How Radio is Making Music International

Special Exclusive Article by Well-known Conductor

A NEW ERA IN MUSIC



ONE of the most interesting, and from the musician's point of view the most valuable, of all the good effects that the popularity of wireless has brought in its train is the manner in which it has helped to popularise international music. There has always been, of course, a number of classical masterpieces by German, Austrian and other masters, which have been widely known and appreciated in every civilised country of the world. But, apart from these, which were generally the compositions of great musicians now dead, there has always been rather a conservative tendency among the bulk of the music-loving public to look askance at "foreign" importations.

An International Stimulus

Naturally enough there is much that is good in this attitude, for a country should support its own composers first so long as their work demands recognition; and of course no one could deny the greatness of such people as Elgar and Parry, to name but two examples. On the other hand, any country, no matter how great its own musicians, is a little apt to become narrow in its conceptions unless its own work is constantly standing the test of comparison with that of the other nations of the world. And this is where radio has played such a splendid part, although that part is only just beginning even now.

Increasing Proportion of Music

It is only five years since broadcasting became a factor in the everyday life of the world. Yet in that very short time the musical public of the world has been vastly increased, and music is gradually becoming an integral part of the life of every nation largely as a direct result of its programmes. Items were chosen at first in the belief that people wanted to hear lectures and talks on their listening-in sets, but the



A recent portrait of Mr. de Groot.

way in which programmes have changed proves, by the very increasing inclusion of it, that music is the most popular of all the sorts of entertainments the B.B.C. can give. The same thing has happened in other countries.

Long Distance Interest

For a long time, the concerts given from the studios of each nation satisfied the bulk of its population. But the spirit of restless human endeavour



The author with the Stradivarius violin given to him by an appreciative listener on the condition that it was only used for broadcasting.

The much-appreciated transmissions on Sunday evenings from the Piccadilly Hotel render this article by Mr. de Groot of especial interest.

which always remains unsatisfied prompted experimenters to try and get other nations' concerts, and with increasing success. As wireless construction progressed, and it became the rule instead of the exception to get a really efficient small set quite cheaply, there entered a sort of spirit of friendly competition, and the habit of listening-in to other great stations became more general. And this is bound to go on.

When, as is certain soon to be the case, it becomes possible to hear most of the European capitals on wireless sets of moderate cost, comparison of the items is naturally bound to follow. The music rendered will be followed critically, and this will have an influence in many ways.

A Potent Factor

First of all, the flood of letters which pours into the B.B.C. and every other big broadcasting organisation from its listeners will begin to alter. People will express their preference for whatever sort of music most pleases them. Then, living composers will be influenced far more directly than is the case at present, because the chance of hearing constantly the music of other schools and comparing it with their own work is bound to affect their own compositions

to some extent. Now it is more the styles of *past* foreign schools that present themselves for study under present conditions, whereas with radio keeping us constantly in touch, all the latest developments abroad could be studied and criticised easily and without expensive tours or purchases.

An International Standard

It is inevitable in every art that, in time, international comparisons be made and a standard of excellence set which satisfies the tastes of every nation. Radio is going to help to do this in the case of music, for, as I have said, although there are already many works which are accepted as masterpieces, yet it is essential to the welfare of music that the work of

(Continued on p. 282.)

Speaking of DULL EMITTERS

Why use valves calling for Two-point-something or Three-point-something volts—

needing a 4-volt supply, much of which is simply wasted in Rheostats?

Why not use the LUSTROLUX economy combination-HF, LF and Power Valve—each working perfectly on 1-8 to 2 volts?

—parallel the accumulator to get two volts.

and double or treble the "life per charge."

not only that!—think of the initial saving on the cost of the valves themselves.

"LUSTROLUX" 2 volt .06 amp HF. 6/- F. cost 9/- each. —the power valve. 2 volt .34 amp. costs only 11/-

A perfect "Three-valver" if you like, costing only 29/- for valves, and using only .46 amps! —What's more

"LUSTROLUX" IS ALL-BRITISH!

ASK YOUR DEALER

LUSTROLUX

Valves also obtainable from Lewis's, Ltd., Liverpool and Manchester, and

LUSTROLUX LTD.

West Bollington, near Macclesfield.

Send for Catalogue "D."

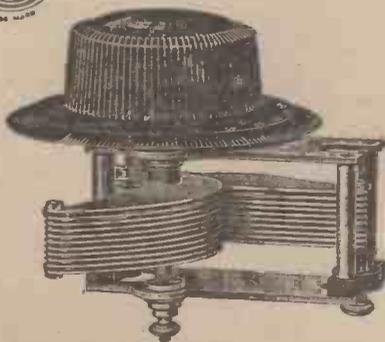
ASK YOUR DEALER

for the new



S. L. F.

The New J.B., S.L.F. Condenser is made on lines similar to our Low Loss Type (Pat. No. 241805). In addition, its many excellent new features include Special Bearings Top and Bottom which eliminate springs. Side and End play in the centre spindle is impossible. The Top Bearing is of large diameter and friction-lined, which ensures an absolutely smooth movement. The brass vanes are supported at tips to ensure accurate spacing. End plates are highly polished and all fittings are heavily nickel-plated.



Fitted with 1/2" shaft, sold complete with 4" Dial and is more compact than most S.L.F. Condensers.

Retail Prices :

.0005 mfd	11/6
.00035 mfd	10/6
.00025 mfd	10/-

Gang Control Triple Condenser for the Elstree "Solodyne," 47/6

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Agents for Holland: Radio Beurs, Papestraat 8, Sgavenhage, Hague, Holland



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I am assisted by a large and expert staff, we can be helped you we will say so; if we can we will tell you how.

