

WIRELESS, incorporating 'Wireless Weekly,' OCTOBER 16, 1926.

WIRELESS



INCORPORATING
WIRELESS WEEKLY



Vol. V. | OCTOBER 16, 1926 | No. 9

30 TO 3,000 METRES
ON A
THREE-VALVE SET

By L. H. THOMAS

WHAT THE NEW WAVE-LENGTHS MEAN TO YOU

By G. P. KENDALL, B.Sc.

**The International Prizewinners
Tell Their Story**

**How to Try Parallel Feed
Circuits**

[Registered at the G.P.O. as a Newspaper.]



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

"WHY I CHOOSE RADIO." By John Henry.



J. H. Reyner, B.Sc. (Hons.), A.M.I.E.E., who writes on the interesting subject of "Problems of Single-Dial Control."

WIRELESS 2^D

THE ONE-WORD WEEKLY

Obtainable from all Newsagents, Bookstalls and Booksellers, or direct from the Publishers, Radio Press, Ltd., Bush House, Strand, London, W.C.2. Subscription Rates, 13/- per annum throughout the world.

FROM YOUR NEWSAGENT

Pat. No.
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DEMPSEY— TUNNEY FIGHT

Clearly received in London

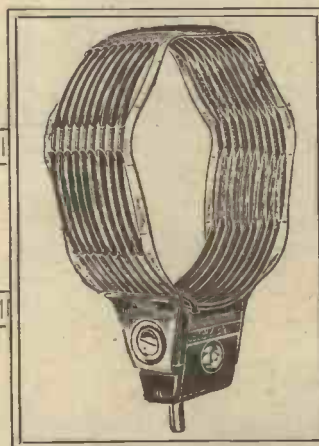
Copy of unsolicited letter received by
IGRANIC ELECTRIC CO. LTD.

DEAR SIRS,

Clapham, S.W.11. 24/9/26.

I think the following may interest you. At the beginning of this month I purchased two sets of your short-wave coils, and having tried innumerable coils for the short waves, both home-made and commercial, I must confess I was amazed at the efficiency of yours. This was so marked that it even tempted me to arise at 2.30 this morning in the hope of hearing the fight broadcast. I tuned in within two minutes of 2XAF on 32.79 metres and held it without a break till 4 a.m. when I had to close down. There was a certain amount of fading but not enough to prevent me hearing practically every word from the ringside, and the progress of the whole ten rounds was followed with intense interest. When the fight was finished dance music followed, and on switching on the loud-speaker I found that the strength was quite enough to fill the room, although not perhaps full loud-speaker strength as some people know it. The set was a three valve O-V-2 and the circuit similar to the one you publish in the pamphlet describing the coils. Having got the above results, I can only say that the coils exceeded my expectations, for although I have received U.S. transmissions before I have never tuned in with such ease or held them for so long.—
Yours faithfully,
(Sgd.) F. R. RAWLINGS.

