

WIRELESS, incorporating "Wireless Weekly," JULY 10, 1926.

WIRELESS



INCORPORATING
WIRELESS WEEKLY

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WEEKLY

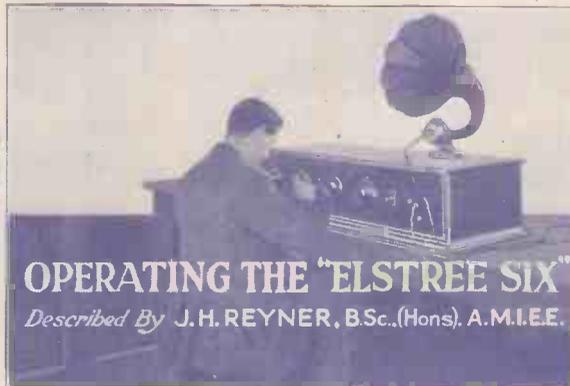
Vol. IV.] JULY 10, 1926 [No. 7

IN THIS ISSUE:
**RELAYS TO DAVENTRY
WITHOUT
CHANGING COILS:**
A SELF-CONTAINED
TWO-VALVE RECEIVER
By JOHN UNDERDOWN

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OPERATING THE "ELSTREE SIX"

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

Operating the "Elstree Six"

FOLLOWING the publication of the original article on the "Elstree Six," the July issue of MODERN WIRELESS contains further details of this remarkable receiver.

The article in this issue is devoted to practical details concerning the adjustment and neutralisation, and the hints given will enable you to get the best out of the set with the minimum of trouble.

In an article happily named "All Europe on a Frame," Mr. Harris describes a handsome eight-valve Superheterodyne Receiver. Close study of "supers," both in this country and in the States, enables the author to give constructional details of an extremely reliable receiver.

Such characteristics as simplicity of operation; particularly sharp tuning; high quality of reproduction; a pleasing and compact appearance and economy of operation (a very important point!) must be added to that of the surprising ease with which Stations all over Europe may be tuned in from a previous calibration.

Read this short interesting list; it gives the principal contents for the July issue:

- All Europe on a Frame Aerial.
By Percy W. Harris, M.I.R.E.
- Operating the "Elstree Six."
*Described by J. H. Reyner, B.Sc. (Hons.)
A.C.G.I., D.I.C., A.M.I.E.E.*
- How British Broadcasting is Received on the Continent.
*By Captain L. F. Plugge, B.Sc., F.R.Ae.S.
F.R.Met.S.*
- The "Riverside Four."
By D. J. S. Hart, B.Sc.
- Circuits for Sharp Tuning.
By E. M. Mason.
- A Chat About "Local Conditions."
By Stanley G. Rattee, M.I.R.E.E.
- My Home Set.
By John Underdown.
- Calibrating Your Receiver.
By Capt. H. J. Rowland, M.C., M.I.E.E.
- Some Notes on 45-metre Transmission.
By R. W. H. Bloram (5L9).
- Split Coil Circuits with Ordinary Coils.
By W. G. Kay.
- Regular Programmes from Continental Broadcasting Stations.
*Progress in High Frequency Transformers.
By J. H. Reyner, B.Sc. (Hons.), A.M.I.E.E.*
- Elstree's Artificial 2L0.

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'0002 "	1/6
'0005 "	1/6
'0003 "	(with clip for grid leak)	1/8
'001 "	1/8
'002 "	1/10
'005 "	2/8
'01 "	3/9

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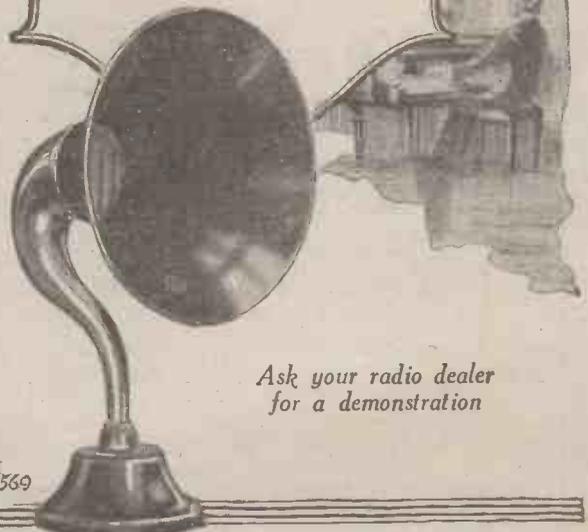
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2569

MORE FACTS ABOUT L.F. TRANSFORMERS

It is sometimes advised that a transformer should be used in the second L.F. stage of different type or ratio from that employed in the first.

In regard to type, whilst it is conceivable that the defects of two inferior transformers might cancel out, there is no reason for any difference of type when good transformers are used.

The question of transformer ratio is affected by the fact that the impedance of the transformer primary should exceed that of the valve as much as possible to ensure maximum amplification ratio. If the transformer ratio is high, the impedance of the primary must necessarily be low at low frequencies and the greater step-up of the high ratio transformer will be annulled by the reduced amplification ratio obtained with a high impedance valve, or, if a low impedance valve be used, by its lower amplification factor. Moreover, these low impedance valves are power valves costing more initially and to maintain.

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WIRELESS WEEKLY

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THIS WEEK'S NOTES AND NEWS

Cheap and —

WIRELESS sets are, I hear, being sold for truly remarkable figures in New Zealand, which is being turned into a kind of "dumping-ground" for American apparatus. The only British set on the market there, is a not very high-grade crystal set, and there are numbers of American 5-valve sets which, complete with loud-speakers, cost £4!

Lucky Sweden

BBROADCASTING has made rather rapid progress in Sweden, where the number of listeners is now 120,000. Conditions there are rather remarkable on account of the mountainous nature of the country, but nevertheless they have a good selection of distant stations to choose from, and are not badly troubled by atmospherics or local interference.

A Contrast

THE Irish Free State is soon to have three new stations, each with a power equivalent to that of Dublin. These Irish listeners are in a lucky position, since they find it quite easy to take their choice of two or three of the British stations, to say nothing of Belfast and their own station.

In Ceylon a very different state of affairs prevails. Although the Colombo station has now been working for over two years, the number of licensed listeners is under 300, although the population of the island is 4½ millions. I hear that the quality of the transmissions is quite satisfactory, but that there are not enough of them. If the number and length of the transmissions were to be increased, I should

think the demand for licences would grow considerably bigger.

Have You Noticed It?

I HAVE recently had my own opinions confirmed from several sources, that atmospherics are not nearly so

the side of his head, while a station in Chile reported the ether quite clear. This, of course, is nothing unusual, but just serves to show that atmospherics of the most poisonous variety are, as a rule, only local.

A "Demonstration"

I WAS amused to read recently of the test of a wireless set in Court, for the purpose of determining whether or not it did what was claimed for it. Apparently the manufacturers stated that it would receive the Continental stations, whereas the actual stations received on it were Nottingham, Birmingham and Manchester. I should think it must have had a bad attack of "stage-fright" in the awful presence of the Bench. What would have happened if someone had allowed it to oscillate?

For Organ Lovers

DURING July several organ recitals will be broadcast from St. Botolph's Church, Bishopsgate. The organist will be Dr. Herbert W. Hickox, F.R.C.O., who is Professor of the Organ at the Guildhall School of Music.

Returned, With Thanks!

I HAVE recently been reading that Graham Bell, the inventor of the telephone, used to get somewhat

"fed up" with the boring people who used to ring him up for nothing in particular, and adopted the expedient of placing the receiver in front of the microphone, and letting them talk to themselves! Sometimes, I am afraid, we should like to do this to the B.B.C., but since they are *always* listening to their own transmission I don't think it would have much effect.

(Continued on next page.)

"BOTTLED" WIRELESS



This ingenious "machine," which is installed in an American barber's shop, contains a five-valve wireless receiver, and by inserting a coin customers are able to listen to the local station on a loud-speaker.

troublesome this summer as they were last year. Two friends of mine both report listening in during an actual storm, and hearing only the very tamest form of atmospherics at the time. I myself have been doing a fair amount of listening on the short waves just lately, and heard a Brazilian station complaining about such terrible atmospherics that he had to listen with the aerial off and the 'phones on

This Week's Notes and News—continued

An Amusing Item

LISTENERS will, I fancy, have a very entertaining time between 5.30 and 6 p.m. on July 6, when a debate on the subject, "Is Scientific Invention a Nuisance?" will be broadcast. The debaters will be Professor A. M. Low and Mr. E. V. Knox, the well-known "Evoc" of *Punch*.

The Recitals

THE pianoforte recitals this week (Chopin's Nocturnes) will be given by Niedzielski, who will continue next week. The week beginning on July 19 will be filled by M. Jean Baptiste Toner with Bach's two- and three-part inventions.

Those Ships

COMPLAINTS are still coming in from the South Coast about the unnecessary amount of jamming from ship and shore stations working off their wavelengths. Speaking from personal experience, I find that the worst spot of all is Hastings, where London and Daventry are inclined to be weaker, and the jamming stronger. In London and other cities with their own broadcasting stations we cannot imagine what it is to have the local station wiped right out, but a short stay on the South Coast soon puts this efficiency right! If only the ship and shore stations kept to 600 metres instead of wandering round about 300 and 450 metres the trouble would probably not exist.

A Substitute

ANOTHER mosquito is to take the place of "Cynthia," who, you will remember, died of "mike-fright" at 2LO while rehearsing.

As a Relief

IAM rather glad to see that a correspondent in one of the daily papers has written in defence of the number of talks broadcast by the B.B.C. He says that music, if taken in too large quantities, becomes "cheap" and is not appreciated, and for this reason he welcomes the loquacity of the B.B.C. This is the only letter that I have seen in support of the talks.

Why Do It?

ONE still sees aeriels composed of four or five wires fully a hundred feet long. I wonder whether the owners realise how unnecessary it

normal broadcast wavelengths, of course, a 70-ft. twin is an ample size, and for the short waves anything down to 15 ft. or 20 ft. will work.

A Chance for "DX"!

I HEAR that the Radio Broadcasting Company of New Zealand, Ltd., will have two stations erected and in complete working order by the time this appears in print. They will be at Auckland and Christchurch.

Really!

HAVE been rather amused by the outspoken opinions of some of the wireless experts of the provincial papers lately. Best of all, however, is a cutting from a foreign paper stating that all the distortion associated with wireless reception is due to the faulty design of loud-speakers nowadays, and that what is wanted now is a loud-speaker that will be free from all distortion. I wonder how many owners of those sets without grid-bias could get decent music even from one of these "distortionless" loud-speakers. And also what our leading loud-speaker manufacturers think about that statement?

A Coincidence

IT is rather peculiar that the number of messages sent from Post Office stations to foreign countries and from shore stations to ships should be very nearly equal in number year by year. This year the difference is a little greater than usual, the figures being 223,600 and 228,000.

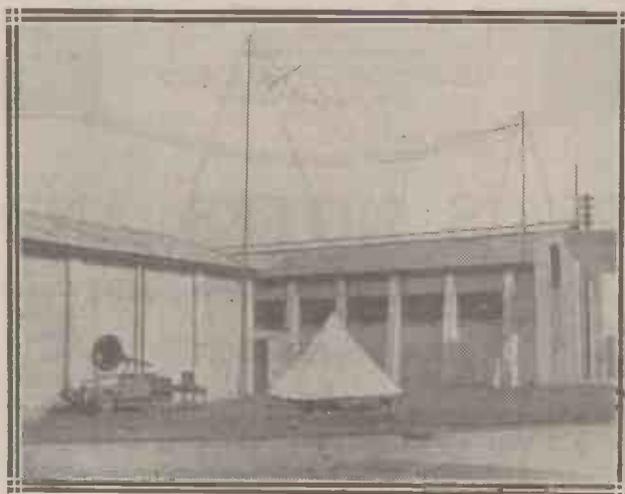
Perhaps!

SCIENTISTS are hoping to find a means of melting the icebergs near the Newfoundland coast, possibly by the "thermit" process. At present wireless is only used for giving navigation warnings in connection with the icebergs, but since it is apparently responsible for those 24-in. cucumbers, who knows but what we may use it for melting icebergs even yet?

The Next Issue

IAM told that the special amplifier number, which will appear next week is likely to be in great demand! Take my advice and "book early!" **CALL-SIGN.**

RADIO IN THE R.A.F.



A special feature of such demonstrations by the R.A.F. as their great Pageant at Hendon on Saturday, July 3, is always the elaborate wireless system.

is to erect the largest possible aerial nowadays? It is, no doubt, the effect of the G.P.O. regulations, which limited the length of an aerial to

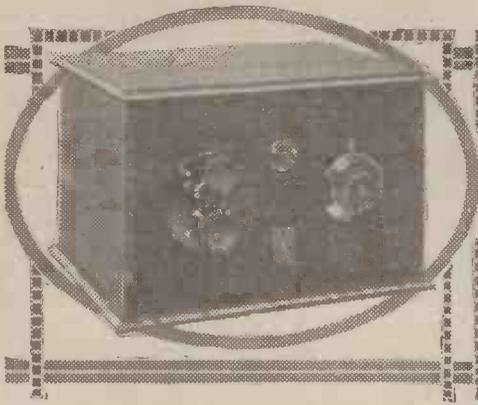
leading loud-speaker manufacturers think about that statement?

DUPLICATED PLANT



The duplication of transmitting plant to guard against interruption of the service by break-down is a subject which 2LO's recent misfortunes render of considerable interest. These are the duplicate generator sets at KGO, California.

100 ft. Thereupon everyone put up one of the maximum length, and the practice has still survived. For the



RELAYS TO DAVENTRY WITHOUT CHANGING COILS

By JOHN UNDERDOWN



THE B.B.C. is largely responsible for the building of this receiver, and, briefly detailed, the circumstances were as follows: An important

relation, to be exact my wife's mother—notice, I do not use the term mother-in-law—was listening to John Henry broadcasting from Margate when 2LO broke down.

"Can't you get the same programme from Daventry?" was the question with which I was at once confronted. Naturally I should have liked to have given a ready reply in the affirmative, but on remembering that I had left a large and heavy H.T. battery upon the top of the case of my set, which would have to be disconnected, and also that three coils would have to be changed, I took the easier course, and explained that the receiver would only tune in stations on the 300- to 500-metre band.

The idea struck me, however, that in such circumstances a receiver which would permit of a very rapid change-over from the local station to Daventry would prove very useful. The receiver about to be described is the result.

Interesting Departures

In a set which will be employed chiefly for reception of the local station or 5XX, ease of handling, compactness and good reproduction should be given careful consideration. In my own opinion, anode-bend rectification is to be preferred in this latter direction to the employment of a grid condenser and leak, and this method has been incorporated in the receiver. The circuit is slightly different from the more common arrangement in which a detector valve, with magnetic reaction on to the aerial coil, is followed by a transformer-coupled stage of note magnification, a modification of the Reinartz circuit being utilised.

Circuit Details

The deviations from the more con-

ventional detector and one note magnifier arrangement will be appreciated better by reference to the theoretical

decreasing the size of C_2 to .0001. On the other hand, for reception on waves above 2,000 metres, employing plain parallel tuning, C_2 may be profitably increased to .0003 with certain types of valves. These changes are quite easily made with clip-in condensers.

Anode-Bend Rectification
The valve V_1 is arranged to rectify on the lower bend of its anode characteristic curve by the insertion of a single grid bias cell in the G.B.1 position. The complication of employing a potentiometer is omitted, and in practice by suitably adjusting the H.T. +1 tapping, that is, the voltage on the plate of the detector valve, excellent rectification results. For V_1 I strongly recommend a resistance-coupling type valve with an anode voltage of the order of 60 to 70 volts. Where other types of valves are employed it may be

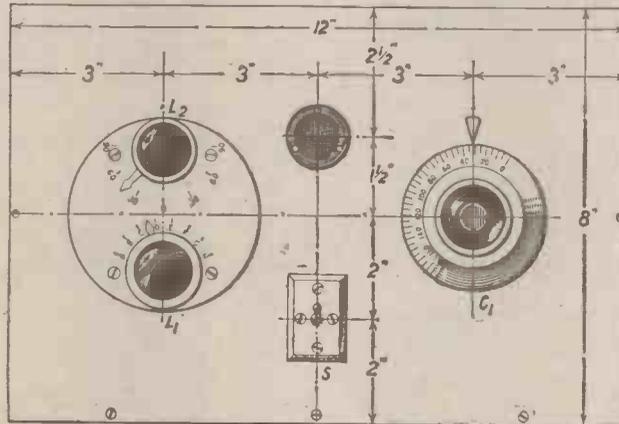


Fig. 1.—The upper knob on the retroactive tuner controls reaction, whilst that below governs the wavelength range setting.

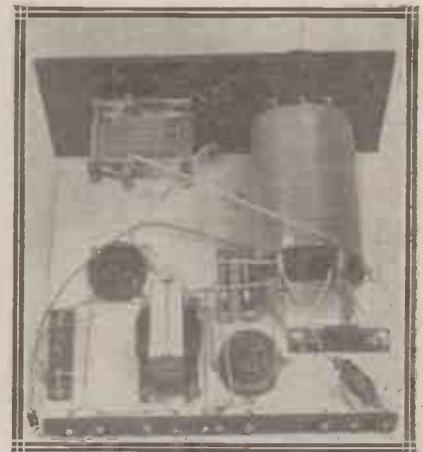
circuit. L_1 is the tapped aerial coil of an R.L. Aerial Tuner, of which L_2 is the reaction coil. This latter coil is intended purely to give magnetic reaction effects, in which capacity it does function excellently over the whole of the waveband of L_1 , C_1 , but still smoother reaction control can be obtained by incorporating the system indicated. Here, instead of employing fixed coupling between L_1 and L_2 and using a variable condenser to control reaction effects, a fixed condenser C_2 is utilised and the degree of reaction coupling is altered by rotating L_2 in the normal manner.

The Reaction Condenser

In practice I generally employ plain parallel tuning in the aerial circuit, the aerial being joined to terminal A_2 , and with this connection I find that a .0002 condenser for C_2 is satisfactory on the ordinary broadcasting wavelengths of 300 to 500 metres and also on the wavelengths upon which Daventry and Radio-Paris transmit.

Where a somewhat higher degree of selectivity is required, however, on the 300- to 500-metre waveband, constant aerial tuning can be employed, and in this case benefit may ensue by

necessary to experiment with the value of G.B.1 and the H.T. voltage. The radio-frequency choke, necessi-



The fixed reaction condenser may be seen immediately below the aerial coil.

(Continued on next page.)

tated by the modified reaction system, is a plug-in coil of large size.

The remainder of the circuit does not depart from convention, and consists of a plain transformer-coupled note-magnifier stage, V_2 having a separate H.T. tapping and provision for grid bias.

An Enclosed Layout

Since the receiver is essentially one for family use, an American enclosed-

Join A1 to CAT Condenser.

Join A2 to G of V_1 ; G of V_1 to other side of CAT thence to "A" terminal on coupler; "A" terminal on coupler to fixed plates C1.

Join E to C2; C2 (same side) to E terminal on coupler and G.B.1-; "E" terminal on coupler to moving plates C1.

Join remaining side of C2 to "R" terminal on coupler below "E" terminal.

Join remaining "R" terminal on coupler to P of V_1 ; P of V_1 to one side of L3 coil socket.

type cabinet, with vertical panel, has been employed, and valves, coils and grid batteries are all placed within the cabinet. Reference to the photographs will show that the resulting set is extremely compact and has a minimum number of controls upon the panel. To the left-hand side of this latter will be seen the two knobs of the R.I. Aerial Tuner, the lower knob actuating a stud switch which varies the amount of coil in circuit, whilst the upper knob is for reaction control. The aerial tuning condenser C_1 is placed to the right-hand side of the panel.

On the centre line of the panel a filament "on and off" switch, allowing the set to be put in and out of operation at a touch, when once adjusted to a given station, and a single valve window directly above it will be seen. The valve window may be omitted if desired, but I generally incorporate one, as this prevents me leaving the set on all night, with consequent wastage of batteries.

Behind-Panel

Arrangements

The behind-panel arrangements are also extremely simple, and little need be said, since they will be appreciated from the photographs and wiring diagram. The aerial tuning and reaction coils will be seen to the right-hand side, whilst the plug-in coil on the left is the radio-frequency choke. This latter should be a large plug-in coil, and here I find the Gambrell "I" or "J" to function admirably, both on the lower and upper broadcast wavelengths. If coils of numbered types are employed, really large ones such as Nos. 500 or 600 should be used.

RELAYS TO DAVENTRY WITHOUT CHANGING COILS

(Continued)

Grid Batteries

The single dry cell for grid bias is placed upon the baseboard beneath the aerial coil, and it may be held in position by means of a rubber band and

appear upon the panel, and this is due to the employment of Amperites or "limiting" resistances. These latter are made in three main types, namely, for 5-volt .25-ampere valves on a 6-volt accumulator, 3-volt .06-ampere valves on a 4-volt accumulator or $4\frac{1}{2}$ -volt dry battery, or 3-volt .06-ampere valves on a 6-volt accumulator. In the actual receiver I have used type 1A, that is, the type for 5-volt .25-ampere valves.

WIRING INSTRUCTIONS

Join other side L3 coil socket to "P" terminal on transformer.

Join "G" terminal on transformer to G of V_2 . Join P of V_2 to one telephone socket.

Join remaining telephone socket to H.T.+2.