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Elwell Aristophone. 4 Valve Receiver, a general-purpose Instrument. Tuning 300-4000 metres without change of Coils, variable Grid Control. N.P. Fittings. Mahogany Cabinet, plug and jack switching for any number of Valves, 1 pair Phones. 4 Valves, H.T. and L.T. Batteries.

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QUESTIONS AND ANSWERS.

This coupon must be accompanied by a P.O. for 2/6 for each question, and a stamped addressed envelope when sending queries to the Radio Press information Dept. for a postal reply.

How Radio is Making Music International

(Continued from page 280)

living composers can be judged by the whole world quickly. And what more certain way than to put it at the command of listeners everywhere by broadcasting it from a wireless studio?

Time Difficulties

I believe that the time is not far distant when international broadcast concerts will be arranged for in many of the principal cities of the world. The difference in times at various places naturally presents a certain obstacle, as it would require an enthusiast to sit up to the small hours waiting for a special item, but of course there are many capitals where such things could be negotiated fairly easily. However, as soon as such concerts become at all a regular feature of our lives, there is going to take place an exchange of ideas and influences which will affect the whole construction of music to some extent.

All poor music is bound to fall before the judgment of international audiences. Only the best will be retained. Competition will be even further stimulated than at present, for there will be a distinctly national

pride about being able to produce work good enough to satisfy a whole world of listeners.

Average Tastes

On the other hand, it would be a fatal mistake to try and make everyone listen-in to programmes of unadulterated classical music of the more difficult sort. When a man comes in tired from a day's work, he does not want to have to think deeply about the composition wireless gives him. It is not like a concert-hall where there are the movements of the orchestra and the compelling magic of the conductor's baton to assist everyone to gain what one may call the "atmosphere" of the music. It is not as if everyone who listens were a musician already familiar with the construction of the work played. The average audience is made up of people who want melody—always melody, and who have little liking, when they are tired at the day's end, for hearing pieces of high technique certainly, but lacking the familiarity of their favourite, though perhaps less classical, compositions.

Listeners are fondest of what they know, so long as this means good music, and after all we musicians have to supply what the public asks, for on their voice we depend. Naturally I do not mean abominable jazz, but for broadcasting especially it is unwise to try too much of the far advanced and more intricate classics.

A Great Force

But by giving more and more music to the world radio is helping all of us who have the love of real music at heart. More, it is granting a great benefit to the world at large. In addition to gradually setting a higher standard in popular tastes, it is helping materially to make beautiful music become more and more widely understood and appreciated, which should result in great works being written to satisfy the increasing demand. And one of the biggest boons to our modern harassing and hurrying world will come with the universal knowledge and love of the masterpieces of music.

A very useful booklet entitled "The Rapid Station Guide" is presented free with every copy of "Modern Wireless" for October.

Have you got your copy yet?
PRICE ONE SHILLING.

BASE-BOARD RHEOSTATS



PORCELAIN
TYPE

The control of modern multi-valve receivers is often simplified by the use of master rheostats, but it is always wise to fit a separate rheostat to each valve. It enables the user to experiment with different types of valves and to operate each one at the correct temperature.

Igramic-Pacent Rheostats, so often mounted on the panels of receivers, are equally suitable for baseboard mounting.

Igramic-Pacent Rheostats are small and compact; mount one by the side of each valve holder and you can simplify wiring and operate each valve correctly.

Igramic-Pacent Rheostats are made with resistances of 6, 10, 20, 30 and 50 ohms. The action is smooth, silent and certain—there are no "blind spots" to cause flickering and noise.

The knobs are of highly finished Bakelite and the dials are of silvered metal.

Porcelain pattern	2/6 each.	..
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Also as Potentiometers with a resistance of 400 ohms. Prices as above.

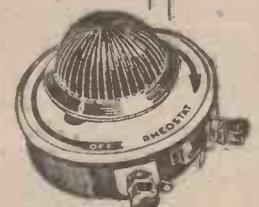
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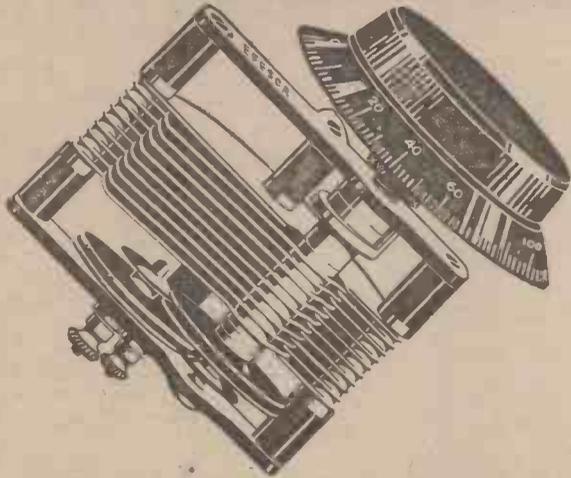
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If you are thinking of buying a finished Set, hear a demonstration of Efescaphone Sets at our Showrooms



Like the Potter at his wheel

THE modern mechanic at his lathe, and the old-time potter at his wheel—craftsmen both! Though the electric motor has replaced the foot pedal, much of the potter's skill and deftness in fashioning his ware is needed by the worker responsible for making the modern Loud Speaker.

Those engaged in the production of Brown Loud Speakers and Headphones have not allowed the necessity of mass-production to exclude the human element. It is this which is responsible for the many unique features for which the Brown is noted. Through every stage—from the original designing of the instrument to the final, rigorous testing—the Brown receives from the

hands of its makers, almost the care and attention of a parent. You can only appreciate the full meaning and effect of this conscientious workmanship when you see and hear the Brown for yourself. In its flawless appearance, in its superb tone, and in its remarkable volume—alike in every phase of the Broadcast—the Brown stands by itself—ahead of comparison.