Use IGRANIC Short-Wave Coils

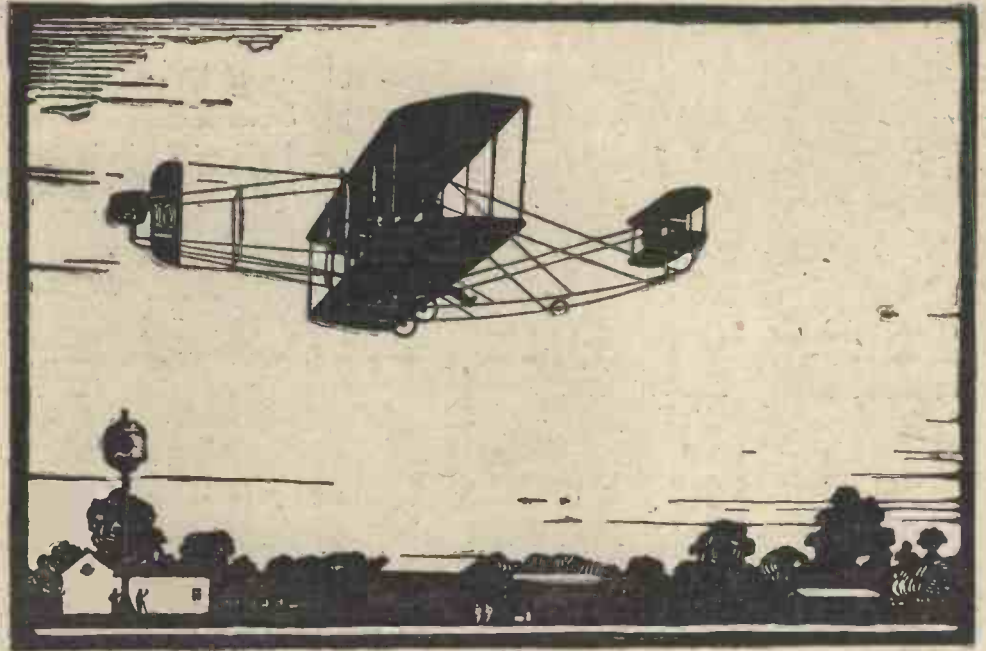


Write for Pamphlet No. S. 33.

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In 1910

In 1910 arose the problem of designing condensers for aircraft wireless sets.

The glass Leyden jars of those days were too bulky and too fragile, and there was no other suitable condenser made.

Thus it was that William Dubilier turned his attention to the subject and commenced his pioneer experiments. He immediately realised that to design a condenser which should be compact, unbreakable, and at the same time efficient under the high frequencies and voltages of wireless circuits would call for much specialised research.

He was successful in that same year in producing the first con-

denser to meet these requirements. Its dielectric was Mica.

Three years later, encouraged by the War Office, he commenced upon the manufacture of condensers on a large scale, and the Dubilier Condenser Company at once assumed the leadership which it holds to this day.

For sixteen years we have specialized in the manufacture of wireless condensers, and for all products bearing our name we have continuously insisted upon that high standard of efficiency which we as Radio Engineers know to be so essential.

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And the possession of such condensers is essential to good results whether you build a crystal set or conduct laboratory research.



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THIS WEEK'S NOTES AND NEWS

Those Wireless Degrees

THE B.B.C.'s "Varsity for All" scheme is, I hear, attracting quite an amount of attention in other countries. Naturally, I hope we shall act up to our reputation in this branch of broadcasting, and do it well if at all; but I must confess that I cannot for the life of me see how some of the difficulties will be surmounted. Anyhow, I have heard once or twice that "difficulties were made to be overcome," so that probably all will be well in the end.

Novel SOS Messages

THE B.B.C. is certainly being put to some novel uses nowadays. There was the recent "poison warning" broadcast, and some of the other "SOS" calls have also been of a peculiar character. One of the B.B.C. officials who deals with this branch of the programmes, if I may call it that, told me, however, that only quite a small fraction of the requests they receive for the broadcasting of SOS calls are deemed worthy of being "put on the air." Otherwise, he said, the programmes would consist of SOS calls with occasional musical items to fill up the vacant spaces!

A Departure

"GALE warnings" are in future to be broadcast from Daventry as required; these will be given out after the time signals at 1 p.m. and 4 p.m., and also at the end of the weather report at 7 p.m. Arrangements have been arrived at with the Meteorological Office of the Air Ministry.

A Rejoinder

THE many listeners who grumble because a real alternative programme is not often obtainable from Daventry probably do not realise that the chief reason for this is the enormous number of letters that the B.B.C. receive from listeners who can only receive Daventry and yet clamour to hear the London programme. It is another case of trying hard to please everybody!

Confusion!