Join H.T.+1 to "B+" on transformer.

Join one filament tag on V_1 to one filament tag on V_2 and thence to one side of the switch.

Join H.T.— to L.T.—.

Join other side of switch to L.T.—.

Join remaining filament connection on V_1 to one side of fixed resistor (R1).

Join remaining filament connection V_2 to one side of fixed resistor (R2).

Join the two remaining terminals on R1 and R2 together and also to L.T.—.

Join L.T.— to G.B.1+ and G.B.2+.

Join "F—" on transformer to G.B.2—.

two drawing pins. G.B.2 should be placed parallel and close to the left-hand edge of the panel between this latter and the radio-frequency choke coil.

Components

A detailed list of the components employed in the receiver is given below for the benefit of the constructor who wishes exactly to duplicate the set, and although it is not necessary to employ all of these if others of good make are to hand, no radical departure, drastically altering the layout, should be made.

One "Pilot" ebonite panel, 12 in. by 8 in. by $\frac{1}{4}$ in. (Peto-Scott Co., Ltd.).

One mahogany cabinet to take above panel and baseboard, $9\frac{1}{2}$ in. deep (Peto-Scott Co., Ltd.).

One ebonite strip, $11\frac{1}{2}$ in. by 1 in. by $\frac{1}{4}$ in. (Peto-Scott Co., Ltd.).

One retroactive tuner (Radio Instruments Ltd.).

One .0005 variable condenser (Jackson Brothers).

One "Connecticut" "on and off" switch (Rothermel Radio Corporation of Great Britain, Ltd.).

One Decko dial indicator (A. F. Bulgin & Co.).

Two Anti-phonics valve holders (Burndep Wireless Ltd.).

One Igranics Patent super-audioformer (Igranics Electric Co., Ltd.).

Two Amperites (Type 1A) (Rothermel Radio Corporation of Great Britain, Ltd.).

One single coil holder (Peto-Scott Co., Ltd.).

One .0002 clip-in condenser and base (L. McMichael, Ltd.).

One .0001 Freshman condenser (Igranics Electric Co., Ltd.).

Ten Eelex sockets and twelve plugs (J. J. Eastick & Sons).
Quantity of Glazite and rubber-covered flex. One valve window.
Radio Press panel transfers.

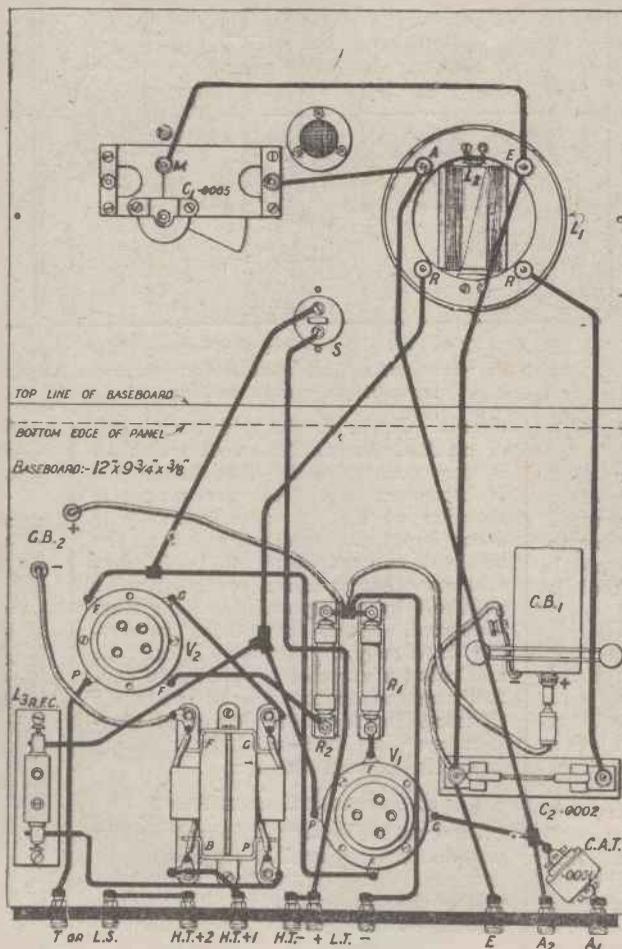


Fig. 2.—The G.B.1 battery is held in position on the baseboard by means of a rubber band and two drawing-pins.

Filament Controls

It will be observed that the usual filament resistance knobs do not

Constructional Work

The constructional work in making the receiver is very largely reduced by the layout which I have adopted, and little difficulty should be experienced here. The necessary centres for holes for the tuner can be made by employing the figured dial as a template. Only three other large holes are required, namely, for the valve window, filament on and off switch and for the variable condenser. No supporting brackets are necessary for the panel, since this may be screwed to the two side fillets of the case.

It will be observed that the clip-in condenser C_2 is conveniently located so that other capacities than that specified may be tried if a different type detector valve or C.A.T. is used.

Battery connections, etc., excepting those for the grid bias batteries are made by means of an ebonite strip upon which a number of sockets are located. These replace the more commonly used terminals, and plugs are used to terminate the battery, telephone and aerial and earth leads. The particular plugs employed will be found to give good, sound electrical and mechanical connections.

RELAYS TO DAVENTRY WITHOUT CHANGING COILS

(Continued)

is screwed in place. The remainder of the wiring can then be completed in a very short space of time.

Testing

When the wiring has been completed

Valves and H.T.

For the detector valve V_1 , employing Type 1A Amperites, resistance-coupling valves, such as the D.F.A.4, D.E.5B., Electron S.S.6, etc., should be employed, whilst for the note magnifier a small power valve, such as the B.4, D.E.5, S.S.4, etc., prove suitable. The 3-volt .06 counterparts of these valves can, of course, be employed if suitable Amperites are obtained. Employing $\frac{1}{4}$ ampere valves I find that a suitable voltage for the detector, with a single cell for grid bias, is of the order of 60 to 70 volts, whilst on the note magnifier 100 to 120 volts with 6 or $7\frac{1}{2}$ volts grid bias should be used.

Switch Settings

I would suggest that the first test be carried out with plain parallel tuning, with the aerial connected to terminal A_2 and the earth to E. With this arrangement I find 2100 tunes on stud B and 5XX upon stud G. The pointer of the reaction control knob, if this is connected up as shown, should be upon the left-hand side of the zero mark. For a start tune in with this latter pointer at zero; and when a station is heard

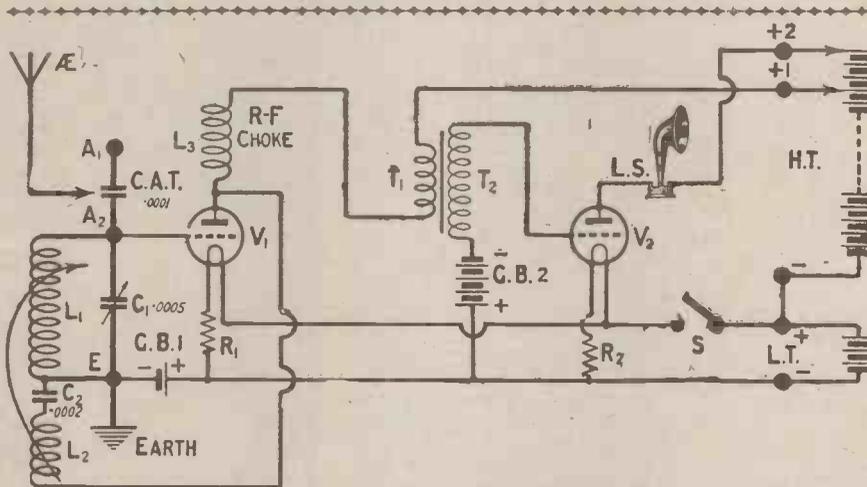
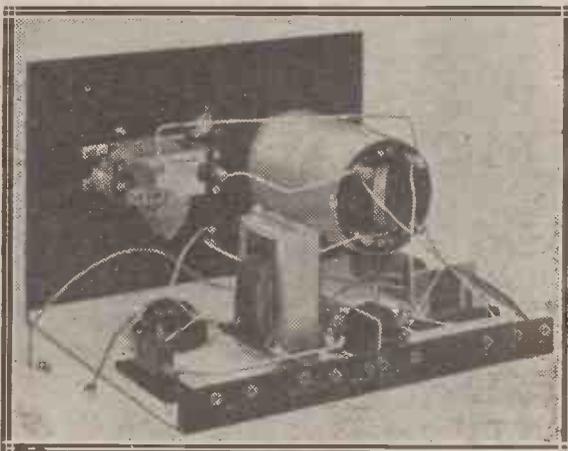


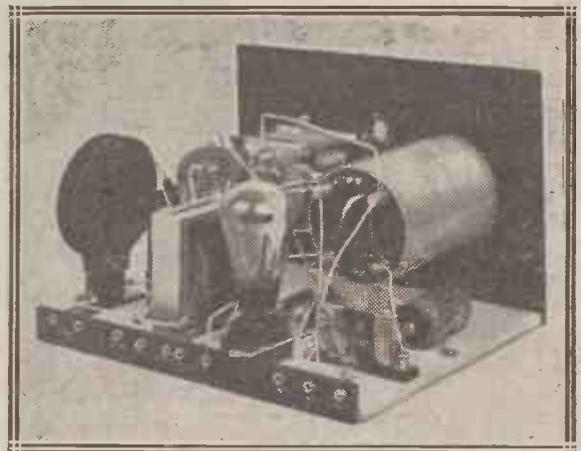
Fig. 3.—The fixed reaction condenser C_2 is of the clip-in variety, so that the capacity can be changed at will.

the testing should be carried out as follows:—First connect the L.T. leads only and with the filament switch in the "on" position insert a suitable valve in turn into each valve holder, noting whether it lights correctly. If it does so, connect aerial and

upon stud G. The pointer of the reaction control knob, if this is connected up as shown, should be upon the left-hand side of the zero mark. For a start tune in with this latter pointer at zero; and when a station is heard



On the extreme left of this picture may be seen the two plugs which go to the G.B.2 battery.



A view of the receiver with coils and valves in position. Note the disposition of the sockets on the ebonite strip.

Wiring

The wiring is extremely simple in nature, and little need be said here. Much time will, however, be saved if all the components upon the wooden baseboard are wired into position as far as possible before the ebonite panel

earth, telephones and H.T. negative to the appropriate sockets, and take a common lead from H.T. +1 and +2 to a low voltage in the H.T. battery. If the brilliance of the valve filaments does not increase, all is correct, and you may proceed to carry on in the normal way.

gradually rotate the knob so that the pointer moves towards the left, re-tuning slightly upon the aerial condenser, when signal strength should be increased. With the system of reaction control incorporated, very smooth working is obtained.

(Continued on page 244.)

PITY THE POOR HIGHBROW!

By C. P. ALLINSON, A.M.I.R.E.

Who are the "Highbrows"? Granted that they are a minority, do they receive as much consideration in the programmes as their numbers warrant? Mr. Allinson expresses very forcibly the views of a listener who finds the bulk of the matter broadcast to fall short of his musical standards.

I WAS round at Tomkin's place, where I had been expressly invited to hear his latest wireless set. Tomkin, I may say, is a votary to NOISE. He is never so happy as when a neighbour comes in and tells him how he heard his set right down at the far end of the road. His ambition is to rattle the rafters and make the welkin ring.

"Loud-Speaking"

"How's that for a set?" he queried, as we sat listening to a blare of "music" that you could almost lean against, issuing from his loud-speaker. I made appropriate remarks and possessed my soul in patience, knowing that an excellent programme was shortly due from the Wireless Symphony Orchestra.

But when it came on, "I can't stand this highbrow music," remarked Tomkin; "let's see what we can get in the way of distance." And bringing up his reaction, he proceeded to "see."

Who are the Highbrows?

It is highly probable that his opinion is that of a very large number of listeners, but let us for a change examine the highbrow's point of view.

We may here pertinently inquire, "What is a highbrow?" Originating in the States, this term has come to have a contemptuous significance as typifying the individual with domed forehead, bulging eyes and anæmic constitution, who is a plain liver and a high thinker. Indeed, in a recent case of slander, or libel, it was complained that the defendant had called the plaintiff a highbrow.

Always Denied

Curiously enough, nobody ever admits to being a highbrow. If tackled on the subject he will reply, "Oh, no, I'm not a highbrow. I certainly don't care for Ethel M. Dell; I much prefer reading Dostoevsky, and

I can't stand 'popular' music. The only composers worth listening to are Scriabin, Stravinsky, Prokofief, and a few others. But I'm not a highbrow."

Consider, however, the highbrow's (whether confessed or otherwise) fate. Night after night the B.B.C. pour forth a flood of (to him) drivelling music. The musical plagiarists of the last half-century are searched for their most trivial and banal tunes. He hears sickly sentiment succeeded by feeble humour, mediocre marches are

parties, talks on subjects of the most puerile description, comic turns that can only be recognised as such by the fact that they are announced to be comic, songs that have been dead for twenty years, and a mass of non-descript items that defy description.

"Ah," I hear someone say, "we frequently have broadcasts of Wagner and music of that kind."

Yes, and what is it if we come to examine it? Wagner it may be in name, but it is some excerpt that has been done to death by every band from

Southend Pier to the Royal Air Force Band. I believe on one occasion they broadcast one of Stravinsky's works, and occasionally a little Russian music of the baser sort (Rubinstein's Melody in F, for example) trickles through the microphone. And where some work of real merit, such as Rimsky Korsakoff's Symphonic Poem, "Scheherzade," is given us it is mutilated beyond all recognition. Its character is completely obscured by poor rendition, glittering orchestration becomes a shiny smear, passages that should be brutal in treatment degenerate into bluster, and passages of real beauty are overlaid with sickly sentiment.

Tuneful Classics

There is a popular conception that classical music is dull and has no tune, and that modern music is merely noise. One need only, however, refer to composers like Purcell, Bird, and Dr. Arne, some of whose music has been adapted in the "Beggar's Opera," to take just three of our own composers, or Mozart, Schumann and Dvorak, to take others, who have written much work that is both tuneful and of real merit. Among moderns surely music by such composers as Elgar, Ravel, Hugo Wolf, da Falla,

(Continued on page 226.)

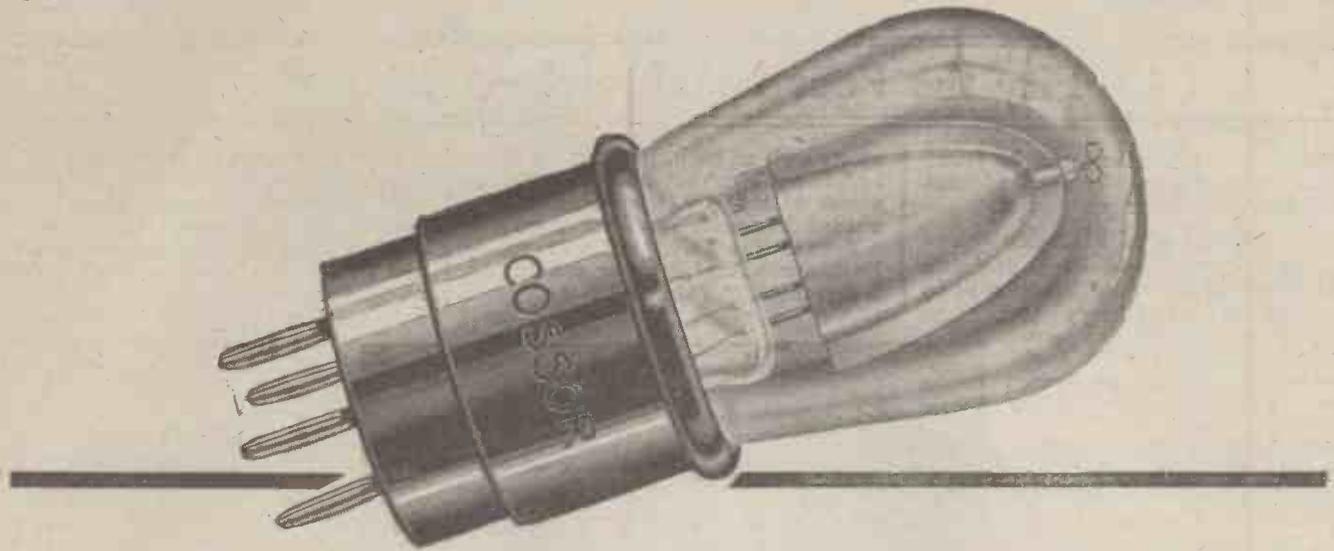


Many people appreciate jazz bands, but they appear to lacerate the feelings of the section of listeners for whom Mr. Allinson is claiming greater consideration.

followed by that epitome of musical futility, the English ballad, decrepit overtures give place to musical (save the mark) comedy.

What a Fate!

Where then does the highbrow find his place in the scheme of the B.B.C.? Except for a few minutes devoted to classical pianoforte works and an occasional evening during the week when chamber music and some of the lighter works of merit are given, he is condemned, unless possessed of a powerful multi-valve receiver, to listen to futile entertainment by concert



At last the shockproof Valve

THERE is little need to ask "Which is the most vulnerable part of any valve?" Even a man who had never owned a Wireless Set would be able to guess the answer! Ever since Edison ransacked the world for filament material for his first electric lamp, the glowing thread within its crystal globe has been an object of special regard.

The wireless valve is first cousin to the electric lamp—but year by year the relationship is getting more remote. Whereas in the latter, efficiency is measured by the amount of light it gives, the whole resources of Science have been enlisted to obtain in the valve the maximum of efficiency with the minimum of light.

And now that a new Cossor Valve has been evolved with a special filament which operates at a glow almost indiscernible we appear to be within a reasonable distance of a valve which will never wear out.

But filament glow has been only one of the problems which Cossor has faced—and conquered. Another—almost equally as important—has been the perfection of a system of filament suspension which would successfully withstand the thousand and one shocks which every valve must encounter in use.

The Cossor Point One, now being placed on the market, is the

first valve in which the new system of Co-axial Mounting has been utilised. For the first time there is available a method which enables the three elements—the Filament, the Grid and the Anode—to be securely united together at the top as well as at the bottom.

How this is effected can be readily understood from the illustration above. At the top of the Anode will be seen a seonite insulator which—projecting downward—is firmly secured to the top of the Grid. Through the centre of this seonite tube is threaded a fine wire which acts as the third support to the fila-

ment. Thus it has been found possible to evolve a system of construction which will resist without harm the hardest of shocks. Even if the elements in this Cossor Point One should be displaced through an accidental blow they must always be in the same relative positions.

Co-axial Mounting is destined to be one of the most important developments of the year. In this brief announcement it is obviously impossible to enlarge in detail upon its many advantages.

Try out this astonishing new Valve now. Remember its current consumption is barely one-tenth of an ampere. One super-heterodyne fitted with seven of them actually takes less current than a single-valve Set using one ordinary valve.

The new Cossor Point One

—the first Valve in which the filament, grid and anode are secured together at top and bottom in permanent alignment.

Red Top	Plain Top	Green Top
For H.F. use	For Detector	Power Valve
18 volts	18 volts	18 volts
1 amp.	1 amp.	15 amp.
15/6	15/6	18/6

—fitted with the new 1 amp. filament

Pity the Poor Highbrow!—continued

Max Reger, and others can be found that will please even the most inveterate tune-monger.

An Ill-used Minority

Although the highbrow is doubtless in a very small minority, is he to be condemned everlastingly to listen to penny-a-line pot-boilers turned out by hack composers without an ounce of real music in them? He pays his licence fee like the rest, and surely he is entitled to get some return.

Otherwise there is nothing left for him except to purchase a powerful set which will enable him to receive Continental transmissions, where he will find the works of the most modern of composers as well as the classics being broadcast, and being rendered with true insight and artistry.

A Contrast

Imagine his delight at finding the works, of Scriabin Schönberg, Goossens, Glinka, Ravel, Liadov, Poulenc, and others being broadcast, as well as those of classical com-

posers such as Bach, Brahms, Scarlatti and Cesar Franck. And this after a search of the B.B.C. stations has rewarded him with anything from the "Belle of New York" of 1895 to "No, No, Nanette," of 1925, or even, if he is fortunate, "Valencia"!

Is there no one to sympathise with him in his search for some of the masterpieces of the world's great composers? Or is he everlastingly to be condemned to listen to all that is futile and worthless in music, sneered at by an ignorant public to whom "I Hear You Calling Me" represents the pinnacle of musical art?



"He hears sickly sentiment succeeded by feeble humour."

Radio Contours

SIR,—We were very interested to see in Capt. E. A. Anson's article that East Grinstead got strong wireless reception. During the week-end we borrowed a crystal set and got it working with excellent results. We had always thought we were too far away for a crystal set to be any good, and did not want the trouble of looking after a valve set. Thanks to the valuable information in your paper we are now able to enjoy wireless without a bother.

Yours faithfully,
E. M. DOUGLAS.

Sussex.