The new DISC. Brown reputation is fully upheld in this, the latest model. Strongly housed in its handsome metal case, in volume and tone it is unequalled. In two models (both 2,000 ohms).

Black and Gold £7.7.0 Oxydised Silver £8.8.0

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Brown

Rheostat



Inside

A RHEOSTAT is ingeniously built inside this dial. Only a space of 2½" diameter is required in front of the panel and 7/16" at the back. Thus valuable space is saved, wiring is made easier and the appearance of the panel improved.

The movement is extremely smooth and a very fine variation is possible. The dial (made of genuine Bakelite) is marked 0 to 100 and a nickel-plated pointer guides the adjustment. Fixing is by the one-hole method.

Nickel Plated Dial Indicator.

Made in three types, 6, 15 and 30 ohms resistances respectively. Each sold at the very moderate price of

Resistance in Dial.

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Obtainable from all up-to-date dealers.

Soldering Tag.

One Hole Fixing.

Patent 246435

BENJAMIN Self-contained RHEOSTAT

Out of sight, out of mind.

THE BENJAMIN ELECTRIC LTD.,
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The Benjamin Battery Switch gives perfect current control and costs only 1/3.

CORRESPONDENCE

An Appreciation

DEAR SIR,—I write this letter in reference to the one-valve set for 35s. described in WIRELESS, Vol. I, No. 10, by Mr. J. H. Reyner.

I put together a set using this circuit, substituting bought components for his home-made ones. I have had excellent results with it. Although it has only been in use for a week I have received more than twenty-five stations, including many continentals.

Amongst the best of the latter are Hamburg, Frankfurt, Vienna and Brünn (Czecho-Slovakia).

Dundee comes in at good loud-speaker strength and can be heard all over a large room.

In closing, I may say that no solder or patent connector was employed in the wiring. Neither was any ebonite employed for a panel, or as bushes for the terminals.

I have read your paper since its origin and have made a great many sets from your designs.

I wish your paper every success and a long life.—I remain, yours faithfully,

CONON PETERKIN.

Arbroath, Forfarshire.

Real Alternative Programmes Wanted

SIR,—Much has been said and written with reference to alternative programmes, the B.B.C. even showing what is possible in that direction, also admitting that an alternative is necessary. In spite of that, at the present time there are several nights in the week when there is no alternative, every station taking the London programme. Makers are improving sets, listeners are being encouraged to build better and more expensive sets—for what? To have only the London programme?

The number of licences may be increasing now, but surely with such a policy the result will eventually be the reverse. I am not speaking from my personal view only, but this seems to be the opinion of the majority of listeners with whom I come into contact—not a few, by the way.

With regard to the merit, or otherwise, of the London programme I do not propose to express an opinion, but I am certainly of the opinion that the chief necessity at the present time is to give every listener a chance to pick up at least two stations. Apparently there is only one way to get this: pressure of public opinion, and I honestly believe that the majority of listeners desire this more than anything else in connection with broadcasting. I think if the readers of your valuable papers only recognise this fact, with your kind assistance we shall soon get what is so obviously necessary. What do your readers think?—Yours faithfully,

J. E. BIRD.

South Norwood, S.E.25.



This week-end build your own loud speaker!

First of all go to your dealer and satisfy yourself that the "Lissenola," costing only 13/6, really is fully equal in power and tone to any loud speaker on the market. Ask your Dealer to put on the best loud speaker he has in stock—then use the same horn on the "Lissenola" and see if you can notice any difference.

When you get the "Lissenola" home you can build a horn yourself for a few pence, providing you with a powerful instrument which will compare with any expensive loud speaker you have ever heard. Or, if you prefer a cone-principle diaphragm—very simply made—you should get a Lissen Reed as well (1/- extra). If you have never heard a "Lissenola" there's a surprise in store for you.



Before buying ask your dealer to demonstrate the

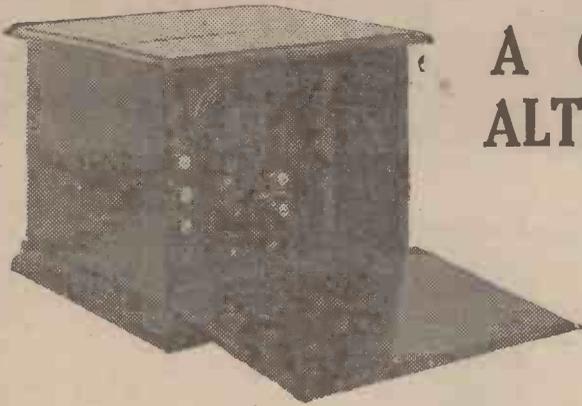
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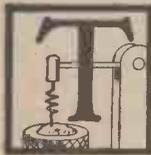


A CRYSTAL SET FOR THE ALTERNATIVE PROGRAMMES

Build this selective little receiver and be ready for the new conditions.

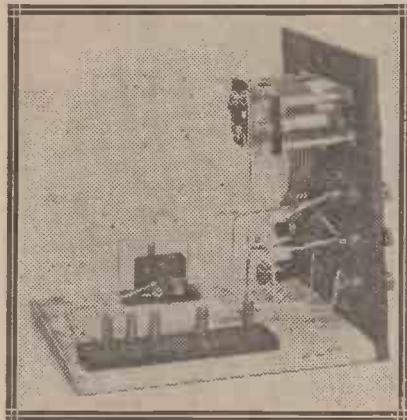
SHARP TUNING AND STRONG SIGNALS

This compact crystal set, described by R. J. O'Connell, incorporates a convenient form of inductively-coupled, centre-tapped circuit, and is designed in such a manner that a two-valve amplifier can later be included in the "phones" compartment of the cabinet.