MR. WALLACE MATON, of Hythe, near Southampton, whose "wireless exchange" succeeded in making the Post Office sit up and take notice rather suddenly a few months ago, is carrying on in the comforting belief that he is within his rights. All his "subscribers" must, of course, have the usual licences, but they receive the programmes free of any trouble for the small sum of 1s. 6d. per week! The *Hampshire Observer* considers that there are big possibilities in this "from a commercial point of view." Does this mean that the listeners who ring up the exchange and ask for 2LO will be given a wrong number?

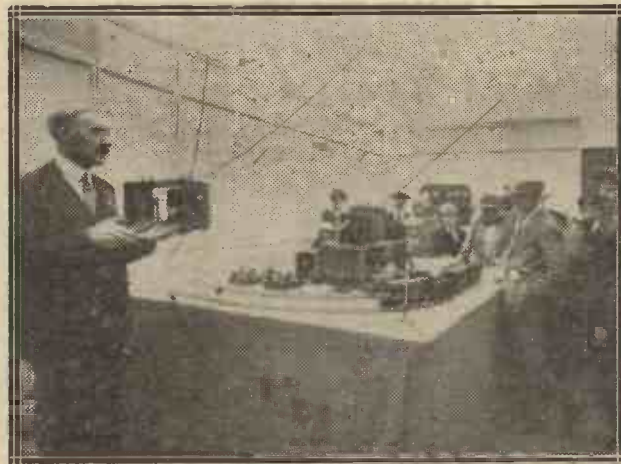
Improvement Still Wanted

APPARENTLY there are still very few people in the country who know how to erect an aerial that is useful without being unsightly. The Hungerford Rural District Council is one of the latest to receive complaints that Council houses are being damaged by the erection of masts and lead-in tubes, etc., and also quite an independent complaint about the disfiguration of the landscape. I have seen

an aerial which is as nearly electrically perfect as I should think possible, and yet is an ornament to the house. Also, no huge holes have been bored in the walls and window frames. I wonder when we shall improve in this direction?

More Newcomers

BBROADCASTING stations in foreign countries are now springing up. (Continued on next page.)

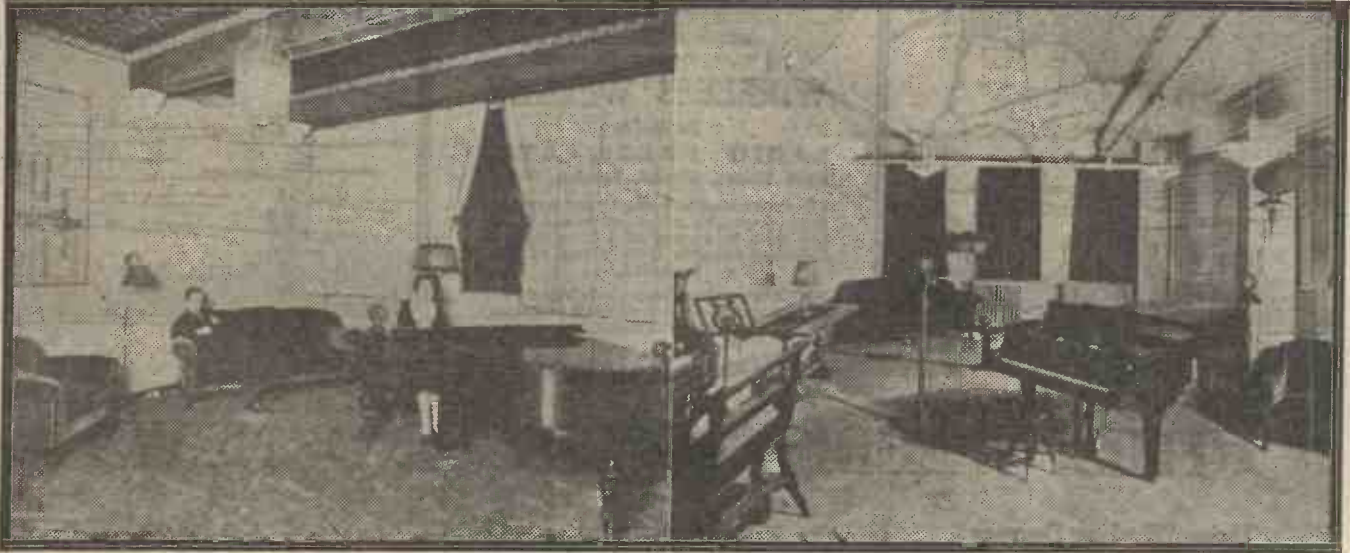


At the Model Engineering Exhibition held recently at the Horticultural Hall, London, the wireless control of railways formed a fascinating exhibit. Major Phillips is seen demonstrating.