A PLUG-IN TUNING SPADE

A simple spade-tuned crystal receiver may be improvised from a two-way coil holder, a crystal detector, and the usual terminals. With this purpose in view, a plug-in spade tuner

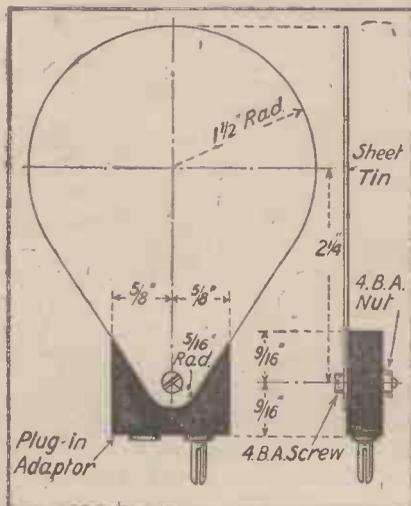


Fig. 1.—Constructional details of the tuning spade.

should be made in accordance with the details given in Fig. 1. All that is necessary for the construction of the tuning spade is a coil plug of the type shown in the drawing, a piece of

sheet copper 3 in. x 4 1/16 in., and a 4 B.A. screw and nut. To construct, first drill a 4 B.A. clearance hole centrally in the plug-in adaptor, as indicated. Next cut the sheet copper with a pair of tinman's shears to the shape and dimensions shown. Punch a 4 B.A. clearing hole in the copper to receive the securing screw. Assemble the spade thus made to the plug-in adaptor by means of the screw and nut in the manner indicated.

How it is Used

To put the device into operation, first connect up the receiver in the following order:—One side of the fixed coil holder to the aerial terminal, and one side of the crystal detector. The other side of the fixed coil holder to the earth terminals, and one of the telephone terminals. The remaining side of the crystal detector to the other telephone terminal.

To operate, plug a suitable size of coil into the fixed coil holder, and the spade tuner into the moving coil holder. Vary the angle of the moving coil holder until signals are at their loudest. The plug-in coil should be experimented with until the most suitable sized coil for the local station is found. No variable condenser will be required for tuning a crystal receiver of this type. Alternatively, the idea may be adapted to an existing receiver which has already a two-way coil holder embodied in it.

K. R. C.

IMPROVING A SET OF SPANNERS

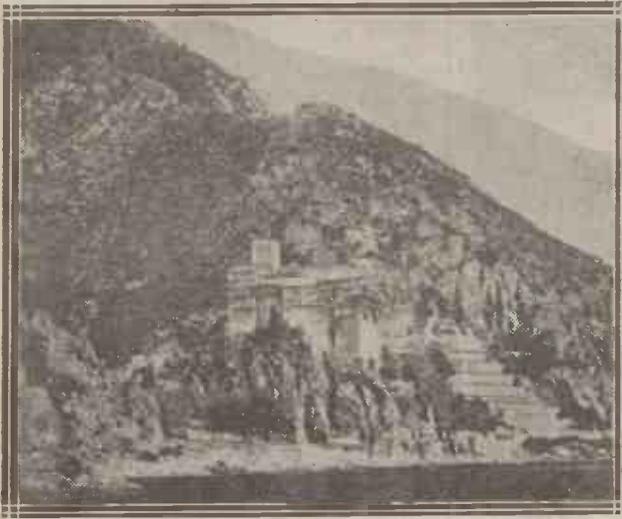
Those who possess a set of spanners for B.A. nuts will probably have found that owing to the inaccurate stamping of the spanners they will not accurately fit the size of nut for which they are intended. A simple method of overcoming this defect is shown in the accompanying diagram. A file cut is made as shown along half the length



Fig. 1.—A thin flat file should be used for making the cut in the spanner.

of the flats only. By doing this the original dimensions of the spanner are retained for odd-sized nuts and the file cut enables one to use the same spanner head for the nut which it should fit. By doing this to a whole set of B.A. spanners quite a useful range of sizes are made and a set prepared in this way should suit almost any nut up to a given size. A thin flat file should be used for making the cuts in the spanners.

F. O. R. D.



Reception Conditions in the North-Western Area

By Captain E. A. ANSON

The investigation of the sector on the north-west of 2LO is now complete and reveals a very well-served area.

Those readers who were operators during the war may remember that Mount Athos was responsible for some extraordinary radio shadow effects in the Aegean Sea. It is a good example of the effect sometimes exerted by abrupt hills.

STRONG, robust signals are predominant throughout this area. Crystal users are able to receive 2LO at distances greater than normal, whilst valve users are chiefly concerned as to methods for cutting out the local station. Not only does 2LO come in well throughout the area, but as London becomes more distant, so Daventry becomes nearer and louder. Truly this district is particularly well served, and, judging from the large number of aerials (every cottage has one), it must be a paradise for crystal sets.

A Bad Area to Come?

It is with great pleasure that one sees the .02 and .04 lines off the map, and they are left to wander about beyond the 50-mile radius, until at Bedford the .04 unhappily returns, to be followed shortly by the .02 near St. Neots, where a reading of .019 was obtained. When a contour line is seen to make an excursion like this, it is naturally good for listeners, as signals are reaching out well. How-

springy give in them that is seen to the best advantage when someone tries to walk through the counterpoise.

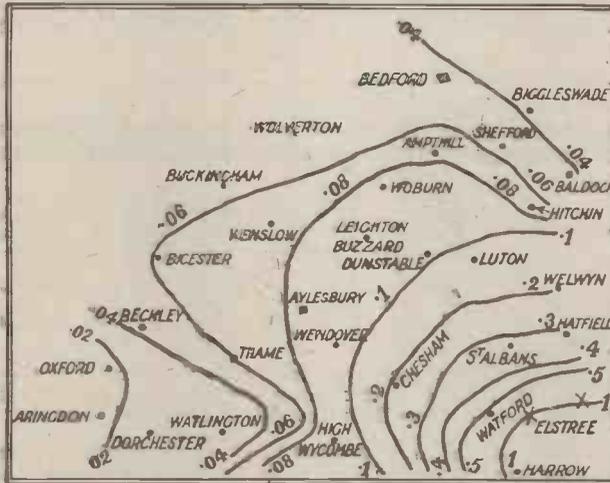
The Moullin and valve receiver are fitted into a rough wooden case some 2 ft. 6 in. by 1 ft. 6 in.; it weighs quite a lot when carried a few hundred yards! The valves themselves are transported in their own cardboard boxes filled with cotton wool wrapped in felt and placed in ex-Army haversacks.

Low-resistance Brown 'phones and transformer are used to indicate that nothing has gone wrong and that the measurement is being made on 2LO and not on some local oscillator. Tuning, of course, is done by watching the Moullin voltmeter.

Effect of Hills

The country up to about 20 miles is fairly level, and unbroken by any predominating features that might affect signals from 2LO. Beyond this distance there is a distinct ridge of chalky hills running in a north-easterly direction, roughly, from Wycombe to Hitchin. Once past these hills the country once again becomes flat right up to the 50-mile radius, beyond which no measurements were taken. This block of higher ground does seem to have an effect on signal strength; after an area of poorer reception around High Wycombe the .1 contour line fails to extend beyond these hills, and does not reach out in sympathy with its next neighbour, the .08 line. If someone suddenly removed these hills it might be expected that the .1 line would reach out further.

Whilst there is certainly an area of comparatively low reception near High Wycombe, this neighbourhood is much better off than further south, round Camberley and Haslemere, where good results require receivers out of all proportion to distance. For instance, at Camberley a crystal cannot be said to be at all satisfactory; it is possible to hear 2LO faintly on a crystal, but it is not a pleasure, being somewhat of a strain.



The only poor region in this area is around High Wycombe and Watlington.

ever, it is significant to see the contours closing in to the north, and it would appear to show that the next area will not be so good.

Further Practical Details

The masts used in these experiments are 20 ft. high. Each consists of four socketed steel tubes, and were obtained very cheaply from Leslie Dixon & Co. Three tent pegs support each mast, and the erection, measurement, and dismantling take about half an hour all told. The aerial insulators were really intended to do duty as rubber door-springs. They are excellent for portable work, as they do not break, and there is a delightful

A Letter from Austria

GENTLEMEN,—Please kindly to take notice for your column, "Short Wave Notes and News," that Austrian amateurs are now assembled in the Trial-Transmitter Union, the Oesterreichischer Versuchs Sender Verband, Honorary Praesident Professor Dr. Reithofer, of the Vienna Technical High School, Praesident Ing. Col. Anderle.

The intermediate ö (oe) - - - followed from two call-signs is used. A special amateur transmitter's law is prepared and shall be issued soon.

At first most transmitter are of the small power type, input not exceeding 4 watts. Greater stations up to 20 watt input are Ö WA, Ö HU; Ö GP; Ö HL; Ö AA; they are working on the 40 and on the 80 m. band.

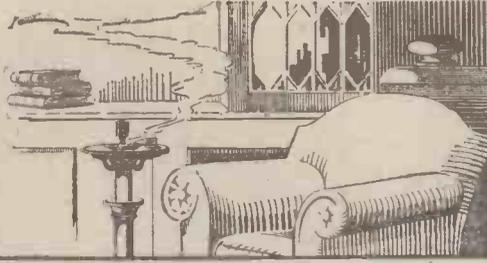
Amateur transmission in the Alps offers many interesting problems, and the union shall be glad to arrange schedules for British amateurs.

All communications addressed to: Schriftführer des oesterreichischen Versuchs-Sender Verbandes, Herr E. Wettendorfer, Austria, Wien, XVII, Veronikagasse 36.—Yours truly,

E. WETTENDORFER,
Secretary, De W.M.

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.

Oscillating Crystal

I have managed to find a little time lately to experiment with this again. It certainly is very curious to get a crystal oscillating, and there is no doubt it does oscillate, for the thing howls nobly like a one-valve set in certain positions. I have not so far noticed very much amplification as a result of the oscillation, except just at moments, when it seemed also to distort.

It requires great patience, as you can never be quite sure what adjustment will not put the crystal out of oscillation, and it takes a lot of painstaking manipulation to get it back again. On the other hand, sometimes, if you get a good point on the oscillating zincite, it will remain ready to oscillate from one day to another, or even longer, provided the set is not jarred. The apparatus is complicated, but not expensive, and the experi-

ments are quite interesting to make, but have practically to be limited to a place where normal crystal reception is fairly loud.

Using the Mains

I was shown an extraordinarily simple plan for using high tension from house-lighting D.C. mains the other day. The current was carried through a lamp in each pole, thus making anything in the nature of a dangerous short circuit impossible, and was then divided up potentiometer-fashion by a low conductivity strip—a slate pencil in this instance. From this potentials up to the maximum could be tapped off simply by connecting at different points.

H.T. Accumulators

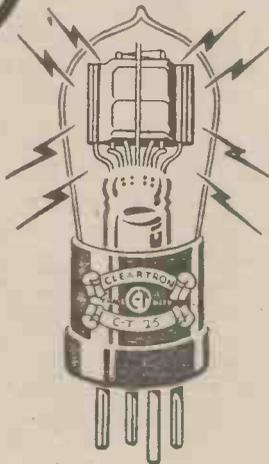
These small accumulators for high-tension supply are getting better and cheaper every month, but even so I expect their first cost will be a deter-

rent to most users. I fancy that in about a year's time the use of both filament current and H.T. from the lighting mains will be almost universal except in isolated places, and that the dry battery will have almost disappeared.

Mechanical Strength

I recollect very well in the early days of electrical engineering that it used to be one of our most constant gibes that dynamos were only held together with sealing-wax and string, and it really was more or less true of early apparatus. I recollect one armature in particular in which, after it had flown to pieces, calculation disclosed that three wood screws were carrying a pull of about a ton and a half. Gradually the elements of mechanics were absorbed by electricians, and electrical apparatus began to have the necessary mechanical strength.

The same development may now be seen taking place in wireless. Coils which were flimsy have been strengthened and protected; rheostats are not quite as gimcrack as they were, though still bad; and switches are now able to stand being operated more than half a dozen times without coming unstuck. In coil holders this development has been rather arrested, as very few of these are a mechanical job, but terminals, fixed condensers, and all the rest of the components of a set are continually improving in this respect.



ELECTRONS

The Life of the Valve

The unusual electronic emission from the filament of this valve is responsible for its remarkable efficiency and utility. But to give you this efficiency the electron flow must be thoroughly constant and generous.

Not only is the CLEARTRON-built anode efficient but it brings a 40 to 60 per cent. increase in electronic emission. A unique theory—protected by patents pending—develops a specially constructed path which yields greater and more even electron output. That is why CLEARTRON valves bring greater distance and increased volume.

Full technical data of all types obtainable from your dealer or from

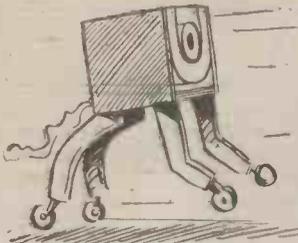
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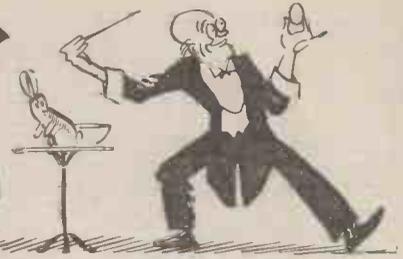
BRITISH



MADE



JOTTINGS BY THE WAY BY "WIRELESS WAYFARER"



Read this interesting article and see how "Wireless Wayfarer" in conjunction with Professor Goop have "solved" the high-tension problem!



I OFTEN call round in the evening to see my old friend Professor Goop at his jolly little house "The Microfarads," which is situated in one of the pleasantest parts of Little Puddleton, being roughly at the mid-point of a triangle formed by the glue factory, the sewage farm and the gas-works. The Professor is, as probably even the newest of new readers has realised, the world's record inventor. He makes a rule of inventing something every single day, even if it is only an excuse to Mrs. Goop for his late return home when he has been spending an evening at the Little Puddleton wireless club or in the den of one of its distinguished members.

A Blessing to Laundries

On the occasion of which I am writing I found the Professor just completing his designs for his button cracking machine, a device which will perform mechanically the work that is now done laboriously by hand in laundries, thus lightening the labours of conscientious toilers at mangle, wash-tub and ironing board. He prophesies that when he has perfected the collar fraying machine, the shirt render and the sock shrinker that he has in mind a single hand (by which of course I mean the two hands of a single hand, if you understand) will suffice for the entire running of even those laundries most addicted to frightfulness.

Proof Positive

He demonstrated the powers of his button-cracking machine by inserting in it half a dozen control knobs which he removed from a receiving set that Poddleby had lent him. As a result of this demonstration I can assure you that the machine is completely efficient, and I am sure that Poddleby will endorse my verdict when he has seen his set.

A Ponderous Problem

"And what," asked the Professor, as we sat a little later smoking in the

garden, "what do you consider the weightiest problem in wireless today?" "The accumulator," I replied without hesitation. "I carried mine home yesterday with the thermometer at about eighty-six in the shade, at least it would have been, only there was not any shade, and before I had finished it weighed rather over half a ton. All the world records for weight carrying went by the board." "No, no," said the Professor, kindly. "Perhaps I was not very fortunate in my choice of words. I should have said the most important problem."



... Even if it is only an excuse for his late return home ...

... What do you consider the weightiest problem in wireless to-day ...

Vital Matters

This made me think a bit. You see there are so many problems; finding the square root of .0003, and how to reach the aerial pulley when the halliard slips through your fingers, how to make fellows at the club believe you when you tell them that you heard WGY on a crystal, and how to convince the fellow from whom you try to borrow a valve that he has some chance of seeing it back again, and what to say when the announcer of the station that you have just told an admiring audience is Johannesburg, says "2LO Calling!" before you can switch off. I was still thinking hard when the Professor, remarking that this unaccustomed exercise seemed to be telling severely upon me, obligingly supplied the answer himself.

An Abolitionist

"The most pressing problem at the present time in wireless reception," said he, "is that of the high-tension supply. How do your high-tension batteries behave?" "Only yesterday," I groaned, "mine came out all

over spots; then it began to bubble at me, and when it was tired of doing that it blew up." "Exactly," beamed the Professor. "The things are a perfect pest. I have decided that you and I together shall find a means of abolishing the high-tension battery so that all may be peace in the households of good and true wireless men." "But," I protested, "some other fellows abolished the high-tension battery years ago, and it still goes on existing; these things die hard." "When I abolish a thing it is abolished," shouted the Professor, bringing down

his fist with a thump on the table in order to emphasise his point. It was unfortunate that my new hat should have been reposing at the point of impact. Gazing ruefully at the wreckage I was forced to admit that his was no idle boast.

We Make a Start

Being, as you know, men of action, we plunged at once into the work to which we hands.

Professor was not long in finding an avenue through which we might profitably explore, after the manner of all the best politicians. There was, he explained, an enormous amount of energy always running to waste in the ether. Atmospherics were continually occurring, and nobody yet had thought of harnessing them for useful purposes. Why should we not devise an atmospheric trap for catching them and bottle them when caught so that they might be released as and when required for a spot of work?

Forestalled!

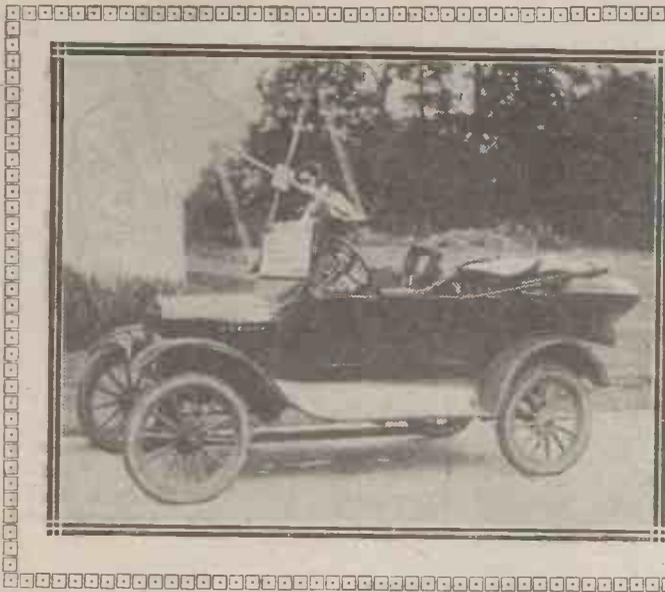
We were both rather intrigued by this suggestion to begin with, though the design of a suitable trap and of an efficient bottling apparatus appeared to offer certain difficulties. And then an insuperable objection occurred to me. "Professor," I said, "All of the inventions that we have given to the world between us so far have been completely original. I am afraid that this present idea of yours

(Continued on next page.)

WIRELESS AND CRIME

By NETLEY LUCAS

Whether wireless does or does not make the criminal's lot a harder one is a point which is sometimes argued, but there can be no question that it has been responsible for many extraordinary and sometimes thrilling episodes.



THE criminal of to-day views the advance in wireless telegraphy and broadcasting with mixed feelings. In speaking of the criminal I refer to the professional "Raffles" who makes crime his living and who takes into consideration every scientific appliance which may be used either in his interests or against him.

When it Helps

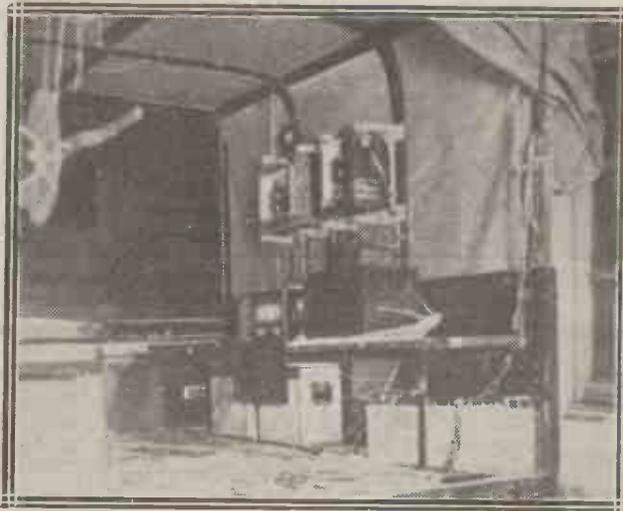
Let us consider first of all in what way wireless can be regarded as an asset to the criminal for the furtherance of his nefarious projects. That it is a quick means of communication between crooks is a foregone conclusion, but the cable and telegraph is equally useful in this respect.

The only other way in which wireless becomes an asset and a source of income to the crook is to the confidence trickster who hoaxes wireless enthusiasts by selling wireless equipment for a firm which does not exist by door-to-door canvassing and the burglar who poses as a Post Office official and gains entrance to houses to inspect a "set," his real object being to spy out the "lay of the land" for his proposed burglary.

As a Deterrent

That wireless and broadcasting is a deterrent to crime is an undeniable fact. The various Police Forces of the world are all linked up by wireless communication since the International Police Conference held in America in 1923, when the Police Chiefs of some 18 countries drew up a scheme for co-operation in the tracking down of international crooks.

In America to-day many of the larger City Police Departments have their own private radio station by which they are able to keep in constant touch with one another, New York, Chicago and Philadelphia being connected by wireless telephony as well as the old system of long-distance telephones.



Scotland Yard have made full use of wireless communication, and this picture shows the apparatus inside one of the specially equipped vans.

A Famous Case

The wireless is, of course, especially helpful to the Police in tracing criminals at sea who are fleeing from justice to pastures new, either to spend their ill-gotten gains or to hide from the long arm of the Law only, as in the case of a murderer.

There are innumerable cases when murderers and crooks have been located at sea and arrested on wireless instructions from the Police.

The case of Crippen on board the "Montrose" is too hackneyed a case in point to bear description.

Since the inauguration of the B.B.C., Scotland Yard has on several occasions broadcast descriptions of missing persons and requests to witnesses of some incident, crime or accident to attend their nearest Police Station. Although it has not yet been necessary, Scotland Yard would not be slow in broadcasting the description of a wanted man if the circumstances warranted it.