HERE is no doubt a great number of users of crystal sets who believe that the question of selectivity is one which belongs to the realms of multi-valve sets and still use a direct-coupled circuit in their receiver.

Those readers situated near the coast have long ago realised that sets of the latter type are useless, and with the



This photograph was taken to show how the coil mounts are disposed upon the baseboard.

WHAT YOU WILL NEED

- One mahogany cabinet (Magic Five type) 10 ins. deep, to take panel measuring 6 ins. by 7 ins., and having a compartment on the right-hand side 3 ins. wide. (Camco.)
- One ebonite panel, 6 ins. by 7 ins., and one baseboard 6 ins. by 7 1/8 ins. (Peto-Scott Co., Ltd.)
- One Astatic aerial coupler and base. (Peto-Scott Co., Ltd.)
- One variable condenser, .0003 capacity. (Jackson Bros.)
- One permanent detector. (Radio Instruments, Ltd.)
- One 2-pole push-pull switch. (Lissen.)
- One board-mounting coil mount. (Radi-Arc Electrical Co., Ltd.)
- Five terminals. (Burne-Jones and Co., Ltd.)
- One packet Radio Press panel transfers.
- Quantity of Glazite and screws.

possibility of two programmes (exclusive of that transmitted by 5XX) being available to crystal users in at least the London area in the near future, it

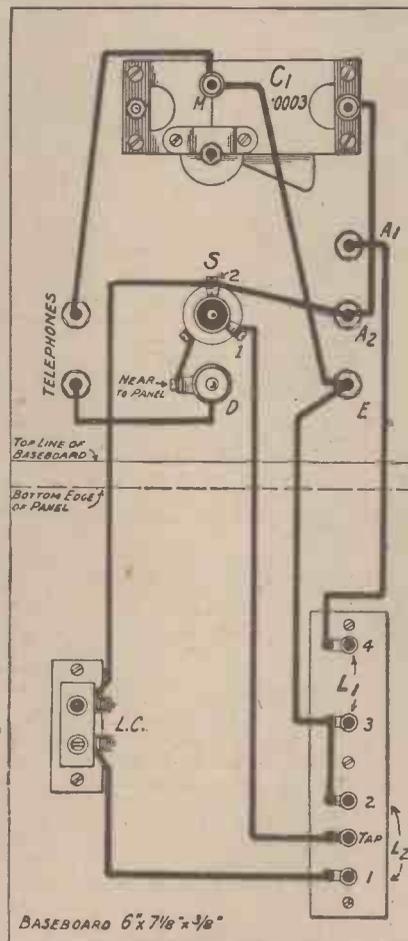


Fig. 1.—The wiring is very simple, and may be followed out from this drawing.

will be necessary to give as much thought to the selective properties of a crystal set as of a valve receiver. It should also be borne in mind that an increase in the efficiency of the tuning arrangement will, as a rule, give an increase in signal strength, thereby making it doubly worth one's while to use some selective aerial coupling.

The Chosen Circuit

After a considerable amount of experimenting, the arrangement shown in Fig. 3 was found to give a very high degree of selectivity, and when

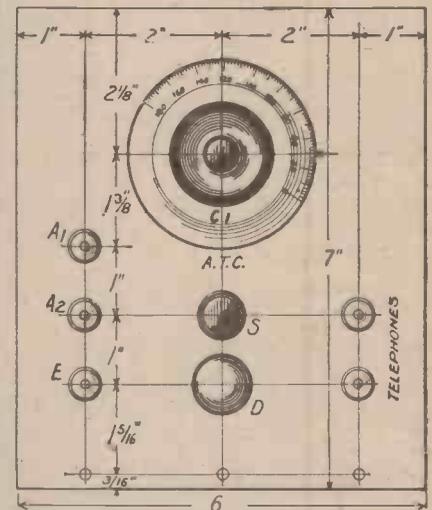


Fig. 2.—The knob marked S is the switch and is only brought into use when it is desired to change from the local station to Daventry.

WIRING INSTRUCTIONS

- Join A1 to terminal 4 on L1, L2 coil base.
- Join A2 to fixed plates of C1, to contact 2 of switch S, and to one side of L.C. socket.
- Join E to moving vanes C1, to one telephone terminal, and to socket 3 of L1, L2 coil base.
- Join socket 3 of L1, L2 coil base to socket 2 on same base.
- Join remaining telephone terminal to side of detector D farthest from panel.
- Join remaining side of Detector D to bottom contact of switch S.
- Join contact 1 on switch S to socket on L1, L2 coil base marked "Tap."
- Join remaining side of L.C. socket to socket 1 on L1, L2 coil base.

(Continued on next page.)

A CRYSTAL SET FOR THE ALTERNATIVE PROGRAMMES

(Continued from previous page)

tested against another crystal set employing a direct-coupled aerial circuit gave a very noticeable increase in signal strength. This circuit consists of a small tapped coil L1, tightly coupled to the centre-tapped coil L2, across half of which is connected the crystal detector and telephones. Four tappings are taken from L1, and much of the efficiency of the circuit depends on the number of turns in use.

While it is quite possible to employ the inductively coupled arrangement for the reception of 5XX, the advantages to be gained from such an arrangement are not so noticeable on the longer waves, and a direct-coupled circuit is used on the longer wavelengths.

Using this arrangement with the aerial connected to A1 and the switch S pushed in, the crystal is connected half-way across L1, and we have the circuit shown in Fig. 3. When re-

ceiving Daventry the aerial is connected to A2, and a coil is placed in the loading coil socket; the switch pulled out places the crystal across the whole circuit.

A list of the parts used in the original receiver is given herewith. It will be noticed that names of the makers of the parts used in the author's set are given as a guide for

the reader, but, as has been pointed out in these pages before, any components advertised in this journal may be substituted, provided they are of suitable values.