Underground

M.CORVER, experimenting in the Limburg coal mines, has succeeded in transmitting telephony on a wave of 30 metres through the earth. He made the interesting discovery that these short waves apparently travelled much more easily horizontally than vertically under these conditions.

This Week's Notes and News—continued



Two interesting examples of American studio organisation. On the left is that belonging to station WENR, while the right-hand picture shows the studio at WBAL.

like the proverbial mushrooms (although I must confess that I have never watched one of these growing). Six or seven new stations are shortly being built in Japan, and also Lithuania and Latvia seem to have their eyes on the possibility of increasing the size and power of their stations. Soon we shall hear of the London programme being broadcast to "all countries except the Fiji Islands, Samoa and St. Helena" or something of that sort!

Useful to Autograph Hunters

"**A**UTOGRAPH telegrams" may soon become accomplished facts in France. More than this, they may even "speak for themselves." The telegram and the radiogram are at present looked upon as the limit in coldness and brevity. In the future, however, we may receive a photograph of the actual document scribbled by our friend at the other end, the photograph itself having been transmitted by wire or wireless. As an experiment, autograph telegrams will be accepted at Marseilles, Paris, Lyons, Nice, Bordeaux and Strasbourg. They may be sent from any place in this list to any other.

More Short Waves

THE short-wave WGY station, 2XAF, will, I hear, be transmitting much more frequently and regularly in future. A power of 50 kw. is used on occasions, though I

believe the normal working power is rather lower. The exact wavelength (crystal controlled) is 32.79 metres, and the station may be heard almost any night after 10 p.m. G.M.T.

2NM Again

HOWEVER the distant parts of the world may be linked together by means of a chain of broadcasting stations, the amateur trans-

tance work can be realised. Communication over 3,000 miles or so can, of course, be maintained with powers as low as 10 watts!

Tolerance!

A CURIOUS situation has arisen in Budapest. The Vicar-General, Dr. Mezsaros, has forbidden Catholics to listen in while non-Catholic sermons are being broadcast, owing to "Protestant propaganda," for which radio is said to be used.

Less of It

WE shall, if the B.B.C. carry out their promises, no longer be able to accuse 2LO of being "2loquacious." They have stated, in an official announcement, that they will continue to make any essential announcements of main items and artists, but they will leave details and explanations to the *Radio Times*.

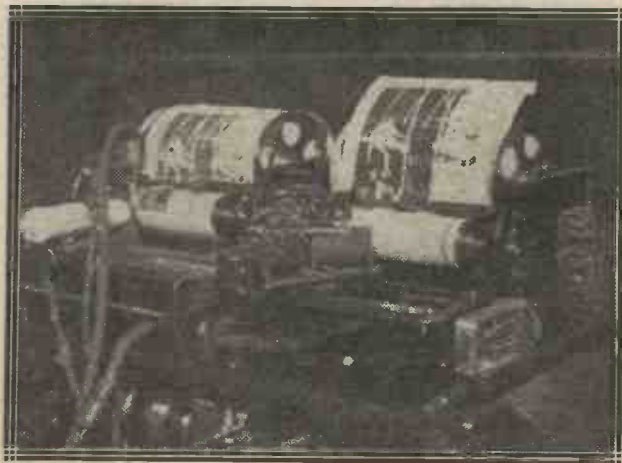
Phonofilm Possibilities

THE recent success of the "talking films" makes one wonder how far ahead the day is when a phonofilm will be shown in a large London cinema, and transmitted simultaneously both

by television and telephony to all the large provincial centres. What shall we think then of the "early efforts of broadcasting?"