The Boot-legger

It is the criminal who generally takes the lead over the Police in utilising Science, and, as I have already said, a large number of crooks communicate with each other by wireless.

In America most of the large bootlegging and whisky-running rings have their own secret wireless stations by means of which they communicate with whisky-running craft in that mysterious bourne and liquor market known as "Rum Row." The American Prohibition Authorities have on several occasions located liquor caches and the headquarters of liquor combines by means of Wireless Direction Finders.

An Escape

I know of a recent case where a notorious American criminal fleeing from the U.S. with a valuable haul of jewellery narrowly escaped arrest at Southampton by means of the ships' wireless.

Three days out from New York he received a marconigram in code to the effect that his arrest on arrival at Southampton was imminent. This timely warning enabled the crook to

(Continued on page 248.)



SHORT-WAVE

Notes & News



SINCE the writer commented upon the "quiet atmosphere" prevailing upon the 20-metre wave-band, several letters have reached him describ-

ing some very good reception feats, and all expressing the wish that more transmitters would go down a step and work on 23 instead of 45 metres, thereby relieving the congestion on the latter band.

The 20-metre wave is, apparently, not quite so much of a "daylight band" as it was at first believed to be; American amateurs can be heard all through the night, the best times at present being about 11 p.m. and 5 a.m.

Co-operation Wanted

Mr. F. N. Baskerville, of Hale, Cheshire, has made some interesting observations on the subject, and offers to co-operate with any transmitters who wish to conduct tests below 30 metres. He finds the 10-30-metre band entirely free of static, fading, and local interference. Why not go down below and remedy these deficiencies? Mr. Baskerville's full address is 9, Arthog Drive, Hale, Cheshire.

Piracy

We have received a letter from a gentleman who states that he is transmitting with a call-sign consisting of a figure followed by the letters "CQ." We have always understood that the G.P.O. did not issue the call-signs 2CQ, 5CQ and 6CQ, and this supposition is apparently correct, as the gentleman in question wishes QSLs to be sent to an address which consists of a Monomark only!

A Remedy?

With reference to illicit transmissions, the T. and R. section of the R.S.G.B. have recently been laying stress on the fact that "pirates" lower the prestige of the whole amateur transmitting fraternity, and that

Intermediates

We are printing on these pages a new and revised list of "Intermediates," those in brackets being only in unofficial use at the present time.

Austria

The Austrian transmitters now seem to be showing distinct signs of life, and may be heard working on both the 40-metre and 80-metre bands. A letter from the operator of OE-WM will be found in another part of this issue.

South America

The condition that the South American stations shall be at their best when no United States stations can be heard seems quite general now, and by no means a freak. No explanation has yet been suggested for it. Perhaps some of our readers will oblige? There are now about thirty-five Brazilian stations operating regularly with sufficient power to be heard in this country.

Australasia

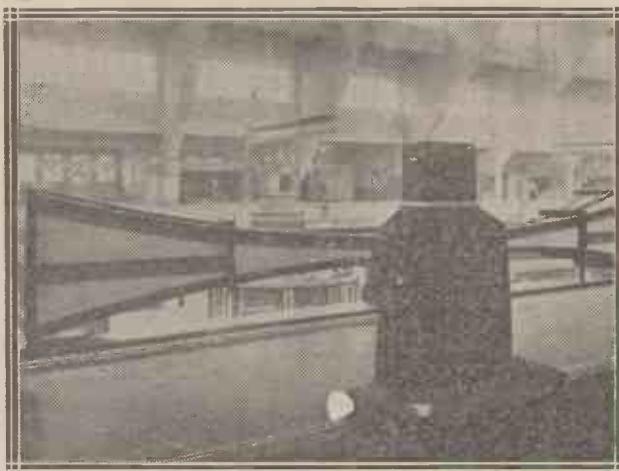
On the other hand, there seems to be no connection between Australia and New Zealand in this way. Sometimes only the "As" are to be heard, and sometimes only the "Zs," but they seem to be quite independent of one another, both coming in equally well on occasions.

Low Power Work

Mr. R. J. Drudge-Coates (Y-DCR) has been carrying out some further experiments in reception, and has put up several fine records, including the reception of

K-W3 (Germany) when the latter was using *one watt*. He has also worked S-2NX when the Finnish station was using only six watts.

THE LARGEST IN THE WORLD?



This giant loud-speaker was built by Messrs. Siemens for use at a German wireless exhibition.

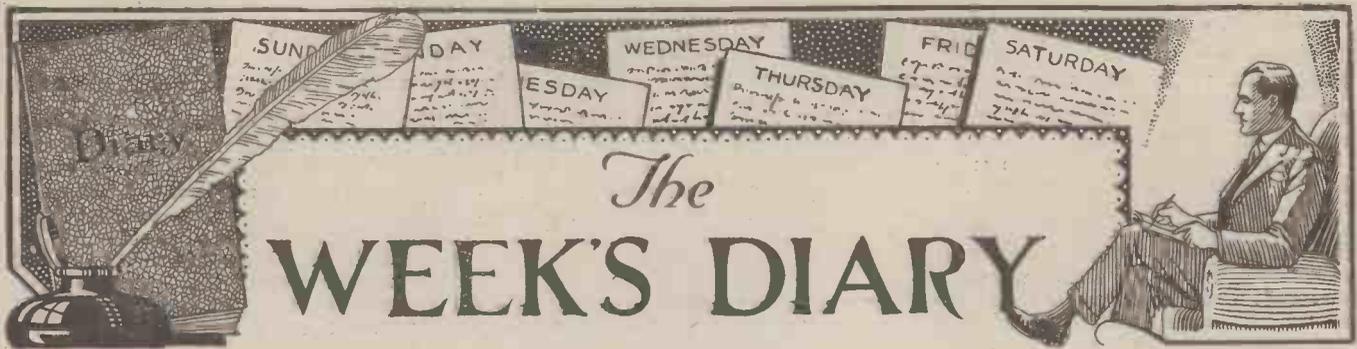
no licensed transmitter should reply to a call from one of these "pirates." This certainly would seem to be the only way of stamping them out, but, of course, when the offender descends

- A: Australia.
- AI: (Tripoli, Africa).
- AU: (Alaska).
- B: Belgium.
- BE: Bermuda.
- BO: (Bolivia).
- BZ: Brazil.
- C: Canada.
- CH: Chile.
- CO: (Colombia).
- CR: (Costa Rica).
- CS: Czecho-Slovakia.
- CZ: (Canal Zone, Panama).
- D: Denmark.
- E: Spain.
- EG: (Egypt).
- F: France.
- FI: French Indo-China.

- G: Great Britain.
- GI: Northern Ireland.
- GW: Irish Free State.
- H: Switzerland.
- HU: Hawaii.
- I: Italy.
- IC: (Iceland).
- J: Japan.
- K: Germany.
- KY: (Kenya Colony).
- L: Luxembourg.
- LA: Norway.
- M: Mexico.
- MF: (Morocco).
- N: Holland.
- O: South Africa.
- OE: Austria.
- P: Portugal and Madeira.

- PE: (Palestine).
- PI: Philippine Islands.
- PR: Porto Rico.
- Q: Cuba.
- R: Argentine and (Russia).
- S: Finland.
- SM: Sweden.
- SR: (Salvador).
- SS: Straits Settlements.
- T: (Poland).
- TJ: Trans-Jordania.
- TU: (Tunis).
- U: United States.
- W: (Hungary).
- X: Portable stations.
- Y: (Uruguay) and India.
- YS: Yugo-Slavin.
- Z: New Zealand.

to using the call of a licensed station to cover the fact that he is a "pirate," the matter becomes more difficult.



The WEEK'S DIARY

NOW that an agreement has been entered into between the Egyptian Government and the Marconi Company for a broadcast service, we may shortly see the bazaars of Alexandria and Cairo exhibiting their loud-speakers in great variety. As one who lived in Egypt for some time in pre-war days, I know how keenly the natives take to any form of what they term "mechanical music," for gramophones and records have an enormous sale in all Mohammedan countries. The natives seem to delight in the most raucous and strident instrument and almost invariably play records at a very much higher speed than that at which they were designed to run. The combined effect of high-speed records and inferior machines played with worn-out needles, is too horrible to describe. You cannot "play" a wireless installation too fast, but you can certainly over-amplify and distort it.

WHILE portable receivers do not yet appear to have achieved the popularity their merits deserve, it is interesting to note that many more portable sets are in use this year than last. Further, there seems to be an increasing demand for what may be called "semi-portable" sets — receivers designed not to carry from one place to another as a regular event, but which can be rapidly moved from one room to another or taken out into the garden without the inconvenience of separate batteries with trailing wires.

THE other Sunday I drove to a well-known watering-place on the South Coast, and dropping in to tea at a charming bungalow, found music proceeding from the eaves of the building, from which on inspection I found a loud-speaker suspended. The music, I may say, was of rather a doleful character, and was succeeded by a Shakespearean recital. Most people seemed to ignore the "Wireless" entirely, but I noticed one party

listening carefully to everything proceeding from the horn. "Here," I thought, "we have some real Shakespeare enthusiasts!" Not so! They were really listening to see whether the signals came from London or from Bournemouth!

THE Editors, who tell me that the Cartoonists competitions are still as popular as ever, have given me a few tips on the subject so that I may

attention was paid to one of those three points!"

INHABITANTS of Elstree and Boreham Wood (near which lie the Wireless Laboratories) are becoming accustomed to hearing wireless terms. Two or three times a week large parties of visitors descend upon the village of Boreham Wood and raid the local tobacconist on their way to hear the "Elstree Six." The Laboratories, by the way, are quite close to the Elstree railway station, but actually are nearer to the village of Boreham Wood than Elstree itself. Other activities in the neighbourhood include the erection of huge studios for a new film-producing company, which hopes to rival Los Angeles in the near future.

I OFTEN wonder what radjo receivers would be like if the "reflex" scheme could be developed so as to give really practical amplification, both high and low frequency, on several valves. Think what wonderful results would be obtainable with a two-valve and crystal combination reflexed so as to give two stages of high frequency and two stages of low! There have been several attempts in the past, but the results have invariably been disappointing.



Have you heard 2RN? This photograph shows the power plant at the Dublin station, which is often heard in this country under favourable conditions.

pass them on to readers. Let me tell you what happened. I walked into the room where the staff were busy sorting out entries, and on one side I found a deep pile of "rejects."

"You see that pile over there?" said Mr. Harris, who was supervising the sorting. "Those are the entries sifted out at the very beginning of the judging for three reasons. Every entrant included in that heap has the drawing wrong, a word which does not rhyme, or far too many syllables in his last line. Tell readers of WIRELESS who enter for the competition that there are hundreds of really excellent entries which would stand good chances of winning prizes if only

I SEE that Mr. Basil Macdonald Hastings has been holding forth in the *Evening Standard* on the defects (to him) of the broadcasting programme. Much that he writes is amusing, some sarcastic, and some quite frankly—at least, in my humble opinion—wrong. For example, he apparently thinks that wishing "a happy birthday" to "a number of real children who are supposed to be listening in" is a rather silly effort. I do not agree with him. The letter bags of the B.B.C. are crowded with requests for birthday announcements, and thousands of children get quite excited, days before, in anticipation

(Continued on next page.)

The Week's Diary—continued

of their names being called out among several hundred others.

I do, however, agree with the critic in his remarks about the unsuitability of some of the matters thought to be amusing to children. Young folks of every generation have always resented patronage, from whatever source it comes, and not all of the uncles and aunts have that sympathy with children which makes for a successful children's hour.

* * *

I REALLY think the musicians who, by taking up the position that they should be paid an extra fee for concerts when broadcast, have prevented the broadcasting of the Hallé Concerts next season are very short-sighted in their attitude. Anything which popularises good music is distinctly good for musicians of all grades. The sale of gramophone records has never been so large in the history of the art as at the present time, and much of the success has been due to the popularising of tunes by broadcasting. Contrast, for example, the present ease of selecting dance music now that we all hear so many tunes, with the difficulties of the old days when the titles meant nothing to us.

* * *

MR. HARRY DAY'S question to the Postmaster - General "whether, in view of the oscillation annoyance experienced by wireless listeners he would consider action to prohibit reaction on the aerial," was not framed in a fashion to effect much good. In any case, if the Postmaster-General contemplated taking steps to abate the oscillation nuisance by issuing new regulations (a perfectly ridiculous procedure in my opinion) the point to be aimed at should be the prohibition of radiating receivers, and not the framing of a regulation of so narrow a scope as that suggested. For example, any expert could produce a dozen different circuits, none of which use reaction on the aerial, which can make themselves intolerable nuisances for miles around.

In America, where receiver radiation is now practically unknown, and where I have reason to believe that listeners are no less selfish than here, the cure of the trouble has been the production of really good designs which give efficiency of reception both in selectivity and sensitivity without the use of any direct reaction at all. Professor Hazeltine's neutrodyne circuits the Rice neutralising arrangements and others of a like nature, give all the selectivity and the sensitivity that the average amateur requires while being completely non-radiating.

TALK about "educating the listener" to the proper use of reaction is so much waste of breath. So long as practically every commercial wireless receiver sold in the country can be made to radiate, just so



"Wave-Trap" recently remarked on the absence this year of that usual hardy perennial, the wireless set "no bigger than a watch": here is something perilously like it from Germany. It is a combined pocket gramophone and wireless set.

long will howling persist, for the temptation to use a set on the very edge of reaction where much greater amplification is obtained is too great for human nature to resist.

TO CRYSTAL USERS.

Why not build an amplifier and let all the family hear with a loud-speaker? MAKE SURE of getting the next issue of "Wireless" which will be a very special number containing three complete designs for low-frequency amplifiers which can be attached to ANY set, commercial or home-made.

The home constructor, knowing much more about the apparatus he uses, and following all the latest developments in the technical papers, is probably a far milder sinner than he who buys a ready-made set, and

the production of numerous designs for his benefit, giving high efficiency without radiation, is doing a great deal to improve matters. The astounding success of the "Elstree Six," and other recent Radio Press circuits, is proof that the home constructor knows what he wants in this direction and is prepared to build it even when it means the scrapping of his existing set to do so.

* * *

TOGETHER with many other of the members of the Radio Press staff I listened on Monday evening, the 28th, to the very interesting test conducted by 2LO after the conclusion of the usual evening programme in sending out two different programmes on wavelengths nearly 100 metres apart. Seven miles away a good modern crystal set succeeded in separating the stations not only easily but with a silent gap between the two readings. The addition of amplifiers to the crystal set for the purpose of accentuating, if anything, the interference that might exist showed that even with three stages there was a completely silent space between the two transmissions. Valve sets, of course, being far more selective than crystal sets when properly designed, gave far better results. A detailed report of a number of these experiments will be found on another page.

* * *

GREAT as have been the improvements in wireless transmitting apparatus during the last year, the engineers are still faced with one problem which crops up regularly at the broadcasting of public dinners and other functions. I refer to the difficulty of making the speakers address the microphone as well as the audience. Have you noticed that after the announcer in the studio has directed the attentions of the listeners to the coming event, the first words of a speech or even of the announcement by the toast master are very often faint, and grow in volume as the amplifiers are brought into play? (I do not refer to the ordinary "fading-in" effect which is adopted when the Savoy Bands broadcast.) Even if the microphone is many feet away from the speaker, the use of amplifiers can bring up the strength sufficiently to give moderately good broadcast reproduction, but it must not be forgotten that amplifiers so used cannot compensate for the loss of the good effect of a nearby microphone. I take it that in no case is a speaker at a public dinner broadcast without his being notified beforehand. When such a reminder is given, could not arrangements be made at the same time to avoid loss of distinctness which sometimes comes from a wrong placing of the instrument?

WAVE-TRAP.



GIVE US MORE HIGH-POWER STATIONS!

A Plea for Real Alternative Programmes

By "AVERAGE LISTENER"

The experimenter's family know from bitter experience that although his new set will quite likely bring in lots of distant stations, including foreigners and sometimes even Americans, yet they will *not* hear anything like a whole evening of perfectly received transmission, because of the frequent intervals of interruption by morse, fading of the signals, and so on. Probably they take a rather black view of the possibilities, but it must be admitted that there is really no set which is capable of giving a proper alternative programme at any desired moment with *absolute certainty*.

The Difficulty

The trouble is that, no matter how good the set may be, there are times when the strength of the desired signals is below that of the general noises, interference, atmospherics, and so on coming in on the same wavelength, and in a situation like this the would-be listener is quite helpless. This kind of thing, of course, occurs at intervals with many even quite strong transmissions, because they fade and periodically go down below the general noise level, whereupon even the most powerful set must lose them.

The Fascination of DX

All this, of course, does not affect distant reception as a fascinating pastime, for such it is, because one can still receive enough of almost any distant transmission that comes in at all to identify it and to take an interest in it. Provided that the set is a good one, there will be quite long periods of perfectly uninterrupted reception, but the trouble comes when one tries to provide an alternative programme on those evenings when the local station is carrying out a transmission which does not appeal to the family. On these occasions any interruptions by morse, atmospherics, or fading will not be tolerated, and one begins to realise that the only

How can one get real alternative programmes under the present conditions?
Can it be done by building a new and ultra-sensitive receiver?

real alternative programme available is that of the high-power station.

5XX Insufficient

In this, again, there is a difficulty, because so often the high-power station in these days is simply relaying the programme of one of the other main stations (usually 2LO), and it is possible that an alternative may thus not be available from here.

The provision of alternative programmes is probably fully accepted in all quarters at the present time as being one of the most essential conditions for the success of broadcasting

shall be able to achieve this desirable end. So far as present knowledge indicates, it is not a question of the design of more and more sensitive sets, because of that factor of noise level which has been mentioned. At the present time, the only way to get that desirable alternative programme is to increase the power of the transmitting stations, to raise their voices, so to speak, above the level of the general noise. It would then be possible with relatively simple sets to get uninterrupted reception and an easy choice of programmes by the mere turning of few dials without anything really critical in the way of adjustment.

A Great Step Forward

It is difficult to underestimate the enormous boon it would be to the listening public to be able to select good, clear, uninterrupted transmission without any difficulty of manipulation and without the necessity of very elaborate sets. By far the greater part of the present dissatisfaction with certain aspects of the programme would automatically disappear, and we should hear no more of those grumbles such as "I can't stand this highbrow stuff," "I am sick of all this jazz," and so on.

Put Up the Power!

What we want, then, is an increase in the power of all main stations to such a value that they shall come through the general noise at good strength on even simple sets, and it is difficult to see what really valid reasons there are in the way of such a change. The expense to the B.B.C. would not be great, and it would to a large extent be offset by the fact that a great number of the present small relay stations which are encumbering the ether with their feeble transmissions could be scrapped.

(Continued on page 244.)



To provide alternative programmes it would not be necessary to build stations on such an elaborate scale as Daventry.

as an entertainment, solving as it does, to a large extent, the problem of pleasing simultaneously the different sections of the listening public. A real alternative programme, then, can be granted as an essential from the entertainment point of view, although it does not affect the fascination of distant reception as a hobby, to enjoy which it is not necessary to be able to guarantee excellent and uninterrupted reception for hours on end.

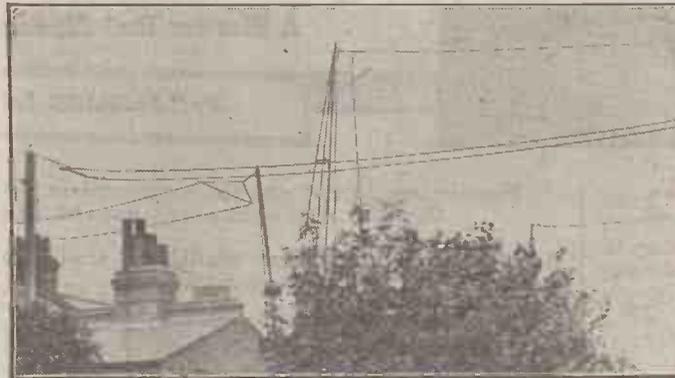
The Solution

It is interesting to consider the obstacles still in our way before we

NEED THEY BE UNSIGHTLY?

Some Simply Effected Improvements in Your Aerial

By REGINALD GEORGE



IT seems probable that not less than 90 per cent. of wireless aerials are supported, at any rate at one end, by means of some sort of mast, and a journey on the railway past the backs of suburban houses suggests that almost the same high proportion of the masts are of the scaffold-pole type.

Why Not?

The most enthusiastic wireless "fan" would not attempt to contend that a scaffold pole in its natural state improves the landscape, and most possessors of such poles would no doubt be ready enough to replace them by neatly finished flag masts if only the expense were not so great. Yet it is really a very simple matter to effect such improvements in the appearance of the scaffold pole that it can easily be mistaken, at quite a short distance, for the more expensive ship's mast; and the following hints will, it is hoped, tempt many to endeavour to make some improvement.

The Cap

It is astonishing what a big improvement is effected by the simple device of affixing a cap to the top of the pole. To cut a circular disc of wood with a diameter rather less than twice that of the top of the pole is not a very difficult matter, and even those who have not the tools or the ability to execute such a piece of work can buy for a few coppers one or a pair of the wooden discs which are sold for use as wheels on children's engines, wagons and other toys. The disc or wheel should be screwed centrally on the top of the pole, and, as already stated, the effect of this simple addition is really remarkable.