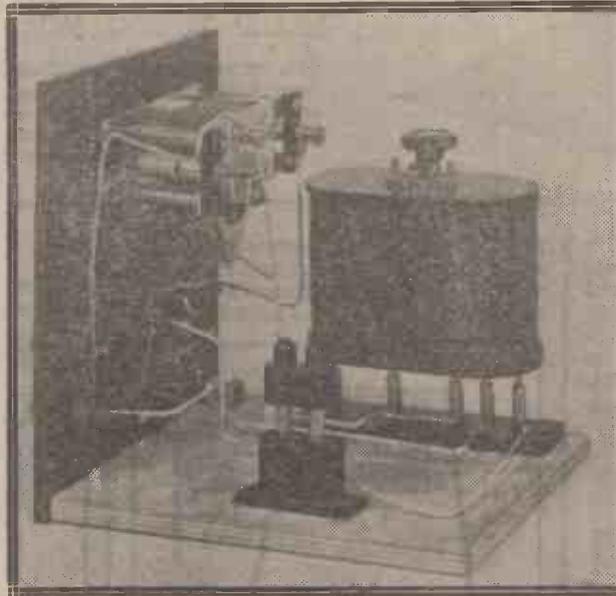
Construction

The first step in construction is to mark out the panel, and no difficulty should be experienced in this operation. The panel is attached to the baseboard by three screws, and it will not be necessary to make use of angle brackets for this purpose. Having mounted the components on the panel, put the short-wave coupler in its base and with a No. 200 plug-in coil in the coil socket, arrange these components on the baseboard, making sure that they do not obstruct the moving vanes of the variable condenser or prevent the set from fitting comfortably in the cabinet.

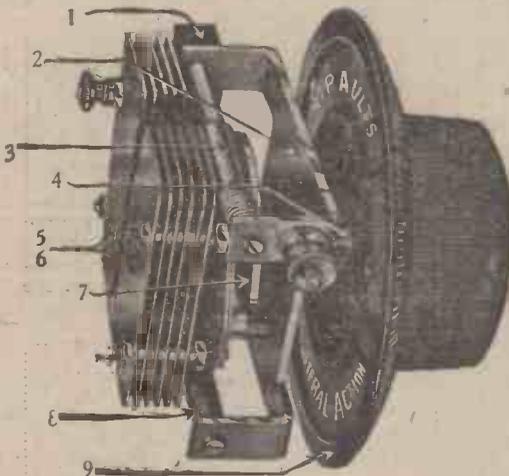
Wiring

The wiring may now be commenced, and as will be seen from the diagram this is a very simple business, and should present no difficulty to even the veriest novice. In fact the whole operation may be completed in less than an hour.

(Continued on page 292.)



A shorting strip is necessary across the loading coil socket when the local station is being received.



Special Constructional Features :

1. High-grade Ebonite Insulating Bar.
2. Rigid Heavy Gauge Main Frame, placed out of the magnetic field, avoiding eddy current losses.
3. Slider Contact, silent in action and making permanent connection to terminal.
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The excellent points of design which are so necessary for the efficient operation of a commercial Set make Ripaults Lateral Action Condensers ideal for your own purposes.

So study the unique constructional features listed—and ask yourself whether you can really afford to leave the tuning circuits of your Set minus the efficiency given by this triumph in Condenser design.

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(PATENT APPLIED FOR)

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GIVE INCREASED
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BEYOND PRAISE.

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Simply plug in to any convenient lamp-holder.
Complete with Adaptor, Switch and Connecting Cords.

DIRECT CURRENT MODEL

Approx. Voltage Tappings 30, 50, 75, 90 and 120 volts.
Ready for Immediate Use.

£3 - 0 - 0

"CONSTRUCTIONAL KIT"

with full wiring instructions,

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ALTERNATING CURRENT MODEL

Approx. Voltage Tappings 30, 60, 90 and 130 volts. Dual tappings
are taken from each voltage, thus providing in all 8 separate tappings.
Ready for Immediate Use. (Including Valve)

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When ordering please state voltage and frequency of Lighting Mains.

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Mr. W. F. G., Longsight:—"I was delighted with the result, a beautiful tone, perfectly clear and no harshness, and at the same time I may as well tell you it is a great saving of expense."

R. C. L., Exmouth, writes:—"We have 3 of your units in use, and all are functioning O.K."

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4 " L.F. .06 " }
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2 " L.F. .02 " }

NEUTRON H.T. BATTERY

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Long Life (Sealed with special plugs to avoid tampering). Note-new price

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Signal strength increased 50 per cent. Simply dissolve in hot water and pour into earth tube or around your earth connection. 3/6

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[RED · YELLOW · BLUE · BLACK · WHITE and GREEN]

Obtainable in ten-foot coils, price 1s. 2d. per coil. Or in two-foot lengths—four assorted colours—1s. per packet. Write for interesting descriptive leaflet to

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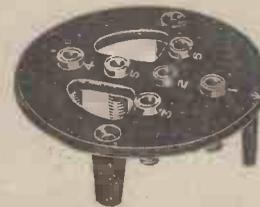
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LOW LOSS INDUCTANCE FORMER



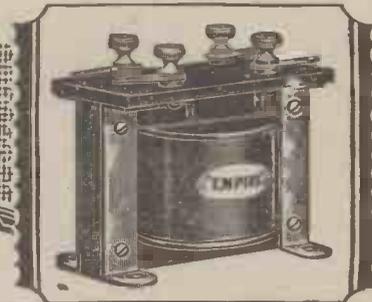
ENABLES the set builder to construct coils, H.F. Transformers, oscillator couplers, etc., of the highest efficiency, conforming to the new standard windings and six-pin base. Constructed of the highest quality bakelite, the former is provided with six ribs which support the windings giving the maximum "Wound on air" effect.