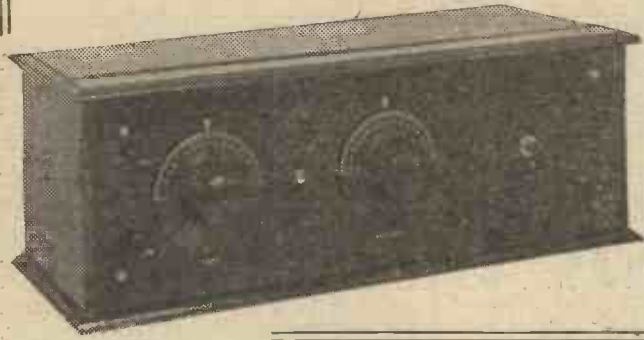
Licences in India

RADIO in India is increasing in popularity almost day by day, says an Indian correspondent. Over 2,700 licences were granted during the past six months. **CALL-SIGN.**



The apparatus at Radio House on which the first pictures of the fight were received. Notice the revolving drums.

mitters still seem to hold the prize for "hooking up" with remote places. Mr. Gerald Marcuse, 2NM, was recently in communication with Mr. R. Earle, of Singapore. This was the first contact between Great Britain and Malaya. When one considers that the powers used were considerably less than one-quarter of that used by some of the broadcasting stations, the value of short waves for long-dis-



30 to 3,000 METRES ON A THREE-VALVE SET

By L. H. THOMAS

The short-wave enthusiast is rather apt to speak slightly of what he calls "B.C.L.'s," but the reason why so many of us confine our activities to the broadcast band is the difficulty of providing a separate set for short-wave work. Here is a design for a receiver which overcomes the difficulty in an efficient manner.



ALTHOUGH there is now no room for doubt that, in order to "make a round" of the Continental stations, it is absolutely necessary to use one or more stages of high-frequency amplification, there are many who wish to receive the local station at really good loud-speaker strength, and, if possible, to receive four or five of the stronger distant stations as well, also on the loud-speaker.

Unfortunately, however, there seems to be an impression abroad that sets which do not use high-frequency amplification are good for nothing at all but Daventry and the local station.

Admittedly, sometimes such sets do not possess a sufficiently high degree of selectivity to permit of the reception of anything else.

Some Results

The receiver described in this article consists of a detector arranged on a principle similar to the "Reinartz" arrangement, followed by two note-magnifiers, the latter being arranged so that either a fairly low amplification and very good quality may be obtained from the local station, while higher amplification (perhaps at the expense of a little of the purity of reproduction) may be obtained when desired. This end has

WHAT YOU WILL NEED

- One cabinet, 21 ins. by 7 ins. by 7 ins. with baseboard 6½ ins. deep. (Camco.)
 - One panel, 21 ins. by 7 ins. by 3/16 ins. (Camco.)
 - One pair of right-angled brackets. (Camco.)
 - Two .00025 straight-line frequency condensers, with slow-motion drive. (Ormond Engineering.)
 - Two multi-ratio L.F. transformers. (Radio Instruments, Ltd.)
 - Three "Clearer-Tone" valve-holders. (Benjamin Electric, Ltd.)
 - One base-mounting coil socket.
 - One H.F. choke. (Lissen, Ltd.)
 - Three baseboard mounting rheostats. (Lissen, Ltd.)
 - One .0003 fixed condenser and one 4-megohm leak. (Dubilier Condenser Co.)
 - One .0001 fixed condenser. (Dubilier Condenser Co.)
 - One .001 fixed condenser. (Dubilier Condenser Co.)
 - One strip to take 7 terminals.
- Terminals inscribed as follows:
 Aerial, Earth, L.S.+, L.S.-, L.T.+, L.T.-, H.T.+1, H.T.+2, Grid+, Grid-1, Grid-2. (Belling & Lee.)
- Two "Decko" dial indicators and one on-off switch. (A. F. Bulgin.)
 - Glazite for wiring, and one packet of Radio Press Panel Transfers.
- Approximate Cost: £9.

been arrived at by the use of "multi-ratio" L.F. transformers. The set is also arranged to cover an extremely wide range of wavelengths.