Painting

A further immense improvement in the appearance of the pole is effected by painting it. The procedure is as follows. First strip the pole of all bark. Then plane it, but take care not to ruin the plane iron by jabbing it hard against the knots which seem to abound in scaffold poles. A good way of dealing with knots is to run the edge of a chopping axe along the pole. The axe edge is not so delicate as the plane-iron edge.

taking pains to fill up all the cracks which were missed in the puttying process, and finally give the pole a coat of colour. The colour recommended is white or green. The labour expended in thus treating the pole will be considerable, but, if the work is thoroughly done, will be amply repaid by results.

Securing the Pole

An excellent way to secure the pole in an upright position without the use of stay wires is to bolt its base between two baulks of timber sunk firmly into the ground. In the figure, which shows the suggested arrangement, the aerial is supposed to be running through the paper either directly towards or directly away from the reader. Two baulks of timber, measuring about 6 in. x 2 in. and about 6 feet long are sunk 3 feet into the ground at such a distance apart that the space between their inner surfaces is some $\frac{1}{2}$ in. greater than the diameter of the pole at the base.

Use of Concrete

The nature of the sub-soil will decide whether it is necessary to bed the baulks in concrete. It is essential that they should be rigid, and it is better to bed them in concrete unnecessarily rather than to take the risk of their shifting during a gale. If they are concreted in, it will probably be sufficient to sink them about 2 ft.

If they are not cemented in, a good plan is to screw horizontally on to their edges on the side towards the aerial another length of 6-in. by 2-in. timber. This should be of a fair length, and screwed in such a position that its top is just below the surface when the baulks are erected. This board will offer a good resistance against the pull on the upright baulks. When ramming back the earth which has been excavated, it is well to remember that the ramming should be at least as hard at the bottom of the cavity as at the surface.

Attaching the Pole

Three holes are drilled right through the baulks and the pole, and three bolts inserted and the nuts tightened up. The size of the bolts and nuts desirable will depend upon the size of the pole and of the aerial which it is

(Continued on page 238.)

Filling Cracks

The next is a tedious task, but well worth while. Go along the pole filling in with putty all the bigger cracks

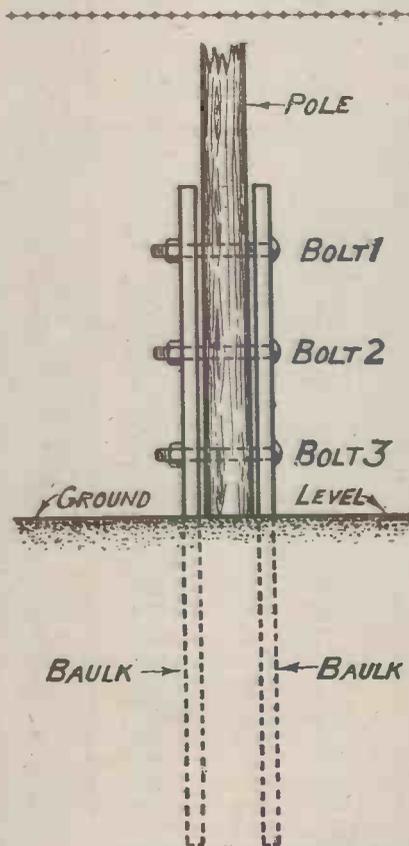


Fig. 1.—An excellent way to secure the pole in an upright position without the use of stay wires is to bolt its base between two baulks of timber sunk firmly into the ground.

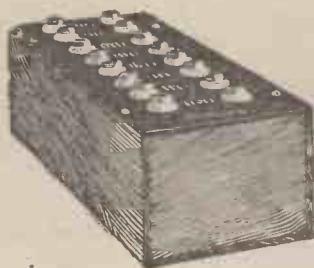
and as many of the smaller ones as patience permits. Then give the pole and cap a good coat of white lead,

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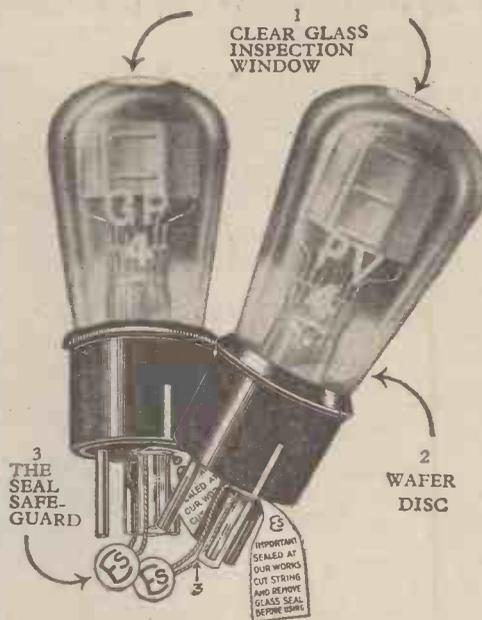
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THE EDISON SWAN ELECTRIC CO. LTD

NEED THEY BE UNSIGHTLY?

(Continued from page 236)

intended to support, but here again it is wise to use bolts which are unnecessarily large rather than flimsy bolts which may fail to stand the strain.

Two Methods

Before drilling the holes for the bolts it should be decided which of the two following alternative methods is to be adopted. In the first, the pole is allowed to stand on the ground; in the second, the pole stands on a block of wood about 4 in. thick inserted between the baulks. The first method possibly gives greater rigidity and security, but the second offers two advantages.

One is that when it is desired to lower the pole all that is necessary is to knock out the 4-in. block from under the pole, remove two of the bolts, and to utilise the third bolt as a pivot on which to swing the pole down. The other is that the moisture in the ground will rot the block rather than the pole, and the block is easily and cheaply replaceable.

The Advantages

In both methods the weight of the pole when in position bears on the ground and is not carried by the bolts—and this is a very desirable feature.

If the baulks, after having their edges bevelled off, are painted to match the pole, the job will look well, while the absence of stay wires, which are apt to be unsightly, not only improves the general appearance of the mast, but also enables the fullest advantage to be taken of the available length.

Securing the Aerial

The rope or wire which is attached to the aerial and passed through the pulley is usually fastened off by a fixed connection on the pole. In wet weather, when the rope shrinks, a greater strain is thrown on both the rope and the aerial. Similarly, when a gale of wind sways the aerial, the strain may be sufficient to break either the aerial wires or the rope. On the other hand, in dry weather, the rope stretches and the aerial has a tendency to sag, with a consequent loss in efficiency.

A Better Method

Instead of fastening the rope off, a weight should be suspended from it so that it hangs a few feet from the ground.

The strain on the aerial will then be constant, and will be equal to the weight used. When the rope contracts, the weight will rise, and when the rope stretches, the weight will fall. The amount of weight to be used will

depend upon the degrees of tautness desired for the aerial and the total weight of the aerial, including the weights of the spreaders (if any), of the insulators, of the wires, etc. The necessary weight can, however, be simply found by experiment. A bucket filled with stones is useful.

General

If the foregoing hints are adopted it will be found that an aerial of con-

THE EARTH WIRE

Most people nowadays realise the importance of having a good earth, though it is curious to notice how often defects are to be found in the method of connecting the receiving set to the earth point. It is of little use to bury a large copper plate deeply in a carefully-chosen damp spot if your earth wire consists, as it did in a recent instance that I came across, of fifty or sixty feet of thin, single wire.

No Wonder!

The owner of this particular receiving set complained that his tuning was flat, that he could not get distant stations, and that his signal strength was far from being up to the mark. He assured me that he had a first-rate earth—wires buried immediately under the aerial and running its entire length. There was nothing to criticise in the actual earth contact, but the connection between it and the set was of No. 26 double-cotton-covered wire. For this we substituted 7/22 cable, and by taking a shorter path

we were able considerably to reduce the length of the earth wire. There have been no further complaints about the performances of the receiving set!

Short and Thick

The earth wire should always be kept as short as possible, and it should be quite as stout as the aerial lead-in. It should be soldered to the earth plate, whatever form this may take.

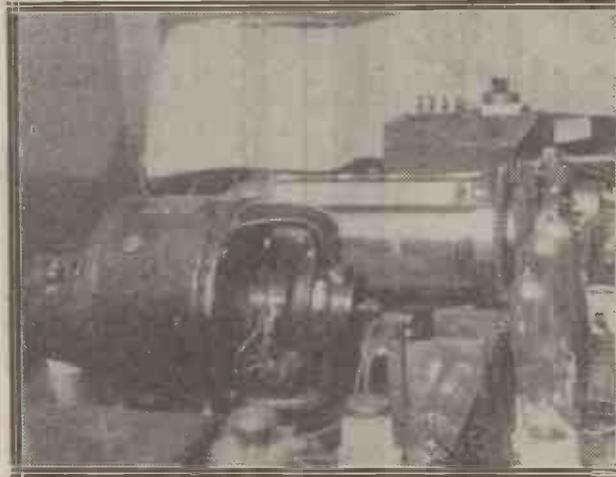
It is a little difficult sometimes to decide upon the best position for the earth plate; it may happen that a long lead will be needed if it is buried immediately under the aerial, though a short one may be possible if it is in some other position. In such cases it is best to try both connections against the other to see which gives the better results. If it is impossible to fix up an outside earth without having a very long earth wire it is often preferable to use an indoor connection to a water pipe for receiving purposes, the outdoor connection being brought into service only when the aerial is earthed whilst the set is not working.

R. W. H.

from spring brass, as shown in the photograph.

With a detector mounted at this angle it will be found that the hand can be rested upon the panel of the set, and the most delicate adjustment can then be made with the greatest ease. Your cheap detector will have become almost the equal of the expensive micrometer-adjustment types.

H. G. A.

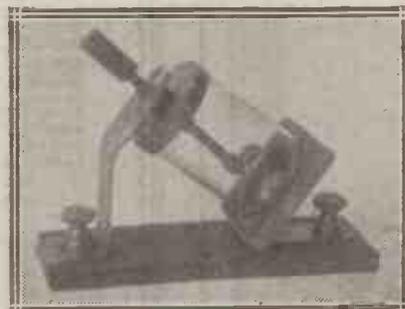


A close-up view of part of the apparatus used in the wireless transmission of pictures to America. Note the glass cylinder around which the positive film is wrapped.

siderably better appearance and higher efficiency has been obtained at practically no expense.

AN IMPROVED CRYSTAL DETECTOR

The average crystal detector is far from being as convenient as the enthusiastic experimenter would desire; however, if the reader is a fairly good mechanic, a greatly improved

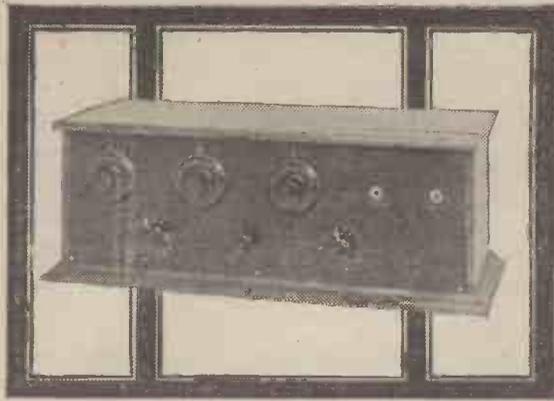


By placing the detector at an angle as shown it will be found that most delicate adjustments can be made with ease.

article can be constructed from one of the cheaper detectors obtainable for about a shilling.

Both vertical and horizontal detectors are a little awkward to adjust, and a more convenient angle can be secured by making a new end support

(Continued at foot of next column.)



A HIGH-TENSION BATTERY FOR BIG SETS

A simple solution of the difficult problem of H.T. supply for greedy sets.

By R. W. HALLOWS, M.A.

THE problem of the high-tension battery for use in connection with multi-valve sets is one which has been engaging the attention of many wireless enthusiasts for some time past. Of one thing we can be quite sure, and that is that it is not of the slightest use to try to use the small batteries made with cells of the

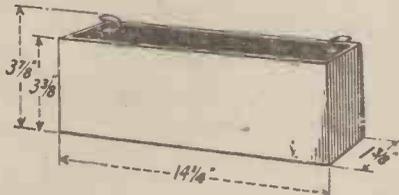


Fig. 1.—The dimensions of a commercial 15 volt unit which weighs about 4 lbs.

same size as those which go to make up a flashlamp refill in any set containing more than three general-purpose valves.

Heavy Loads

These little cells cannot give more than about 3 milliamperes of current for any length of time without suffering severely from the effects of polarization. We may take the average consumption per valve for a big set at nearly 1 milliampere, or thereabouts, apiece for the H.F. valves and the rectifier; 1.5 to 2 milliamperes for a general-purpose note magnifier with a high-tension positive lead of its own, and 4 or 5 milliamperes for a power valve with proper grid bias.

The five-valve set thus requires as a rule round about 8 milliamperes of current. For a receiver of this calibre we must use a high-tension battery made up of cells of very much larger size, unless we use an accumulator battery, which is satisfactory up to a point, though charging is rather a business, and many of these batteries do not last, as some people imagine, for many months on end with one charge.

A Lasting Type

The most satisfactory high-tension battery arrangement that I have found yet, is that to be described in this

short article. Briefly it consists of seven heavy "strip" units, each of which has a nominal E.M.F. of 15 volts. It should be remembered that two sizes of 15-volt units are made: there is the standard type weighing about 1 1/4 lbs., and there is the large one which weighs 4 lbs. It is the latter that is required for making up a high-tension battery for multi-valve sets. Fig. 1 shows one maker's version of these units, which measures, as will be seen, 14 1/4 x 3 3/8 x 1 3/8 inches.

Renewals

The initial cost may seem rather high, but it is worth it in the end, for the battery has a long life and gives silent working until its units are run down to quite a small terminal voltage. One great point about the battery made up of units is that each of them can be tested from time to time with a voltmeter—this should be done when the battery has been under load for half an hour or so, and not at the end of a period of rest—and any unit which has fallen to below 10 volts can be discarded. If a big "solid" battery is used two or three dead cells in different parts of it may throw the whole thing out of action.

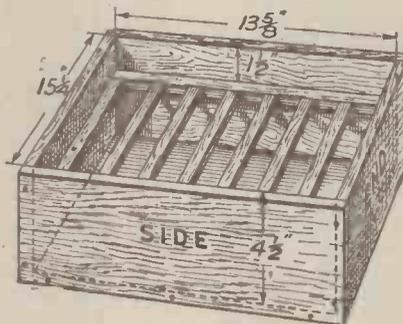


Fig. 2.—A sheet of thick window glass is placed in the bottom of the containing box for insulation purposes.

With the unit battery renewals of the weak portions are easy.

Total Voltage

These units contain eleven dry cells of quite good size. The actual E.M.F. when they are new is therefore about 16.5 volts. Seven of them will thus give a maximum initial voltage of

115.5. This should be sufficient for all ordinary requirements, but those who require very high plate voltages for their power valves can alter the design to suit their own requirements, making the battery consist of as many units as are needed.

Fig. 2 shows the box, which should be made of 3/4-inch mahogany or other hard wood. Upon the bottom of it

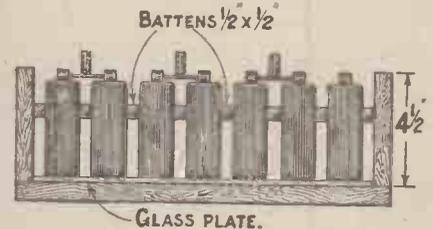


Fig. 3.—This drawing shows the case with one side removed to illustrate the position of the units and of the separating battens.

is placed a sheet of thick window glass, which any glazier will cut to size. The glass is rather important, since the bottom of the case is often the weakest point in the insulation of a battery. It may, however, be dispensed with by fixing a 1/2-inch square hard-wood batten to the bottom of the box along each of the sides. If the units stand upon these the air space below them will give excellent insulation. Half-inch square battens of hard wood can be bought ready cut and planed in parcels containing 100 ft. in 2 ft. lengths. Before use they should be baked and paraffin waxed so as to render them waterproof.

Preventing Leakage

Fig. 2 also shows the way in which the interior of the box is arranged in seven compartments to take the units which make up the battery. This is done by fixing battens to the sides and ends 1 1/2 inches down from the top edge. Other battens are then run across, as shown in the drawing. Fixed into the case in this way the cells are well insulated from one another, and as the units are kept separate, leakage by creeping is prevented.

(Continued on next page.)

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A HIGH-TENSION BATTERY FOR BIG SETS—(cont. from page 239)

duced to a minimum. Fig. 3 gives a view of the case with one side removed to show the position of the units and of the separating battens, whilst in Fig. 4 the complete battery is seen from above.

Tappings

Some of these large-size 15-volt units are provided with a very handy form of spring terminal, which makes excellent connection and obviates the need for soldering. In Fig. 5 is seen a very handy form of connector for use between the units, which are placed "heads and tails" in the case so that the positive of one comes opposite to the negative of the next. It is cut from a piece of sheet brass 1/2 inch wide and 2 1/2 inches in length. The end tags, each 1 inch long, should be about 3/16 inch in width, which will give plenty of strength, and will allow them to fit easily into the clips. In the wider portion in the middle a hole is drilled to take either a valve leg or a Clix terminal. Personally, I use the flush-fitting valve legs which are obtainable cheaply from advertisers. These make a very neat job of the connectors.

The Cover

Though no lid is shown in the drawing it is advisable to fit one so as to exclude dust and damp as far as possible. Better than a wooden lid is a cover made from a piece of American cloth measuring 15 x 16 1/2, on to which is stitched a kind of valance about 3 inches in depth. This fits tightly over the case and protects the battery

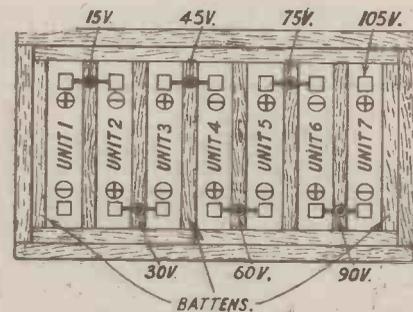


Fig. 4.—A plan view of the completed battery showing the seven units in position.

from harm. A cover of this kind fits on without any difficulty, when the leads to the set are in place.

A Tapping Question

One point which constructors may criticise is that the high-tension battery constructed on the lines described allows tappings to be taken only at 15-volt steps. At first sight this might appear to be a drawback, but actually, except when a soft valve is in use as rectifier, it will not be found that any-

thing finer is required. With a set, for example, containing both high- and low-frequency stages, and using four general-purpose valves and a power amplifier, three high-tension positive leads may be taken as follows:—No. 1 for the high-frequency valves and the first note magnifier from 60 or 75 volts; No. 2, for the rectifier from 30 or 45 volts; No. 3, for the power valve from the 90-volt socket or the positive clip of the last unit. Should the plate potential of any particular valve be at all critical

CLEARANCE HOLE FOR CLIX OR VALVE LEG.

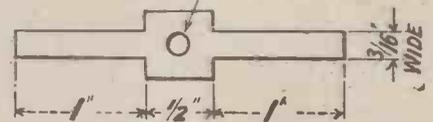


Fig. 5.—This handy connector for use between the units is cut from sheet brass.

it is always possible to meet the situation by placing a small battery tapped in 3-volt steps in series with its high-tension positive lead.

"Inert" Cells

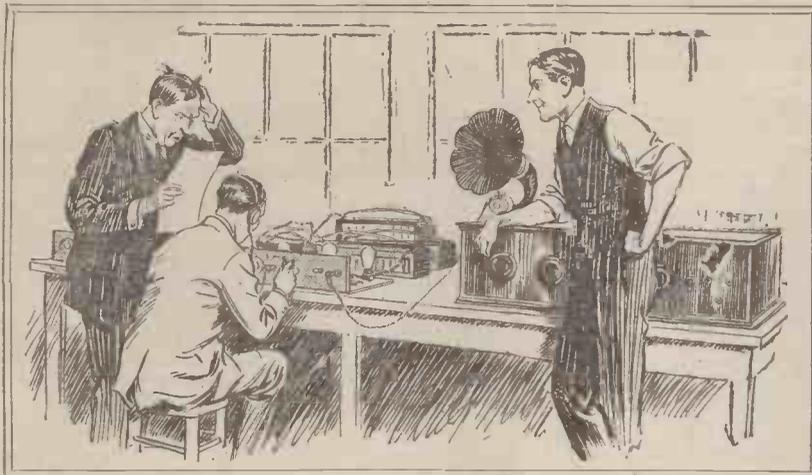
On the whole, though one does not like to be unduly optimistic, I think that a unit battery designed on the lines indicated very nearly approaches the ideal, so far as multi-valve sets are concerned. I believe that those readers who make it up will be just as satisfied with its performances as I am. I would like to mention that most battery makers turn out these units in what is known as the inert form. These require to be filled with water before they will function.

If one purchases the required number of units to give the E.M.F. desired in the ordinary "dry" pattern and also lays in a couple of inert units one need never fear the occurrence of what I call "Sunday night" trouble. Most readers will have had experience of this in the past: friends arrive on Sunday or an early closing day and the set suddenly refuses to function. The fault is traced to the high-tension battery, which in the ordinary way cannot be restored to life on such occasions. If a couple of inert units—which can be stored indefinitely—are kept in the wireless cupboard, any breakdown in the high-tension battery can be put right very quickly.

"The Wireless Constructor"

Have you got your copy of the July Number?

6d. On Sale Everywhere 6d.



THE ELSTREE SIX CHALLENGED!