Copper Screen with Standard 6-pin Base ... 8/6
Screen complete with Base and unwound Coil ... 12/6
Former and Base, unwound 5/-
As used in the "Spanspace Three." Former only ... 4/-

As will be seen from the above illustration the Colvern low loss former conforms to the standard six-pin base. Coils when wound are 2 1/2" in diameter, the height of the former is 2 1/2" only.

Collinson Precision Screw Co., Ltd.
Walthamstow, London, E.17.
Provost Works, Macdonald Road.
Telephone—Walthamstow 532.
ALSO AT 150, KING'S CROSS ROAD, N.W.1



7/6 A RELIABLE 7/6
BRITISH TRANSFORMER

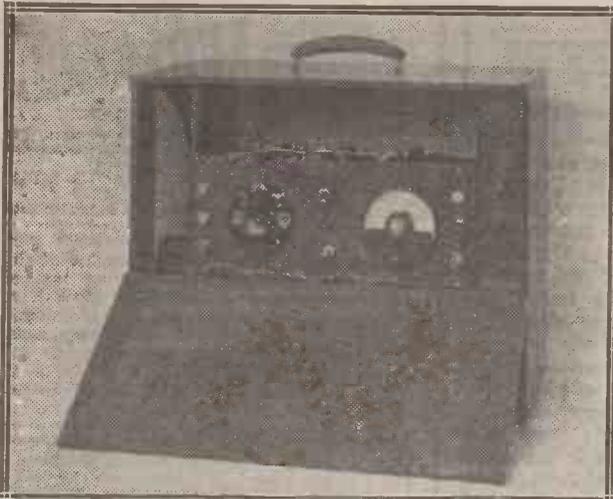
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The "Home or Country" portable receiver described in Vol. V, No. 3, of this journal, seen in its carrying case.

A COMPLETE PORTABLE RECEIVING EQUIPMENT

By H. BRAMFORD

This article completes the description of the useful portable outfit first illustrated in Vol. V, No. 3, in which issue constructional details of the receiver itself appeared.



A COMPLETE equipment for the portable receiver described in a recent issue of WIRELESS is the subject of this article. The receiver, however, is so designed as to be adaptable to any form of portability, and may be conveyed from place to place, in its existing state, with the aid of a suitcase, which is an advantage where weight and bulk is to be considered.

Those who wish, however, to have an entirely self-contained receiving station for the home will find the constructional details given in this article particularly suitable for the purpose. The complete equipment is also useful where a car is available. The cabinet, in the first instance, carries the receiver, all the necessary batteries, together with 'phones and a built-in loud-speaker. In addition to this, there is the frame aerial, and sufficient space is left for such items as aerial wire, earth wire, and earthing rod or tube. The photographs show clearly the arrangement of the various fittings incorporated in this receiver.

Material

The complete outfit and material required is tabulated below, for the benefit of those who wish to make a faithful copy of this set.

Cabinet (Peto-Scott Co., Ltd.).

FRAME AERIAL.

One piece of three-ply wood measuring 19 by 14 in. (Peto-Scott Co., Ltd.).

Four special slotted ebonite fittings (Burne-Jones & Co., Ltd.).

100 ft. of insulated flex (London Electric Wire Co., Ltd.).

Five Clix sockets (Autoveyors, Ltd.).

Two Clix plugs (Autoveyors, Ltd.).

One dozen small brass wood screws.

LOUD-SPEAKER.
Some stout sheet cardboard.

Some sheet fibre.

A quantity of adhesive tape.

Loud-speaker Unit (Amplion).

Plug for Jack (Igranic Electric Co., Ltd.).

may be turned round, or alternatively, the cabinet may remain stationary and the swinging door be opened to the requisite angle.

The construction of the aerial, which is of a simple nature, is clearly shown in an accompanying detailed diagram. First secure the special slotted ebonite fitting to the plywood back by means of small brass wood screws in the positions indicated.

Commence winding from the inside in an anti-clockwise direction. The beginning of the winding is held by a Clix socket, which is mounted upon the plywood back. (Insulators are used each side of the socket to keep it clear of the plywood.) When twelve turns have been made by passing the wire along the slots in the ebonite fittings, mount another Clix socket in the position indicated, bare a portion of the winding at this point, and secure to the socket. Continue the winding to the fifteenth turn, and repeat the process, also repeat at the eighteenth turn, and finish, as shown, at the twenty-first turn.

Mounting the Frame

The five Clix sockets, which are all insulated from the plywood, should be mounted so that the Clix plug used (Continued on next page.)

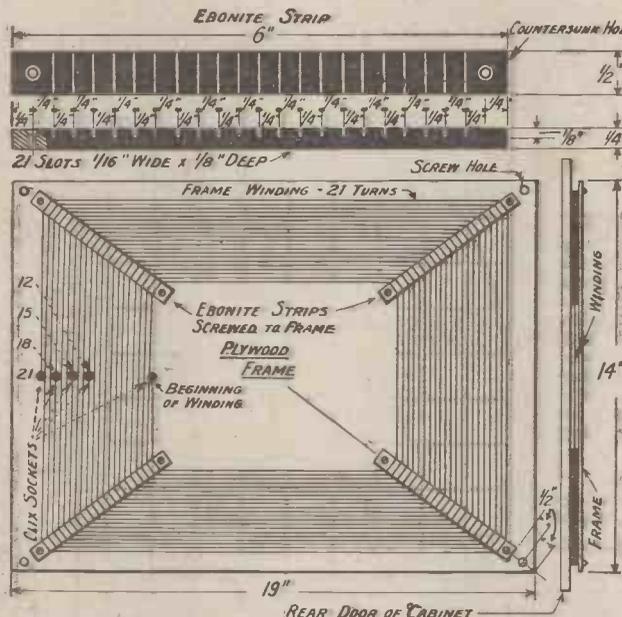


Fig. 1.—The complete constructional details of the frame aerial are given in this drawing.