On actual test on a fairly good aerial in South East London (60 feet long and 35 feet high), 2LO could be cut out completely from Bournemouth, although Manchester and Cardiff were interfered with to some extent.

The actual stations received on the loud-speaker were Daventry, London, Bournemouth, Madrid, Hamburg, Brussels, and two unidentified Austrian stations.

Telephones can, of course, be used if desired, and several more Continental stations received which are normally rather too weak to give satisfactory loud-speaker reproduction. This is not recommended, however, since it becomes decidedly painful if one inadvertently tunes in the local station with two good note-magnifiers in circuit!

Easy Operation

When one considers the simplicity of operation of a set of this type, when compared with sets of the normal "multi-H.F." type, one cannot, of course, reasonably expect to receive anything like the number of stations that some of the latter will bring in, especially when handled by experienced operators.

(Continued on next page.)

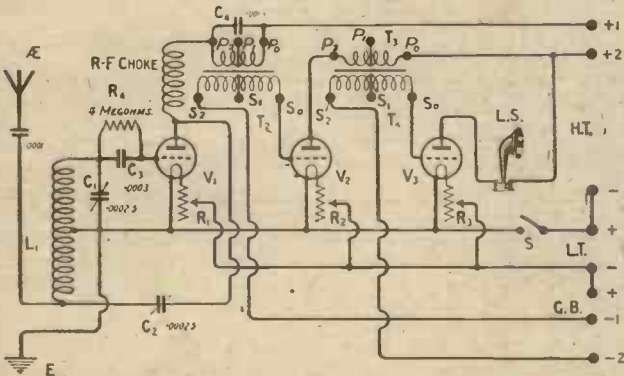
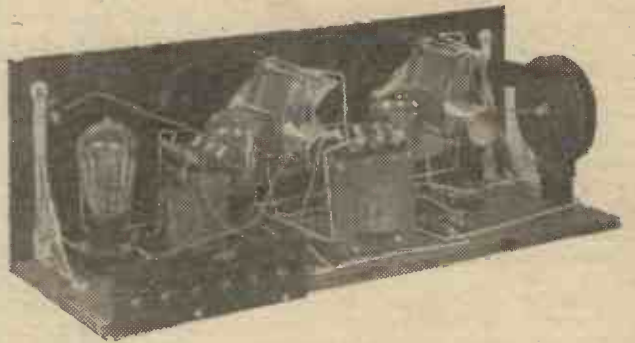


Fig. 1.—A good measure of selectivity is obtained by connecting the aerial to the anode end of the coil.



Theappings on the L.F. transformers should be arranged to suit the valves in use.

30 to 3,000 Metres on a Three-Valve Set—continued

Much of this ease of operation is due to the capacity form of reaction control, but it must be borne in mind that the receiver is not of the non-radiating type, and should therefore not be allowed to oscillate when telephony is being tuned in.

Only one coil (of the centre-tapped type) is used, and this is interchangeable for different wavelength ranges. The actual receiver seen in the photographs has worked extremely well on wavelengths right down to 32 metres, on which wavelength 2XAF, the short-wave sister station to the famous WGY, has been received several times.

All the components have been well spaced from one another, thus making the receiver quite suitable for short-wave work. Any type of short-wave coil may be employed; the writer used the Igranic, and took the "centre tap" on the bare wire by means of a spring clip.

Construction

The construction and assembly of this set is perfectly simple and straightforward, and should be easily finished in one evening. The wiring is also of the simplest order.