AN INTERESTING TEST AT OUR LABORATORIES

The "Elstree Six" versus a Set Without H.F. Stages



An interesting test took place at the Elstree Laboratories recently. Seeing the claims made for the "Elstree Six" in *Modern Wireless* and elsewhere, one of our readers wrote in to say that he would be prepared to place his set against the "Elstree Six" for purposes of comparison.

The Challenger

The set being used by this particular reader was one constructed from Radio Press designs, some eighteen months ago. It consisted of a straightforward detector circuit with a fine adjustment of reaction, followed by two transformer coupled low-frequency stages, and one resistance-coupled power amplifier. A three-coil tuner was used, and handling was decidedly tricky.

A Friendly Affair

As the reader pointed out in his original letter, his offer was quite a friendly challenge, and was inspired by pride in his own receiver, which itself was a Radio Press set. He was accustomed to receiving himself many of the stations which were included in the published test report of the "Elstree Six," and he thought that if he could get these stations it would be interesting to see whether, after all, a six-valve set of the latest type could receive them any better. In other words, he decided to get to the bottom of this high-frequency business!

The Tests

The fullest facilities were accorded for this experiment, and tests were arranged at Mr. X's desire as follows: Mr. X brought over his receiver complete with his own batteries and other equipment. This was by no means a small item, because he was using 230 volts high-tension, which he

obtained from accumulator batteries. The "Elstree Six," of course, as our readers know, only requires 120 volts high-tension.

When the apparatus had been satisfactorily installed and tested, our challenger proceeded to tune in certain stations, starting at the bottom of the scale and working upwards. Immediately any station was received, the aerial and the loud-speaker were

tained. The results are tabulated below, from which the following conclusions will be observed:—

In every case the "Elstree Six" obtained the particular station in a much shorter space of time, and whereas the challenging set was worked on the edge of reaction, on the "Elstree Six" the stations were picked up and tuned in without reaction. One particular occasion will be noticed, that of tuning the set to Bournemouth. This operation, as will be seen, took only 9 seconds, and the tuning was carried out on the loud-speaker.

In every case the tuning on the challenging set was carried out first on headphones, the loud-speaker being switched on afterwards. On the "Elstree Six," on the other hand, with two or three exceptions, the tuning was carried out on the loud-speaker the whole time.

The Decision

The strength and quality of the "Elstree Six" was unquestionably better. The comment of the independent witness was as follows:—

"The Six has a large factor of safety, the quality is good, and for the average man the ease of tuning is remarkable. There could be no question as to which was the better."

The challenging set was, however, an excellent example of what a well-adjusted detector valve can be made to give in expert hands. The most significant factor, however, is the time factor, because although a definite log of the dial setting had been plotted by Mr. X for his set, yet the time taken was in every case in excess of that taken by the "Elstree Six," the difference in some cases being very marked.

A Great Advance

These results indicate that Mr. X had failed to appreciate the enormous (Continued on page 244.)

Report by an Independent Witness on the Tests

The time given is that actually occupied in tuning-in. The strength is rated as follows:—

R7 and over: Good strong loud-speaker strength.
R3 and over: Fair readable loud-speaker strength.
Less than R3: Weak signals, barely intelligible.
The tests were carried out between 8 and 10 p.m.

Station	Time on Mr. X's Receiver	Strength	Time on Elstree Six	Strength
Kiel ...	17 mins. ...	R6 Strong mush	4 mins. ...	R4 much quieter
Cassel ...	3 mins. ...	R2	30 secs. ...	R4
Stoke ...	2 mins. ...	R6	1½ mins. ...	R7
Nottingham ...	2 mins. ...	R7	30 secs. ...	R8
Barcelona ...	1½ mins. ...	R7	20 secs. ...	R8
San Sebastian ...	—	Not obtained	1 min. ...	R6
Cardiff ...	5½ mins. ...	R2	15 secs. ...	R8
Manchester ...	7 mins. ...	R2	12 secs. ...	R6
Bournemouth ...	2 mins. ...	R6	9 secs. ...	R8
Dublin ...	2 mins. ...	R5	12 secs. ...	R5
Hamburg ...	2 mins. ...	R2	10 secs. ...	R3
Aberdeen ...	4½ mins. ...	R1	1½ mins. ...	R3

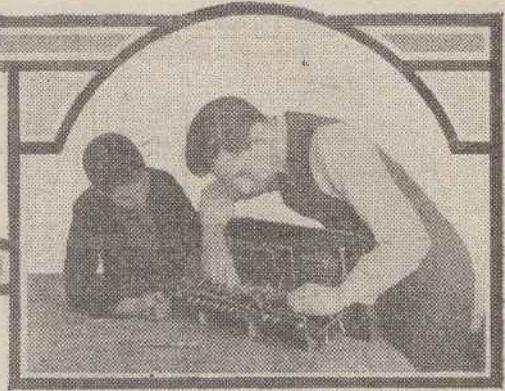
changed over to the "Elstree Six," and this set tuned in.

Since the same aerial and the same loud-speaker were employed, it will be seen that the conditions were identical in each case. It will not be amiss to remark here that the aerials in use at Elstree are simple lengths of 100 ft. of wire at a height of about 20 ft. only. They are therefore representative of the general average aerial, and in fact there are many amateurs who can boast of considerably better aerials than we use at Elstree.

The Umpire

Reverting to the tests in question, a record was kept by an independent witness of the time taken to tune in each station on the loud-speaker, and also the quality of results when ob-

ADDING TO YOUR TOOL KIT



Care should be taken when selecting a hand drill, and some useful information regarding this tool is given this week.



WE now come to the stage in the make-up of our tool chest when it is necessary to go beyond the accomplishment of just fitting things into holes and screwing them up tight. The first really mechanical job is the drilling of holes, and this week's tool provides the means of doing this.

A Useful Type

Hand drills vary greatly in quality and therefore in cost, but the most useful type the amateur may possess, consistent with the policy of not paying too much, is the single-speed drill fitted with a chuck capable of holding any

be resorted to, as this only strains the other part of the chuck. The chuck should be dismantled and the jaw pieces filed with a fine file until the high polish has been removed.

A fair price to pay for a hand drill is in the neighbourhood of seven or eight shillings.

Drills

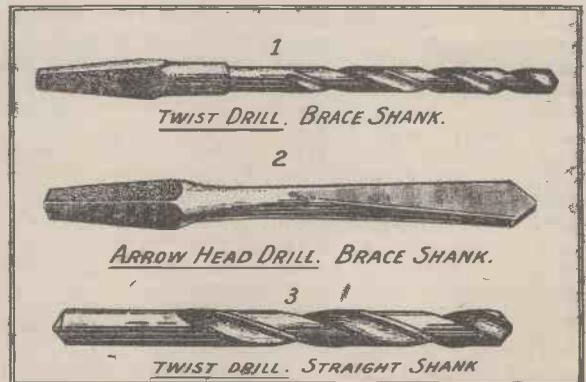
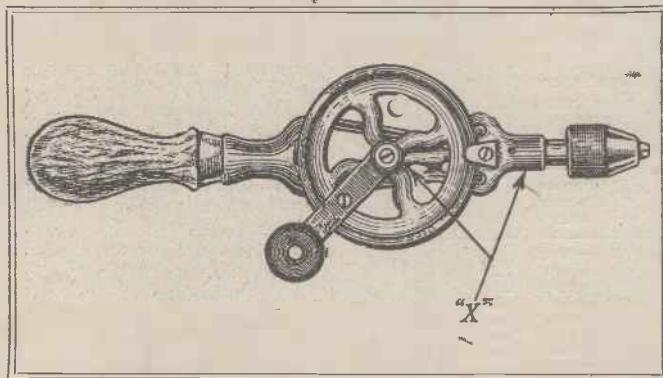
There are three types of drills in common use, twist, arrow-head and diamond. The diamond drill does not interest the amateur, although it is much used by the manufacturers, especially for ebonite drilling. The

method employed is simple, but some practice is necessary, and it is thus best to take one's drills to the local grinder when they get really blunt.

Use of Lubricants

Twist drills can be used to cut any material, even glass, provided that the proper lubricant is used. Ebonite, glass and similar materials are best lubricated with turpentine. Brass does not need any lubrication, nor does cast iron. Steel, copper and zinc are best cut with a little thin machine oil applied to the drill.

When drilling ebonite it is advisable



Figs. 1 and 2. — The most useful type of hand drill which the amateur may obtain at a reasonable price has a single speed, and is capable of holding drills up to 1/4-in. in diameter.

drills up to 1/4 in. in diameter. The type of drill shown in the illustration may be purchased from about four shillings up to twelve. The cheaper classes of hand drills are not to be recommended, the gear wheels being usually roughly cast, and in the writer's experience do not last even a quarter of the time that a drill with correctly-cut teeth will serve.

Lubrication

The better classes of hand drills are fitted with a ball-race thrust bearing which gives very smooth running, and can be thoroughly recommended. However, whatever drill is used do not forget to oil the bearings, and to apply a little thick grease to the gears as one would to other machinery.

After some time the jaws of the chuck may polish and refuse to hold a drill tightly. The expedient of tightening up the chuck in a vice should not

arrow-head drill does not find favour among instrument makers, because when the tool is sharpened, its diameter automatically decreases, but it has its uses for constructional iron work.

Drill Shanks

The twist drill, the most common of drills, may be purchased either with a straight shank as shown in Fig. 2 or with a specially shaped shank to fit a carpenter's brace. For ordinary use in the workshop drill sizes up to 1/4 in. in diameter may be of the straight shank variety, but over that size the brace-shank drills are advised. These fit the ordinary carpenter's brace, which will be included in the tool chest.

Drills may be touched up on a small stone to keep them sharp. A blunt or broken twist-drill may be re-sharpened on an emery wheel. The actual

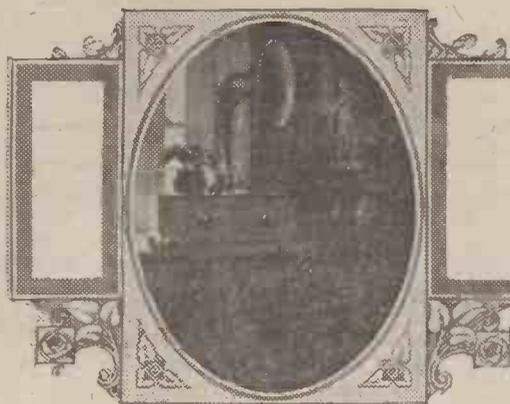
to allow the drill to cut its way into the material rather than to twist the drill round fast and let it wear its way through. For this a steady and gentle pressure is required, with a slow rotation of the drill itself.

Suggested Sizes

Useful sizes of drills for average constructional work are as follow:—

Drill	Used for	Approx. Cost
1/16"	Holes for single wires	s. d.
1/8"	6 B.A. Screws (clearing)	0 4
3/16"	4 B.A. Screws (clearing)	0 5
1/4"	2 B.A. Screws (clearing)	0 6
5/16"	Small one-hole fixing components	0 7
3/8"	Usual one-hole fixing components	1 4
1/2"	Lead-in tubes, etc.....	1 7
5/8"		2 4

The last three drills may be brace-shank bits, and the prices mentioned are for this type of drill.



A Reinartz Receiver for Plug-in Coils

SOME CIRCUITS TO TRY.

By H. BRAMFORD.

Full constructional details of this receiver were given in our last issue. The variety of circuits given below is an indication of the flexibility of the set.



SOME of the various tuning arrangements which may be tried out upon this receiver are shown here. We will first consider the simplest arrangement of all, that is direct coupling, using an ordinary plug-in coil of suitable size. The method of procedure in linking up would be as follows:— Connect aerial to terminal A and earth to terminal E. Insert the valves in their sockets, seeing that the filament switch is off. Connect up the H.T. battery. Plug in a suitable coil and then make the following connections:—

Red Clix plug to socket S_1 .
 Black Clix plug to socket S_2 .
 Green Clix plug to socket S_3 .
 Yellow Clix plug to socket S_4 .
 Switch on the filaments and the receiver is ready to operate. At this juncture the variable condenser C_1 should read zero. Condenser C_2 is not used, as no reaction is employed in this circuit.

Inductive Coupling

Arrangement (b) shows ordinary inductive coupling to obtain which the plugs are arranged in the following order:—

Red Clix plug to socket S_1 .
 Black Clix plug to socket S_2 .
 Green Clix plug to socket S_3 .
 Yellow Clix plug to socket S_4 .

A. Tapped Coil Circuit

Arrangement (c) makes use of a plug-in coil having a tapping, such as an "X" coil, and takes the form of a Reinartz circuit. Connections are as follows:—

Lead B to one tap of coil L_1 .
 Red Clix plug to socket S_2 .
 Black Clix plug to socket S_3 .
 Green Clix plug to socket S_4 .
 Yellow Clix plug to socket S_1 .
 Blue Clix plug to socket S_5 .

A Circuit for a Centre-tapped Coil

Arrangement (g) employs a plug-in centre-tapped coil with the following connections:—

Lead B to the centre tap of coil L_1 .
 Red Clix plug to socket S_1 .

Black Clix plug to socket S_5 .
 Green Clix plug to socket S_4 .
 Yellow Clix plug to socket S_3 .
 Blue Clix plug to socket S_2 .

A Simple Arrangement

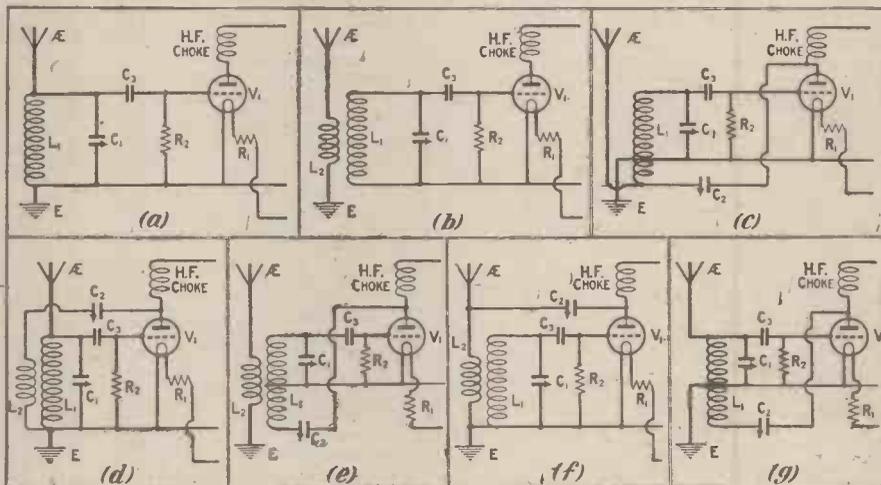
Arrangement (d) uses two plug-in coils without tappings, for which connections should be made as under:—

Red Clix plug to socket S_3 .
 Black Clix plug to socket S_4 .
 Green Clix plug to socket S_5 .
 Yellow Clix plug to socket S_1 .
 Blue Clix plug to socket S_2 .
 White Clix plugs (shorting-link) to sockets S_2 and S_3 .

for coupling the aerial. As before, two coils are used, this time both ordinary plug-in coils. The connections should be made in the following order:—

Red Clix plug to socket S_1 .
 Black Clix plug to socket S_2 .
 Green Clix plug to socket S_3 .
 Yellow Clix plug to socket S_4 .
 Blue Clix plug to socket S_5 .
 White Clix plugs (shorting-link) to sockets S_2 and S_4 .

In addition to these arrangements, several other deviations may be tried out from time to time, which give the operator a choice between selectivity



Here are some of the possible circuits which can be used with this receiver.

Another Tapped Coil Circuit

Arrangement (e) is similar to that shown in (g), but instead of direct coupling, inductive coupling is employed, thus giving a somewhat greater degree of selectivity. The connections necessary are as follows:—

Lead B to centre tap of coil L_1 .
 Red Clix plug to socket S_1 .
 Black Clix plug to socket S_2 .
 Green Clix plug to socket S_3 .
 Yellow Clix plug to socket S_5 .
 Blue Clix plug to socket S_4 .

A Reinartz Circuit

Arrangement (f) is again similar to (d), but the reaction coil is also used

and best local reception, in which case volume with purity only is considered.

OUR COVER DESIGN DID YOU RECOGNISE IT?

Do you recognise the fearsome-looking object depicted on this week's cover? It is the top section of the Eiffel Tower, looking upwards. Incidentally, elsewhere in this issue you will find an article entitled "Need They be Unsightly?" Compare some of the back-garden aerials in the London area with the businesslike arrangement seen on the cover!

RELAYS TO DAVENTRY WITHOUT CHANGING COILS

(Continued from page 223)

Author's Test Report

Upon a good, high aerial at twelve miles south-east of 2LO I obtain that station, employing a 6-volt resistance-coupling valve followed by a small power valve, at excellent loud-speaker strength, whilst 5XX comes in even louder; in fact, I think I may truthfully say that this receiver gives the greatest volume I have obtained upon any two-valve set from this latter station. The quality of reproduction is very good. Upon telephones a large number of British and Continental stations have been logged from time to time.

Next week.—Special hints and instructions for operating and getting the best from this receiver will appear next week.

GIVE US MORE HIGH-POWER STATIONS!

(Continued from page 235)

The Usual Obstacle

As a matter of fact, it is an open secret that the B.B.C. have long wished to carry out such modifications, but the obstacle in the way of pro-

gress is, as usual, none other than the Post Office. Those who remember the absurd difficulties put in the way of the starting of even that pitiful little service from Writtle in the very early days of broadcasting will be able to appreciate this point! Post Office control of the ether to ensure its fair and proper use by all the different services is all very well, but is it to be allowed to stand in the way of progress indefinitely?

"HANDS OFF THE B.B.C."

SIR,— With reference to Mr. Harris's article under the above title in last week's issue of WIRELESS, I am extremely glad to see that one has had the courage to say what he thinks, and I hasten to add my views to those of Mr. Harris.

One has only to review the conduct of the Government during the last six months to realise that once the B.B.C. came under Government control it would become a purely money-making concern. The programmes would almost certainly fall below their present excellent standard, and probably would consist largely of advertising material—naturally the Government would wish to spend the least possible amount upon the productions of the programmes themselves.

Anyone that writes to his M.P. on this serious subject is, I am sure, doing a public service.

I am, Sir,

Yours faithfully,
ARTHUR WARREN.

Surbiton.

THE ELSTREE SIX CHALLENGED!

(Continued from page 241)

advances which have been made in the science of high-frequency amplification, comparatively recently. Our challenger himself was the first to admit this, for when the tests were completed he handled the "Elstree Six" himself for a short time, and was considerably impressed with the ease of control, the facility with which the various stations could be tuned in, and the exceeding pleasantness of the absence of any critical reaction adjustment.

Mr. Wilmot Lunt, the well-known artist and illustrator, has endeavoured to convey his impression of the challenge actually in progress. The test took place in the early evening, which at present is one of the worst possible times for reception, and this may possibly account for the worried expression on Mr. X's face. We do feel, however, that our challenger is to be congratulated on having the courage of his convictions. He was thoroughly proud of his own set, which gave him excellent results, and he had the courage to challenge us direct to satisfy himself definitely that the sets of to-day were really as good as they were claimed to be.

Kill "direct pick-up" for ever!



Cōpex Coils—evolved in co-operation with Mr. J. H. Reyner, joint editor of "Wireless"—completely solve many of the difficult problems which confront the constructor. "Direct pick-up," parasitic oscillations in neutralised receivers, and interaction—all these have been eliminated with what is perhaps the most revolutionary wireless development of recent times.

The new Cōpex Coil cuts out direct pick-up and stray coupling effects, and puts a fine edge on your tuning.

These new coils are interchangeable and plug in standard six-pin base; the coil is covered by a metal screen which definitely neutralises the external magnetic field and positively eliminates all interaction between coils. Fit these coils to your set, and it will instantly become more selective and will give a much more superior tone without any trace of "mush" whatever.

Cōpex Coils have been used in several of the latest Radio Press sets—including the "Five Fifteen" and the "Magic Five"—and are likely to be the basis of many improved circuits in the future.

Cōpex Coils

are interchangeable on a standard six pin base. Copper unit with base (patent applied for) 15/-. Plug-in low loss coils from 4/6 upwards according to wavelength.

PETO-SCOTT Co. Ltd., 77, City Rd., E.C.1

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EELEX PLUG & SOCKET SYSTEM



The EELEX Plug and Socket System enables the set builder to make the best electrical contact in the quickest manner while enhancing the appearance of the set. The special indicating tags, coupled with the six colour selection of plugs, precludes any possibility of wrong connections and burnt-out valves.

Price of plug (six colours) ... 3d. each
Price of socket (six colours) ... 1d. "
Indicating tabs (all usual lettering) ... 1d. "

Write for free catalogue showing full EELEX SYSTEM.



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"WIRELESS,"**

Bush House, Strand, London, W.C.2

Telephone :
City 9911.

COUPON.

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. "WIRELESS."

Vol. IV. No. 7.

GREAT SUCCESS OF TWO-STATION TEST

EASY SEPARATION WITH CRYSTAL RECEIVERS RESULTS OF "WIRELESS" TESTS

THE experiments carried out by the British Broadcasting Company during the evening of Monday, June 28, in transmitting simultaneously two programmes of an entirely different nature was highly successful. From 11.15 p.m. until midnight the Oxford Street transmitter, working on a wavelength (measured at the Radio Press Laboratories) of 361.6 metres, and the emergency installation at Marconi House, working on a measured wavelength of 456.7 metres, were transmitting continuously. In order that our readers might get a clear idea of the result of the test, WIRELESS arranged for observers throughout London and district to listen on simple receivers and report their results. The following is a summary of the reports received:—

RADIO PRESS LABORATORIES AT ELSTREE.