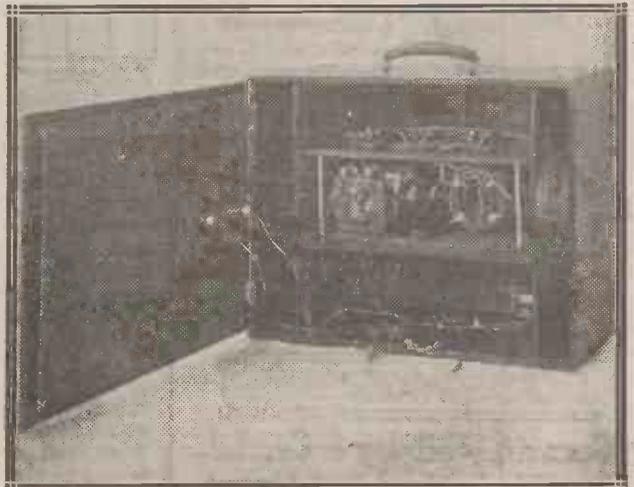
BATTERIES.

Two two-volt unspillable low-tension accumulators (Oldham).

One 90-volt high-tension battery.

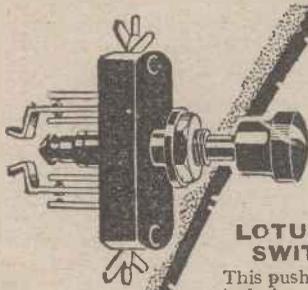
The Frame Aerial

We will first consider the construction of the special frame aerial which is provided with tapplings at convenient intervals. This aerial is screwed to the swinging door at the back of the cabinet in such a way as to give protection to the winding. To obtain a correct position for the aerial, the whole cabinet when closed



A view of the rear of the portable case. The loud-speaker is fitted into the space on the right.

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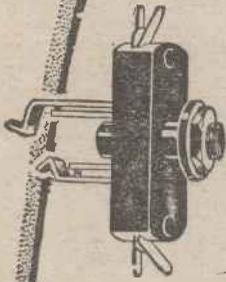


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A COMPLETE PORTABLE RECEIVING EQUIPMENT

(Continued from previous page)

in conjunction with them can be inserted from the other side, being the reverse side to that upon which the winding is made. When the frame is completed, it is secured to the inside of the swinging door of the cabinet with the winding on the inside, for purposes of convenience and protection.

Details of the slotted ebonite fitments are given for the benefit of those who wish to construct their own, and four of them will be required. Two leads are finally taken from the frame aerial to the front of the panel of the receiver on the left-hand side. One end of each lead is equipped with a Clix plug for inserting into the aerial, and the other end with a spade terminal for connection to the panel terminals provided.

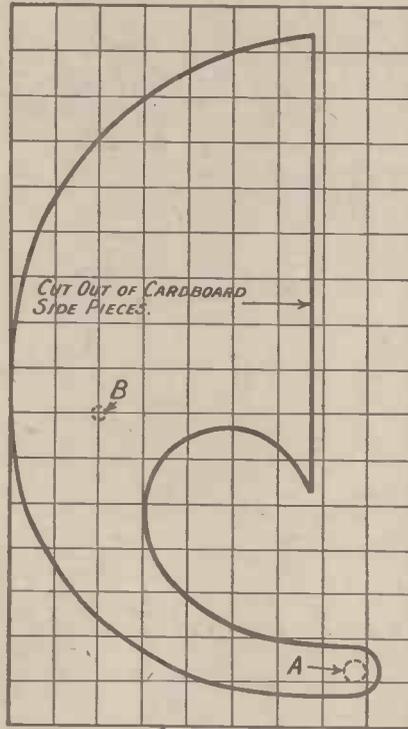


Fig. 2.—Each division in this diagram represents one square inch.

The Built-in Loud-speaker

For the loud-speaker an Amplion unit is used, and this is fixed in the interior of the base of the cabinet, as seen in the photograph. A hole is drilled in the partitioned section of the cabinet, which should provide a tight fit for the metal connecting-piece of the loud-speaker unit.

The "flare" of special shape has next to be made. This fits into the sub-divisional compartment of the cabinet provided for this purpose. First cut out two stout cardboard pieces to the outline shown in the diagram. The squares shown should first be drawn out on one piece of card-
(Continued on page 291.)



19
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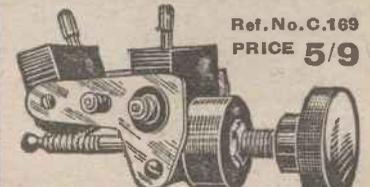
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MORE ABOUT THE LOEWE VALVE.

(Continued from page 272)

sition from the ordinary broadcast band when using these special valves, since the length of leads involved is practically nil. The receiver, however, appears to give noticeably greater efficiency, as might be expected, upon the longer waves employed by Daventry and the other long-wave broadcasting stations. The second "valve" in this set provides the usual detector and two stages of