All battery terminals are on the strip at the rear of the set, the only terminals on the front panel being those for the loud-speaker, aerial and earth. The panel layout is also simplified still further by the use of baseboard-mounting rheostats. As will be seen, nothing else is mounted

on the panel but two variable condensers and the push-pull switch controlling all the filaments.

It will be found easiest to mount all the necessary components on the baseboard and wire them up before the panel is permanently fixed in position. The brackets should, however, be affixed to the panel and a "trial fit" made first of all.

To be Noted Carefully

Special note should be made of the method of placing the L.F. transformers, since any serious deviation from this will almost certainly result in instability and howling. Also, the .001 fixed condenser across the primary winding of the first transformer should in no circumstances be omitted, although when one sees the H.F. choke in the anode circuit of the detector it may seem unnecessary. This also helps considerably to keep the set stable, however.

When the set is completed the

voltmeter across each pair of filament terminals in turn, with the rheostats turned full on and the push-pull switch making contact. If the usual reading of six volts or so is obtained, this part of the set may be taken as correctly wired.

Valves

Now insert the valves. The writer used one of the high-impedance resistance-coupling type as detector, a small power valve as the first note-magnifier, and a larger power valve as the last note-magnifier. As "multi-ratio" transformers are used, however, almost any type of valve within reason can be made to give excellent results.

If valves of the type specified above are used, the connections to the L.F. transformers should be as follows:—The flex leads should in both cases be taken to the ends of the secondary windings (i.e., across S0 and S2). The flex leads to the first primary should be taken to P0 and P2 (giving an impedance of 60,000 ohms), and those to the second primary to P0 and P1. This gives an impedance of 4,000 ohms. Both of these then roughly match the impedance of the valve in the plate circuit of which they are connected. On the transformers themselves is a little table showing the different primary impedances and ratios obtainable, and this will be found helpful if different types of valve are used.

In the original set certain of the transformer connections have been made with rigid wire, flex being used only for the connections that have to be changed.

Voltages

It should be noted that both the L.F. valves are run on the same H.T. (Continued on page 322.)

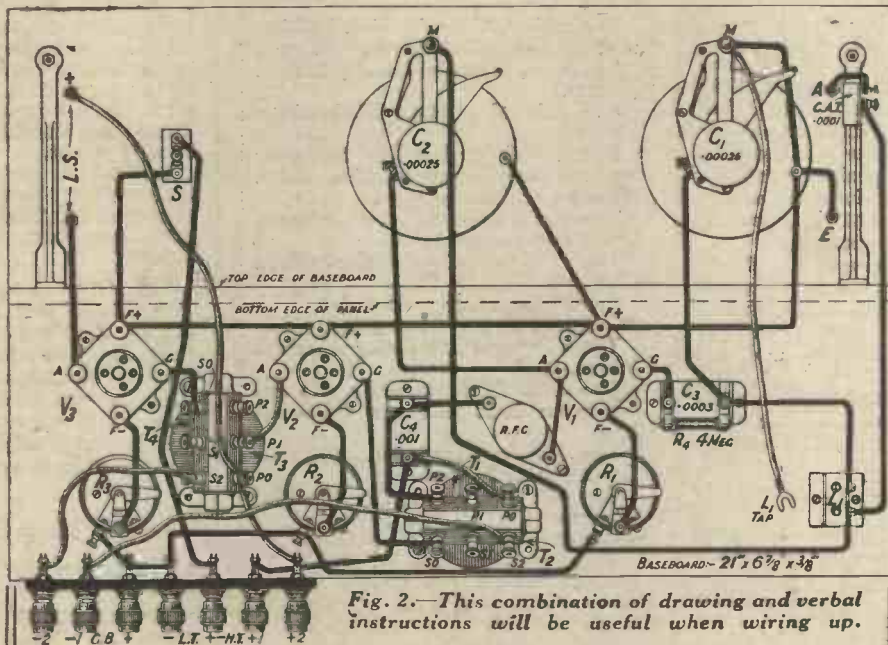


Fig. 2.—This combination of drawing and verbal instructions will be useful when wiring up.