Circuit used: "Crystachoke."

No difficulty whatever in separating the two programmes.

Oxford Street transmission measured with accurate instruments prove to be slightly stronger.

Repetition of test on an ordinary crystal set with parallel tuning and condenser shunted across the whole inductance gave no appreciable interference, but when the station to which the set was tuned stopped transmitting, the other station could be heard faintly in the background. On the Crystachoke circuit nothing could be heard from the second station when the first stopped transmitting.

ROMFORD.

(13 miles East of the London Station.)

Receiver: auto-coupled crystal set with crystal tapped across part of the inductance.

The set adjusted so as to tap the crystal across only a portion of the inductance enabled excellent results to be obtained from either station.

When one station was silent the other could be heard faintly in the background, but during transmission there was not the slightest interference from the second station. The Marconi House transmission was heard much stronger than that from Oxford Street.

SYDENHAM.

(1 mile North of the Crystal Palace.)

On a direct-coupled crystal set either Oxford Street or Marconi

House could be received at good volume without appreciable interference, although one station could be heard when the other was silent. Either station could be heard without interference from the other.

FINCHLEY.

Receiver: crystal set with detector tapped across portion of inductance and aerial auto-coupled.

Each station completely free from the other.

BEXLEY.

(12 miles S.E. of London.)

On a high aerial a direct-coupled crystal set gave only a faint trace of Marconi House when Oxford Street was working. On the Marconi House transmission no trace whatever of the Oxford Street transmission could be heard. Marconi House transmission was slightly louder than the Oxford Street.

ST. JOHN'S WOOD.

(1½ miles from Oxford Street installation.)

On a loose-coupled crystal set the two stations were easily separated.

ILFORD.

Receiver: slider crystal set.

No appreciable interference on one station when the other was working, although when one station was silent the other could be heard slightly.

5 MILES NORTH OF CHARING CROSS.

Receiver: direct-coupled crystal set with plug-in coil and parallel condenser.

No interference between the two stations. Marconi House louder than Oxford Street.

10 MILES WEST OF OXFORD STREET.

Receiver: direct-coupled crystal set.

This particular set gave a very slight background from Oxford Street when listening to Marconi House, but no interference on Oxford Street transmission from Marconi House. When using an X coil, no difficulty in separating one station from the other.

WIMBLEDON.

Auto-coupled crystal set with crystal tapped across half of coil. High aerial. Each station completely free from the other.



*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*

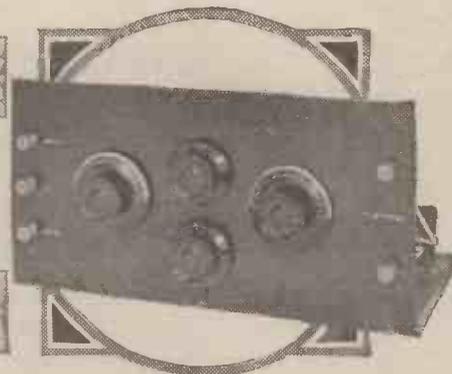
LISSENOLA

LISSEN LIMITED,
18-22, Friars Lane,
Richmond, Surrey.

Managing Director: T. N. COLE. L36

"THIS WAY, PLEASE!"

By G. P. KENDALL, B.Sc.



Do you understand the functions of your by-pass condensers? They are very important little components performing the duties of traffic-controllers at many points in your set, and it pays to know just what they do.



If there is one component in our receiving sets whose function is more taken for granted than any other, that component is undoubtedly the by-pass condenser inserted across the telephones of a single-valve set, or at some other habitual point in the set. It is practically always used, and so we always use it, and that is about all the consideration which it gets from most of us. As a matter of fact, these by-pass condensers are extremely important little fittings, and if we gave their use a little more thought than we do, it is quite probable that some of us would get decidedly better results from our sets.

Understand It!

The function of most of the by-pass condensers in a set are really rather important, and every one who does much experimental work, even of the simplest kind, would be well advised to make sure that he really understands what the by-pass condenser is for when used at various points in the set, so that he may have some idea as to what he is doing, and can choose his capacity values, adjust his connections, and so on, by some more reasonable method than a mere rule of thumb.

An Important Item

Let us take first the condenser, which is practically always used, in a set employing reaction, across the telephones when only one valve is used. Now, this condenser can have a very great effect upon the pleasantness or otherwise of the operation of the whole set, and to get an idea of how important it is, it is quite interesting to disconnect this condenser in some existing set, and notice what a great difference may result.

Why it is Necessary

The reason why a condenser in this position is desirable is because in the anode circuit of a detector valve with reaction we may assume that there are two main types of current flowing, one being the low-frequency currents which cause audible signals in the telephones, and the other the high-frequency currents which produce the reaction effects. Now, high-frequency

phones and make the signals audible, and when these two considerations are understood it becomes quite a simple matter to decide how to carry out the separation of one current from the other.

The Solution

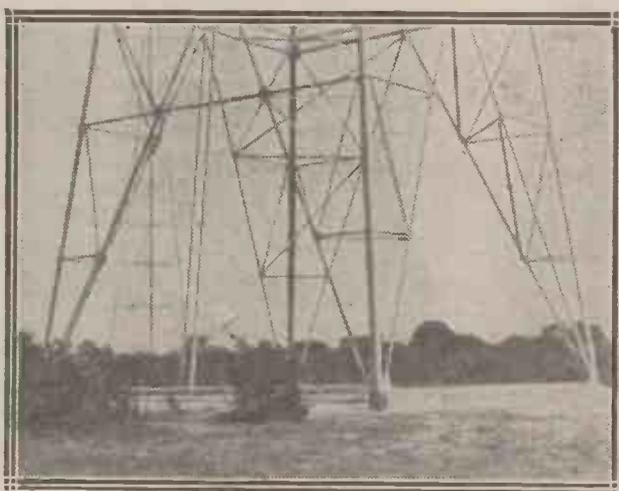
A condenser of suitable capacity would provide the kind of by-pass which we require, and how to separate one current from the other becomes quite clear when we remember the relative ease with which currents of different frequencies can pass through a given size of condenser. High-frequency currents pass through a condenser very much more easily than the low-frequency kind, which we require to operate the telephones, and the higher the frequency the more easily will they pass through.

By choosing a suitable capacity, then, we can find a value which will permit the high-frequency currents to pass through with comparative ease, but which will only allow the very smallest amount of the low-frequency current to get through. As a matter of fact, so little gets through that it has no practical effect. Such a value is in the neighbourhood of .001, and such a condenser can be regarded as almost a short circuit so far as high-frequency currents are concerned, which pass through quite readily, the low-frequency

currents, on the other hand, finding this a path of extreme difficulty, will take the other course through the telephones in the ordinary way.

A Short Circuit

It is extremely useful, then, to get into the habit of regarding a by-pass condenser as being a more or less effectual short circuit for high-frequency currents; in other words, as an alternative path of practically no "resistance" for the high-frequency currents to take when we do not desire them to go by some other path or when the only other path is such as to



Experimental short-wave transmission is now one of the main functions of the Poldhu station; the base of one of the main masts of the old high-power transmitter is seen here.

currents cannot pass at all easily through the windings of the telephones, and unless some alternative path is provided for them, all sorts of undesirable effects will be produced, such as floppiness of reaction control, difficulty in obtaining sufficient reaction without using a very large reaction coil, and so on.

Some sort of alternative path must be provided for these high-frequency currents, by which they may get past the telephones without going through them. This alternative path, moreover, must be of such a nature that it does not divert any appreciable amount of the low-frequency currents which we require to work the tele-

"This Way, Please!"—continued

obstruct their passage in an undesirable way.

Why Separate Them?

At this point it is well to realise that we may wish to provide a short circuit, or alternative path of low resistance, for our high-frequency currents for two reasons. The first of these is that we do not wish them to take the other path, where they might do harm, and so provide them with a relatively easy pass which they would take in preference to the dangerous one. The other is that the one path may be of very high "resistance" for them, so that they would not be able to go through at all easily, and so would be prevented from getting through to some other part of the circuit where we desire them to do useful work. In this case, then, we provide the short-circuit path for them in order that they may get through to the point where they are wanted. This latter is the case in a single-valve reaction circuit where we provide them with an easy path past the telephones, in order that they may do their work in the reaction coil.

An Exception

It is sometimes found that the capacity between the two leads of the telephone cords is sufficient to act as a fairly effective by-pass for the high-frequency currents, so that a single-valve receiver with reaction will work quite tolerably well although there is no definite by-pass condenser provided across the 'phones. This is not a very desirable state of affairs, however, for a reason which is somewhat instructive. If we depend upon such stray capacities as this, and the capacity of the telephone windings, to carry the high-frequency currents across, we are very apt to have a state of affairs set up which will give a good deal of trouble in the form of body-capacity effects.

An Undesirable Effect

If we make the high-frequency currents squeeze their way through all sorts of nooks and crannies of this sort, they are apt to set up what is called a difference of high-frequency potential across the telephones, that is to say the side of the telephones connected to the reaction coil will be at a different electrical "level," so far as high-frequency currents are concerned, from the other side, which is connected to the high-tension battery, and can be regarded as being at earth potential. The result will be that body-capacity effects will be troublesome, even though the reaction control may be fairly satisfactory. In a case like this, our short-circuiting effect is obviously very desirable, and, of

course, the obvious remedy is to use a definite by-pass condenser.

Where It Happens

This state of affairs is sometimes liable to be set up in a receiver of the Reinartz type, where a high-frequency choke is provided in circuit between the anode of the valve and the telephones, definitely to prevent the high-frequency currents from passing that way, and to compel them to take the

ORDER IT EARLY!

The Next Issue of "Wireless" will be a Special Amplifier Number, containing Three Complete Designs for L.F. Amplifiers.

This special number is being expressly prepared for the benefit of readers who wish to change over to loud-speaker reception without re-building their sets, even if they are crystal receivers.

DO NOT MISS IT!

alternative path through the reaction condenser and reaction coil to the filament circuit. It might be thought that in a case like this there was no



The by-pass condenser is a simple-looking little component, but it performs some very important "traffic controlling" functions.

need to provide any by-pass condenser across the telephones, and yet it will be seen that such a condenser is often provided, to short circuit the telephones so far as high-frequency currents are concerned, so that any small amount which may get through the choke shall not give rise to the unfortunate body-capacity effects referred to.

In L.F. Circuits

The use of by-pass condensers to prevent high-frequency currents from taking some other path where they might do harm occurs mostly in connection with low-frequency amplifiers. Now we are most of us inclined to think of low-frequency amplifiers as pieces of apparatus which amplify low-frequency currents alone, forgetting that most of the low-frequency interval couplings will also serve to some slight extent as couplings for high-frequency currents. If, therefore, high-frequency currents get into our low-frequency amplifying circuit they will be amplified and passed through, in a very inefficient fashion it is true, but they will nevertheless be amplified.

Distortion

The result may be all sorts of undesirable things in a large set, the principal one being instability and also on occasions distortion of the received signals. Here, then, is an obvious case for the use of our high-frequency short-circuiting device, and we usually connect it across the first point at which high-frequency currents might enter the low-frequency amplifying circuit. For example, when a low-frequency transformer is used in the anode circuit of the detector valve, to couple that valve to the succeeding low-frequency one, the by-pass condenser is connected across the primary of the first transformer in order that high-frequency currents may be definitely passed away without allowing them to get into the low-frequency circuit.

When It Is Important

The effect is not as a rule very noticeable in transformer coupled amplifiers, but in resistance and choke-coupled ones it may be quite troublesome, and such a by-pass condenser is always desirable, whether or not reaction is used. It is particularly important when one or more stages of high-frequency amplification are used in front.

Other Points

There are quite a number of other places in which it is desirable to use high-frequency short-circuiting paths across various parts of the circuit, but we will content ourselves with considering one more of the type in which we desire to keep high-frequency currents out of a particular place where their entry might cause trouble.

Shunting the H.T.

The point in question is the high-tension battery, and the reason why we desire to keep high-frequency currents from passing through the H.T. battery

(Continued on next page.)

"THIS WAY, PLEASE"

(Continued from page 247)

in some cases is that when the battery becomes old it will have considerable resistance, and therefore if the high-frequency currents are compelled to go through they will set up a difference of potential across it which may produce a sort of reaction effect in the high-frequency stages and make the whole set very unstable.

This is really the reason why what are called "reservoir" condensers are provided across the H.T. tapping which feeds the high-frequency and detector valves. Quite a moderate size of condenser will do, something of the order of .005, although it is usual to use a very much bigger one than this.

In L.F. Amplifiers

The same thing may happen in low-frequency amplifying circuits at times, when, of course, we are trying to short-circuit the actual low-frequency currents themselves, in order, among other things, to prevent the resistance of the H.T. battery setting up a reaction effect in the low-frequency amplifying circuits. For this purpose, however, we require a very much bigger condenser, and one of several microfarads is always preferred for the purpose.

AMATEUR TRANSMITTING NOTES

QRA's Found

- M-1J: J. C. Steffens, Enrice Martenez 12, Mexico, D. F.
 - IC-SN1: Snorri P. B. Arnar, P.O. Box 354, Reykjavik, Iceland.
 - SMVL: Emil Barksten, Brannkyrkagat 85, Stockholm.
 - SMYK: Gustaf Berger, Bergdalen 4, Linkoping.
 - EAR23: Juan Portela, Cervantes 10, Cadiz, Spain.
 - CVPE: A. Gariso (Div. Hon. Sec., Div. 10), B.M.R. Telegraphs, Villa Pery.
 - A-3KJ: W. E. C. Sawyer, 127, Mitchell Street, Northcote, Victoria.
 - A-3SJ: S. J. Mitchell, 5, Brandon Street, Brighton, Victoria.
 - A-7BH: E. C. Sheldrick, Richards Avenue, Launceston, Tasmania.
 - Z-2BD: N. W. Cunningham, View Road, Karori, Wellington, N.Z.
 - R-GA2: G. Sarbach, Venado Tuerto, Argentina.
 - BZ-SQ2: Livio G. Moreira, Rua Paula Gomes 6, Curitiba, Brazil.
 - CH-3AN: Juan Gachelin, Maipu 636, Santiago, Chile.
- QRA's Wanted**
- G-2LA, A-7CW, A-7HL, EARX, TPXX, R-DD7, D-7XU, U-1XV, SS-SLBT, G-6LK, G-5UH, G-5ZI, CAG, GCA.

New Call-sign Allotted

G-5XD: B. C. Christian, 7, Hutchinson Square, Douglas, Isle of Man.

QSL Cards Held

We now hold cards addressed to the following stations, and would be glad if the owners would write and claim them, or if any others knowing the QRA's of the stations in question would supply us with them:—
H-9XA, RRP, D-PK7, A-5KN, Y-1CD, TPAL, BE-1AX, U-1XV, X-GB2, D-7XU, G-6CM, G-6EP, 6XI, TPXX, R-DD7.

WIRELESS AND CRIME

(Continued from page 231)

leave the liner at Cherbourg, take train to Paris, and finish his journey to London by air from Le Bourget to Croydon.

A Real Preventive

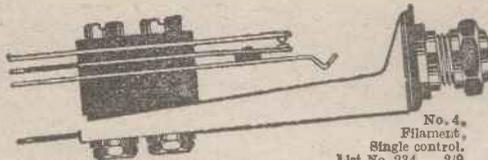
There are many criminals who have not been forewarned, as in this case, but have owed their arrest to Signor Marconi for inventing a means by which the police have been able to encompass their arrest.

I do not hesitate to say that in no small measure is wireless telegraphy and telephony a deterrent to crime, especially that of murder, that is premeditated murder, as the High Seas are no longer a safe refuge.

A NEW BOWYER-LOWE PRODUCT EMBODYING ALL BOWYER-LOWE REFINEMENTS & CRAFTSMANSHIP JACKS

The design of Bowyer-Lowe Jacks was evolved to obviate faults usually apparent in Jacks adapted from telephone uses. The following details indicate the superiority of these Components:

1. Girder frame, ensuring rigidity.
2. Hard phosphor bronze springs (tinned).
3. Silver contacts accurately positioned.
4. Ebonite insulation.
5. No loose panel washers.
6. Wide fantail contacts.



No. 1—Single circuit, open	List No. 231 ... 2/2
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No. 3—Double circuit	List No. 233 ... 3/-
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Tested Components They are Guaranteed

(Announcement by the Bowyer-Lowe Co., Ltd., Letchworth.)

One Rheostat with two uses!



THE "PEERLESS" DUAL RHEOSTAT

3/9

From your dealer or direct. Traders requested to apply for Trade Terms.

THE BEDFORD ELECTRICAL & RADIO CO., LTD.
22, Campbell Road, Bedford.

This "Peerless" Dual Rheostat (as illustrated) covers the needs of both bright and dull emitter valves. It has two windings, one of a resistance of 6 ohms, and a continuation of this on to a 30 ohm winding. The resistance wire is wound on a hard fibre strip under great tension and is immune from damage. The popular one-hole-fixing method is provided, and the terminals are conveniently placed. The contact arm has a perfectly smooth silky action. All the metal parts are nickel-plated. Complete with ebonite combined knob and dial.

2 volt .3 amp.

A Better Valve you cannot buy



4/11

Try a Frelat Valve next time. If you buy on quality you cannot beat it, but if you have a care for economy you will find that not only is first cost an appreciable saving but that the Frelat Valve lasts longer. If your Dealer cannot supply send P.O. 4s. 11d. post free or request delivery C.O.D. and send 6d. in stamps.

THE CONTINENTAL RADIO IMPORT CO., LTD.,
8, SPITAL SQUARE, LONDON, E.1



COMPONENTS WE HAVE TRIED

Conducted by the "Wireless" Laboratories, Elstree.

"Nick-o-Time" Tunometer Coils

MESSRS. THE TUNOMETER WORKS have sent us several of their "Nick-o-Time" Tunometer Coils, some being of continuously variable type and others fixed inductances. All consist of a flat spiral winding laid in a groove cut in an ebonite disc, standard pin and socket mounts being attached. In the variable type a metal arm carrying a grooved wheel which engages with the winding allows the inductance in circuit to be varied. All these coils are well-constructed and highly finished, while their high-frequency resistance was low. The contacts of the variable models were noiseless in action and fine tuning was possible, combined with good signal strength and selectivity.

Auto Audio-Frequency Amplifier

WE have received one of their Auto-audio-frequency amplifiers from Messrs. Bretwood, Ltd., for test and report. This instrument, we understand, is a special form of choke-coupled amplifier, uniform amplification being claimed at all frequencies, in addition to

a special filtering effect, which produces a very silent background when two or more stages are employed.



The Auto Audio-Frequency Amplifier submitted for test by Messrs. Bretwood, Ltd.

On test it was found that in a first-stage L.F. amplifier the degree of amplification was well up to standard, the

quality of speech and music being particularly good, while the background was noticeably silent. In the second stage results were above the average, the quality of both speech and music being excellent.

Devicon Bridge Condenser

WE have received a Devicon bridge condenser for test and report from Messrs. Autoveyors, Ltd. This condenser is constructed on low-loss principles, being provided with metal end plates, two sets of fixed plates which are electrically connected, and two sets of moving plates insulated from one another. The two sets of moving plates are controlled by two concentric conical knobs each provided with a white line for indicating the setting against a fixed graduated scale.

Test figures show a maximum capacity of .00027 between each set of moving vanes and the respective set of fixed vanes, while the insulation resistance was infinity. Careful examination of this condenser showed that it was well constructed and sufficiently robust to stand up to a considerable amount of rough usage.

"M.H." Resistance Coupling Unit

THE resistance-capacity coupling unit made by Messrs. L. McMichael, Ltd., consists of an anode resistance, coupling condenser and grid leak mounted on a special base. On test, the amplification was up to the standard for such an arrangement, while the reproduction was very good, with a satisfactory silent background.

Simple, Accurate, and Easily Adjusted

Moving block
cannot fall

Don't experiment! Get a "Lotus" and be certain of better results. The vernier movement comprises three sets of enclosed precision machine cut gears and reduces the speed of the moving coil block by eight times. The moving block moves in the same direction as the knob, which prevents confusion. It also becomes absolutely rigid in any position, holding the heaviest coil securely. No screws required to tighten it.

LOTUS

VERNIER COIL HOLDERS

From all Radio Dealers.

Two Types:

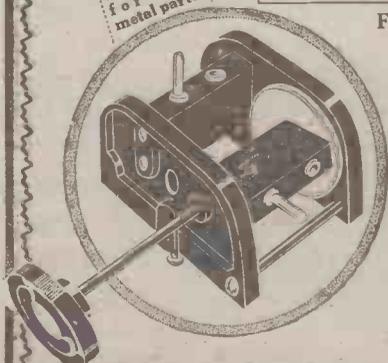
For outside panel mounting:
Two-way 7/-
Three-way 10/6
For inside baseboard mounting, with 6 in. handle:
Two-way 8/-
Three-way 12/6

Garnett, Whiteley
& Co., Ltd.,

Lotus Works, Broad-
green Road, Liverpool

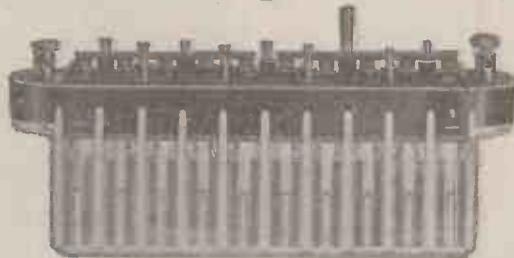
Makers of the new improved
"LOTUS" Valve Holder.