HAVE YOU FILLED IN THE BALLOT PAPER ON PAGE 276? CLOSING DATE—OCTOBER 12

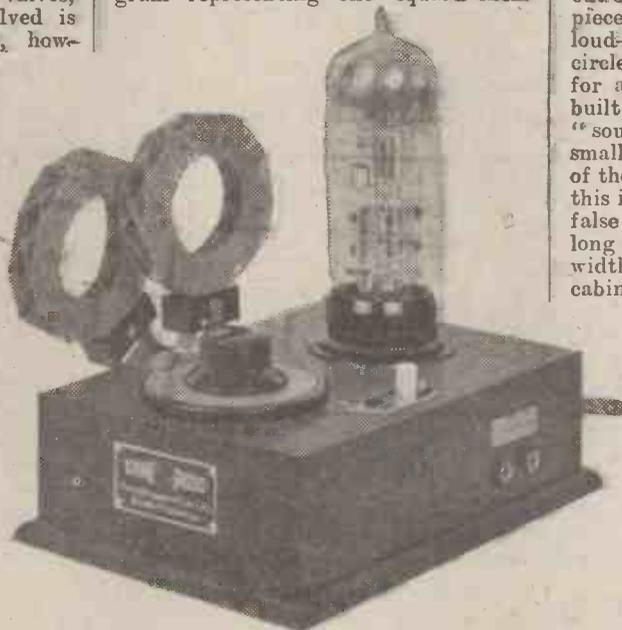
resistance-capacity coupled, note magnification.

Very interesting results were obtained with the larger receiver for distant reception, and really good and pure loud-speaker results were obtained from 10 foreign stations, as well as several of the B.B.C. stations. Using only the second of the two "valves," i.e., with the H.F. stages cut out, very good loud-speaking was obtained from the local station.

A COMPLETE PORTABLE RECEIVING EQUIPMENT

(Continued from page 290)

board, full size, each square in the diagram representing one square inch.



This simple receiver, which incorporates one of the new Loewe valves, is equivalent to a detector and two resistance-coupled L.F. amplifiers.

When this is done, the curves may be easily plotted out. Having cut out one piece, this may be used as a template for cutting out the other piece to ensure similarity.

Horn Assembly

The point "A" indicates that a cut-out should be made in one of the pieces only, where the mouth of the loud-speaker unit should come. The circle B represents a desirable position for a "sound post," which may be built into the completed flare. A "sound post" consists simply of a small round peg passing from one side of the flare to the other. The object of this is to prevent rattling noises due to false vibrations. Now cut out some long fibre strip, equal in width to the width of the compartment in the cabinet in which the finished flare is fixed. This fibre strip is firmly bound round the entire edge of each of the side pieces with adhesive tape. As in doing this the binding tape is shaped around curves, it will be necessary to cut the tape a little less than half-way across, on each side at frequent intervals, thus facilitating the work of binding.

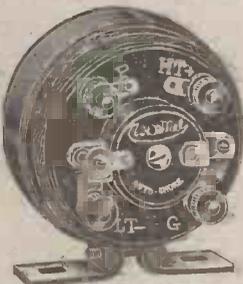
When the binding is completed, a firmly-made narrow curved flare with a rectangular mouth should be the ultimate result. This should then fit firmly into the division in the cabinet, as shown.

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A CRYSTAL SET FOR THE ALTERNATIVE PROGRAMMES

(Continued from page 286)

Having finished the construction, and made sure that the connections are properly made, and that no trace of flux remains on any of the joints, the panel transfers may be put on.

Testing Out

Having placed the set in its cabinet, it may next be tested. Place the short-wave coupler in its base, set the tapping switch at the second tap, and place a shorting plug in the loading coil socket. Now connect the aerial lead to the terminal A1, and attach the earth lead to E. Push the switch right in, and, having previously set the condenser to zero, proceed to revolve it very slowly to the maximum position. If you are listening for 2LO you will probably hear this station with the condenser set at

about 70 degrees. Further adjustment of the tapping point on L1 and a slight retuning of C1 will give increased signal strength, and that is the position at which the aerial tapping should be left. Instructions for receiving Daventry have already been given, and no difficulty should be experienced in this respect.

Author's Test Report

When tested out 10 miles north of 2LO this station was received at excellent strength on the headphones, and

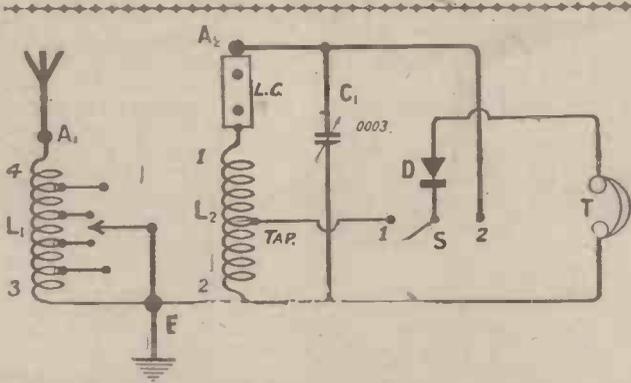


Fig. 3.—The crystal tap should only be used when receiving the local station.

in fact quite readable signals were received with no earth connection. Using a No. 200 coil in the loading coil socket, 5XX was also received at good strength.

in fact quite readable signals were received with no earth connection. Using a No. 200 coil in the loading coil socket, 5XX was also received at good strength.

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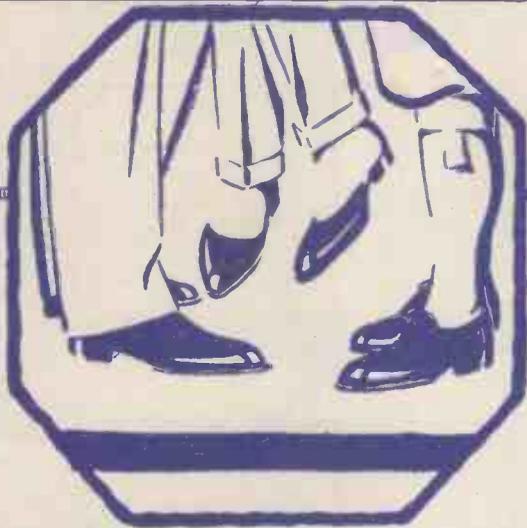
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