Bakelite mouldings for the side plates, coil blocks and knobs; heavy nickel plating for the metal parts.



HAVE YOU DISCOVERED

?



HAVE YOU DISCOVERED the BEST, SUREST AND CHEAPEST form of Anode Current Supply: the H.T. Accumulator?

An H.T. Accumulator MUST be:—

REASONABLE IN FIRST COST; FREE FROM SELF-DISCHARGE; SILENT IN WORKING; CAREFULLY DESIGNED; CAREFULLY MADE; & LEAK PROOF. THE

"DUROS" H.T. ACCUMULATOR IS THE BATTERY BUILT FOR THE JOB.

DON'T SCRAP - RECHARGE!

THE "DUROS" HIGH TENSION ACCUMULATOR UNIT CAN BE OBTAINED FROM YOUR DEALER.

20 VOLT UNIT—12/- 10 VOLT UNIT—6/-
Advt. of A. F. A. ACCUMULATORS, LTD.

I HAVE BEEN ASKED



I have two .0093 variable condensers which I wish to use in Mr. Reyner's "Magic-Five" set, instead of the .0005 condensers specified. Can you tell me what alteration of turn numbers of the screened coils will be required in order that I may cover the same wavelength range as does the arrangement given by the author?

No alteration of turn numbers will effect the condition for which you wish. For example, by suitably increasing the turn numbers of all windings, the maximum wavelength of the present coils when tuned by .0005 condensers could be obtained, but the minimum wavelength would be increased. Stated briefly, therefore, the windings could be altered to give you a higher wavelength, but you will then be unable to tune down as low as do the present coils with .0005 condensers. Your best course would be to

plug in two fixed condensers in parallel with your two .0003 condensers. Condensers of .0002 or .0003 will prove satisfactory for this purpose, but they should only be plugged in when it is desired to obtain transmissions, which cannot be received with the variable condensers and coils alone.

Can you explain to me why suitable condensers connected across the loud-speaker will remove tinniness and give a mellow tone?

In a receiver it often happens that distortion is introduced due to uneven amplification of the various musical frequencies. For example, if the detector valve is followed by an L.F. transformer with a value of primary impedance which is too low, the lower musical frequencies are not amplified to the same extent as the frequencies

of the higher range, with the result that reproduction may be high-pitched and tinny. By introducing a condenser across the loud-speaker, however, or in certain other parts of the amplifying circuits, it can be arranged that the higher frequencies are by-passed to a greater extent than the lower, which although not bringing back the lower frequencies, does result in a more even balance being obtained. This is due to the fact that a condenser offers less impedance to the higher frequencies than to the lower.

How many turns will be required for the ordinary broadcast waveband with a frame aerial of 2 feet sides?

Twelve turns with 1/4-inch spacing should be a suitable number to cover the desired waveband when tuned by a condenser of .0005.

I have a simple set followed by three resistance coupled valves, which up to recently gave me excellent results on the local station. Now, however, the signals die away gradually and do not come back unless I switch the valves off for a short time. Where is the fault likely to be located?

The symptoms given are indicative of a gridleak or leaks having either failed completely or having developed very high resistances. It is likely that if these components are replaced by others of suitable value the trouble will be overcome. J. U.

CAXTON 4-VALVE CABINET

Made for Sets, "As good as money can buy,"
"Harmony Four Receiver," "The Melody Three"

Special Cabinets made to Customer's measurements. Prices quoted.



- Cash with Order. Fumed Oak ... £1 5 0
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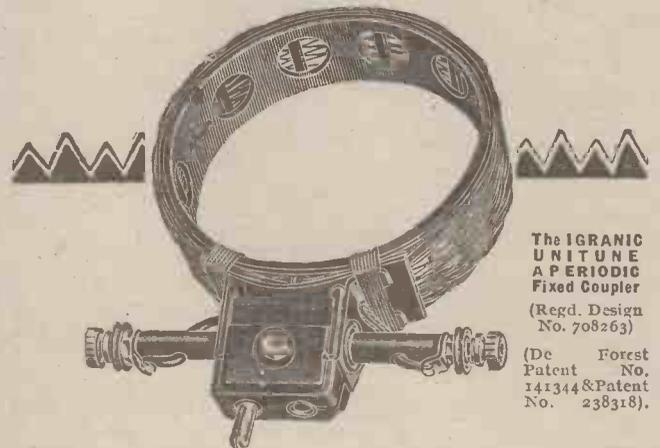
Detachable 7" deep Base Board to mount 21" by 7" panel to slide out of Cabinet front. Also supplied at 10/- extra with two beaded front doors placed 2 ins. in front of the enclosed panel.

Ebonite or Radion Panels Supplied and perfectly Fitted at low extra cost.

All Polished with the new enamel that gives a glass hard surface that cannot be soiled or scratched. SENT FREE.—Catalogue of standard Wireless Cabinets in various sizes and woods.

Packed and delivered free in U.K. No. 59

CAXTON WOOD TURNERY CO., Market Harborough



The IGRANIC UNITUNE APERIODIC Fixed Coupler (Regd. Design No. 708263) (De Forest Patent No. 141344 & Patent No. 238318).

The Unitune Coupler costs far less than a wave-trap

Yet it does a wave-trap's work. Where interference prevents the reception of distant stations the Igranitic Unitune Aperiodic Fixed Coupler will, in many cases, eliminate the interference or reduce it to such an extent as to enable the more distant stations to be received. Its use necessitates no big expense, no reconstruction of your set—you merely plug-in the Unitune Coupler in place of your usual aerial coil and tune in the ordinary way. Two sizes are available: Unitune Minor for 75-180 metres. Price 7/6. Unitune Major for 300-600 metres. Price 9/-.

Ask your dealer about them.

Write for List S.12.

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TWO INTERESTING LETTERS

The "Simplicity" Three-Valve Set

DEAR SIR,—If not too late in the day I would be glad to be allowed to comment very favourably on the above set made as per the very clear instructions in Radio Press Envelope No. 3, by G. P. Kendall, B.Sc. It is by no means the first set I have made, but I followed your instructions. I am using 3s. 9d. valves, home-made coils, chock-full of capacity, etc. (all rules carefully disregarded over the latter); 40 ft. of inside aerial, fair direct earth. I get Dutch, German and French stations, and 2LO and Daventry. Only once got Sheffield and Cardiff same evening. To-night I got Daventry faintly, but understandable, Radio-Paris and Eiffel Tower on two home-made coils very well. My inefficient aerial prevents America coming in (also poor valves). Ships are, of course, deafening. I have used the set about fifteen months. It is a jolly good little set, and many thanks and credit are due to Mr. Kendall.—Yours very faithfully,
Greenwich.

CYRIL MORGAN.

Stars!

SIR,—Perhaps this will be of interest to you. My wireless receiving set is very near the fireguard, which has the usual brass top, and, while testing my wet Leclanche H.T. battery the other day (the set was working on short waves at the time), the H.T. battery is near the floor, and to test it I had to lean down, and in so doing my forehead touched the brass on top of the fireguard, and was left touching it for support. While testing a certain cell, I touched the small positive terminal on the top, when to my surprise a huge flash crossed my eyes. I could not actually see the spark, but it seemed in my eyes. I then tested the voltage from negative to that terminal, and found it was 40 volts. I then tapped each terminal in turn, and found I could vary the flashes, from a very bright flash at 60 volts down to a faint flash at 15 volts. I have never had the experience before. I wonder if any of your readers have, or can you explain it?—
Yours faithfully,
Aberdovey.

SURPRISED.

RESULTS OF "CARTOONIGRAFS" COMPETITION

No. 7.—BRAVO! THE B.B.C.

FIRST PRIZE: When the recent Strike muzzled the Press,
We got the news nevertheless.
Great credit is due
To the B.B.C. who—
"Ruled the Waves" During Britain's Distress.

R. W. BURNS, Field Head, Wakefield, Yorks.

SECOND PRIZE: Left nothing for people to guess.

J. T. BROWN, Bonsall, Nr. Matlock.

THIRD PRIZE: Gave Dame Rumour no chance of success.

R. LANE, The Firmins, West Bergholt, Colchester.

CONSOLATION PRIZES:—The following fifty competitors have each been awarded a Consolation Prize, consisting of three Radio Press Handbooks or Envelopes, each book or envelope not exceeding 2s. 6d. in price. Will those readers whose names appear below, please communicate their choice by letter to the Editor, WIRELESS, Radio Press, Ltd., Bush House, London, W.C.2, marking the envelope "Consolation Prize"? Lists of Radio Press Handbooks and Envelopes will be found on page 252.

E. T. Warner, 71, Foleshill Road, Coventry.
R. B. Starford, 16, Queens Drive, Broad Green, Liverpool.
R. B. Darby, Keelworth, Chisholm Road, Croydon.
G. E. Freer, "Homestead," Friar's Place Lane, Acton, London, W.3.
L. J. Finch, 137, Utting Avenue, Queen's Drive, Walton, Liverpool.
A. W. Hatton, 1, High Street, Burton-on-Trent, Staffordshire.
A. D. Brand, 23, Dix's Place, Paulin Street, Bermondsey, S.E.1.
J. Rich, Palace Cinema, Dunfermline, Scotland.
Thomas Lampitt, 21, Wilson Street, Rainbow Hill, Worcester.
F. G. S. Anderson, 9, St. Leonards Road, West Ealing, W.13.
W. J. Ralph, 3, Farley Place, South Norwood, S.E.25.
Arthur R. Gunter, Clock House, Tenby, S. Wales.
H. Watts, 78, Suffolk Road, Barking, Essex.
Harry E. Jones, 4, Rundle Road, Preston, Lancs.
David Jones, 4, Rundle Road, Preston, Lancs.
Alfred Parish, 88, Jefferson Street, Goole, Yorks.
Reg. Xonaky, 58, High Lane, Chorlton-Cum-Hardy, Manchester.
J. Lewis, 11, Alexandra Street, Stapleford, Nottingham.
John R. Eaton, 14, Rosenau Road, Battersea Park, S.W.11.
Warren H. Hassall, Union Street, Bridgton, Cannock, Stafford.

T. Close, 13, Brooke Road, Walthamstow, E.17.
Arthur Harrison, 128, Walton Street, Oxford.
Mr. John Hill, 49, Reynoldson Street, Newland Avenue, Hull, Yorks.
A. C. Doran, 1, Medwin Street, Clapham, S.W.4.
W. Oughton, 168, Milton Avenue, East Ham, E.6.
E. F. Byles, 8, Barnard Avenue, Great Yarmouth.
W. F. Ramsey, White Cottage, Merstham, Redhill.
W. J. Thomas, 5, Westlands Road, Moseley, Birmingham.
David Watson, 46, Addison Road, Wanstead, E.11.
Wm. A. Goad, 43, Rolt Street, S.E.8.
A. B. Side, "Bottesford," Western Road, Tring, Herts.
Jack Chastelain, 7, Western Terrace, Northampton.
Alexander Anderson, 4, Greyfriars Garden, St. Andrews, Fife.
T. Lewis, 4, Dyfed Avenue, Town Hill, Swansea.
I. Grignon, "Southborough," Brightwell Avenue, Westcliff-on-Sea.
H. M. Pollard, 14, Victor Road, Heaton, Bradford.
R. Harper, 6, Gerrard Street, West End, Leicester.
A. M. Barnes, 4, Talbot Square, Bayswater, London, W.2.
Mr. R. Holmes, 2, West View, Turners Hill, Cheshunt, Herts.
E. W. Garland, 179, St. Margarets Road, St. Margarets-on-Thames, Middlesex.
J. R. Topham-Haynes, 247, Eastfield, Peterborough, Northamptonshire.
J. G. Woolley, "Leyton," Griffithstown, Monmouthshire.
F. Clarke, 4, The Crescent, Horsforth, Leeds.
Mrs. L. Ramsbottom, 109, Commercial Street, Newport, Monmouthshire.
Mr. W. Gwinnell, Preswyla House, Trimsaran, near Kidwelly, South Wales.
James Moore, 100, Main Street, Bridgeton, Glasgow.
Mr. H. C. Clarke, 23, LT. Park Street, Wellingborough, Northants.
Mr. E. Jones, 30, Belmont Terrace, Aberbeeg, Mon., South Wales.
V. Diamond, 19, Crown Street, Millom, Cumberland.

No. 39.

The Circular.



READERS' COMMENTS

The Elstree H.F. Unit

SIR,—I wish to thank you for the constructional details of the H.F. amplifier described in your June 19 issue. For so small a unit the results are really remarkable and fully worth the small cost involved. Using a very ordinary one-valve circuit I was able to tune in all the B.B.C. stations in daylight, besides Radio-Paris, Postes Telegraphes and Eiffel Tower. In the evening, Hamburg, the Hague, Madrid, Radio Barcelona, and two other Continental stations, which at present remain unidentified, came in well.

My aerial is 20 ft. at the house end, 30 ft. at the other, and the total length including the lead-in is about 50ft. The earth wire is about 15 ft. long and is attached to a water-pipe. So with such unattractive conditions I think the set well worth the trouble. Wishing your excellent papers every success, and hoping that you will publish this letter of appreciation.—Yours faithfully,

SECRETARY TO LOCAL WIRELESS CLUB.
Gillingham.

An Advocate of Short Waves

SIR,—The B.B.C. are considering more high-power stations. Why not one to operate on 60 metres or thereabouts?

Quite apart from the large numbers of amateur experimenters in Britain who would build or purchase short-wave sets, there are many thousands of enthusiasts

in tropical countries to whom a short-wave station in the home country would be a veritable godsend. In Nigeria, for instance, KDKA can often be received on a loud-speaker with but little interference, when at two hundred metres or above nothing to be heard, but a deafening tumult of atmospheric crashes and roars.

On a few days in the year only is it possible to receive recognisable speech or music from existing English stations. The interest aroused by these rare exceptions is a sure indication of a big market for short-wave sets, if, and when, Britain has her parallel to KDKA.

Here is a chance for the B.B.C. to help the industry themselves, and last, but not least, those of Britain's sons who carry the white man's burden in countries where comfort and luxury are alike almost unknown.—Yours faithfully,

EX-WEARY.

London and Nigeria.

NEWS IN ADVERTISEMENTS

In the advertisement of Messrs. A. C. Cossor, Ltd., in this issue, will be found particulars of the new Cossor "Point One" valve, which operates from a 2-volt accumulator. This valve is made in three types, for H.F. work, detection, and power amplification, the latter type having a filament consumption of .15 amp. The manufacturers claim that, owing to a special construction, should the

electrodes be displaced by an accidental blow, they must always remain in the same position relative to one another.

Messrs. Igranic Electric, Ltd., are advertising their "Unitune" Coupler, which, they claim, will give greatly increased selectivity over the usual types of coil. It enables a special form of coupling to be used in any receiver without alteration of any components other than the coils.

Messrs. Ferranti, Ltd., in their advertisement of their Low-frequency transformers, invite readers to ask for their leaflet Wa401. This leaflet contains a large amount of useful information about the well-known Ferranti product.

Details of the "Permacon" and of the Cosmos grid-leaks will be found in the advertisement of Messrs. Metro-Vick Supplies, Ltd., who also offer a free "Components Brochure."

A Special Amplifier Issue of WIRELESS will appear next week. Order your copy early. Price as usual.

On Guard!

There is no leakage with a "Lotus" Buoyancy Valve Holder on guard.

Immediate and lasting connection made when valve pins enter valve sockets. The leg socket expands and automatically locks.

Absorbs shock, protects the valves and eliminates all microphonic noises.

Without Terminals 2/3

With Terminals 2/6



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

Garnett, Whiteley & Co., Ltd.,
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Makers of the famous "Lotus" Vernier Coil Holder.



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2	1/-	1/2	12		2/8
Simplified Wireless			Radio Valves and How to Use Them		2/8
By John Scott-Taggart, F.Inst.P., A.M.I.E.E.			By John Scott-Taggart, F.Inst.P., A.M.I.E.E.		
3	1/8	1/8	13		2/8
How to Make Your Own Broadcast Receiver			500 Wireless Questions Answered		2/8
By John Scott-Taggart, F.Inst.P., A.M.I.E.E.			By G. P. Kendall, B.Sc., and E. Redpath.		
4	1/-	1/2	14		2/8
How to Erect Your Wireless Aerial			12 Tested Wireless Sets		2/8
By B. Mitchell, A.M.I.E.E.			By Percy W. Harris, M.I.R.E.		
5	1/8	1/8	16		2/8
The Construction of Wireless Receiving Apparatus			Home Built Wireless Components		2/8
By P. D. Tyers.			By Stanley G. Rattee, M.I.R.E.		
6	1/8	1/8	17		2/8
The Construction of Crystal Receivers			Wireless Sets for Home Constructors		2/8
By Alan L. M. Douglas.			By E. Redpath.		
7	2/6	2/8	18		1/6
How to Make a "Unit" Wireless Receiver			Tuning Coils and How to Wind Them		1/8
By E. Redpath.			By G. P. Kendall, B.Sc.		
8	1/6	1/8	21		1/6
Pictorial Wireless Circuits			Six Simple Sets		1/8
By Oswald J. Rankin.			By Stanley G. Rattee, M.I.R.E.		
9	2/6	2/8	22		1/8
Wireless Valves Simply Explained			Switches in Wireless Circuits		1/8
By John Scott-Taggart, F.Inst.P., A.M.I.E.E.			By Oswald J. Rankin.		
			24		1/6
			Wireless Faults and How to Find Them		1/8
			By R. W. Hallons, M.A.		

ENVELOPES

No.	Price.	Post	No.	Price.	Post
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How to Build an S.T.100 Receiver			How to Build a 2-Valve Amplifier de Luxe		
By John Scott-Taggart, F.Inst.P., A.M.I.E.E.			By Herbert K. Simpson.		
2	2/6	2/8	8	1/6	1/8
How to Build the "Family" 4-Valve Receiver			How to Make a 1-Valve Reflex Receiver		
By Percy W. Harris, M.I.R.E.			By Herbert K. Simpson.		
3	2/6	2/8	9	1/6	1/8
How to Build the "Simplicity" 3-Valve Set			How to Build an Efficient Single-Valve Set		
By G. P. Kendall, B.Sc.			By Herbert K. Simpson.		
4	2/6	2/8	10	2/6	2/8
How to Build the All-Concert de Luxe Receiver			How to Build a Twin-Valve Loud-Speaker Receiver		
By Percy W. Harris, M.I.R.E.			By John Scott-Taggart, F.Inst.P., A.M.I.E.E.		
5	2/6	2/8	11	1/6	1/8
How to Build the Omni Receiver			An Adaptable Crystal-Set		
By John Scott-Taggart, F.Inst.P., A.M.I.E.E.			By Percy W. Harris, M.I.R.E.		
6	1/6	1/8	13	2/6	2/8
How to Build the ABC Wave Trap			The Three-Valve Dual Receiver		
By G. P. Kendall, B.Sc.			By John Scott-Taggart, F.Inst.P., A.M.I.E.E.		

All the above can be obtained from wireless dealers, booksellers, bookstalls, or direct from Dept. S.
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is essential to every wireless retailer. To be able to satisfy himself, and his customers, that transformers, valves, batteries, &c., are in perfect condition cannot but induce pleasant business dealings. To be able to test the continuity of any circuit and locate faults in a customer's receiver will add immeasurably to the service you render.

Such an instrument has been designed and is described in detail in the July issue of *THE DEALER*. The cost of construction is very reasonable and the time occupied in building will be well spent.

The article dealing with this "Service and Testing Set" is only one of many sales-aids to the trader which appear in this issue. Produced for the wireless trade by exclusively wireless publishers *THE DEALER* is the established pre-eminent monthly journal essential to every trader.

Send for a specimen copy now and realise what you miss by not seeing a copy regularly.

Contents of the July issue include in addition to regular features:—
Further Details of the London and Birmingham Exhibitions, an Exclusive Interview with a leading West-End Retailer, an article on "The Art of the Cabinet Maker," and "New Components for the Coming Season."

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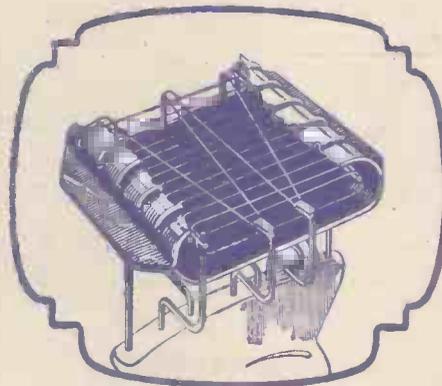


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that the factors controlling the volume of pure reproduction from your receiver are based on the design of the filaments of your valves —

Everybody

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There is no mystery in the construction of a valve. Any anode and grid will operate with any filament but it is the filament that counts, and this is what you pay for.



For 4-volt accumulator or 3 dry cells
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Now look at The Mullard P.M. Filament

Its increased length completely within the field of the anode and grid is obviously greater than that of any other valve on the market. It is supported by five strong but resilient hooks. It has a large core of a special ductile metal that prevents it from breaking except by the very roughest handling.

It consumes **ONLY ONE TENTH AMPERE** and is so economical that no sign of glow can be discerned. Will give you consistent powerful results during a long life.

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