WIRING INSTRUCTIONS.

Join Aerial terminal to one side of C.A.T. condenser.

Join other side of C.A.T. condenser to one side of L1 and thence to moving plates of C2.

Join other side of L1 to one side of C3 and R4 and thence to fixed plates of C1.

Join other side of C3 and R4 to G of V1.

Join A of V1 to one side of R.F. choke and to fixed plates of C2.

Join other side of R.F. choke to one side of C4 and thence to one side of transformer primary T1.

Join other side of T1 to other side of C4 and thence to H.T. +1.

Join one side of transformer secondary T2 to G of V2.

Join other side of T2 to G.B. -1.

Join A of V2 to one side of transformer primary T3.

Join other side of T3 to top loud-speaker terminal and to H.T. +2.

Join one side of transformer secondary T4 to G of V3.

Join other side of T4 to G.B. -2.

Join A of V3 to remaining loud-speaker terminal.

Join H.T. -, L.T. + terminal to one side of switch S.

Join other side of S to F+ of V3, V2 and V1 respectively, and thence to metal screen of C1, earth terminal, and moving plates of C1.

From latter point take flex lead for L1 tap. Join metal screen of C2 to F+ of V1.

Join one side of R3 to G.B. + and thence to L.T. -, one side of R2, and one side of R1 respectively.

Join remaining sides of R1, R2 and R3 to F- contacts of V1, V2 and V3 respectively.

wiring should, of course, be carefully checked before any attempt at testing is made. The usual test across the filament terminals should also be made before inserting the valves. Those who possess a voltmeter may carry this out as follows:—Connect the correct L.T. and H.T. voltages, also the grid-bias battery (the values are mentioned later in the article), and touch the

HOW THE NEW WAVELENGTHS WILL AFFECT YOU

IMPORTANT CHANGES KILOCYCLES AT LAST!

HOW TO MODIFY YOUR SET FOR THE NEW RELAY WAVE



LEANING up the European ether." How easy and desirable a process it sounds! The disgruntled long-distance enthusiast

who has just been trying to receive Madrid and has found in its place nothing but a medley of heterodyne whistles is rather apt to assume that all that is needed is just a little international co-operation, and the whole trouble could be cleared up. In his cooler moments, however, he probably realises, as do most of us, that it is really the most difficult problem in broadcasting to-day. The reason for the great difficulty of the problem is simple; there are actually more stations in Europe than there are "channels" available in the ether for them to work in.

Practical Difficulties

Some idea of the great difficulty of the problem which is being faced at Geneva may be gathered from the fact that the new scheme of wavelengths which it had at first been intended to bring into operation round about the 15th of last month will now not be attempted until near the end of this month, the reason apparently being that the practical arrangements for getting the stations on to their new wavelengths, checking those wavelengths accurately, and so on, cannot be completed until then.

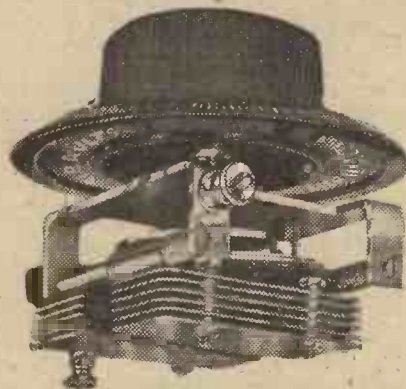
The working out of the new wavelength scheme is unquestionably a courageous and far-seeing step on the part of the authorities at Geneva, but we must not fall into the error of thinking that the matter is ended when a complete scheme is approved. There still remains the very difficult task which is imposed upon the engineering staffs of all the European stations of carrying out that scheme and performing their work with the necessary degree of accuracy to ensure that it shall have a reasonable chance of success. Given time, no doubt the work will be done, and sooner or later the scheme will come into operation, and we shall be able to see just what difference it makes to the European ether and how you and I will be affected.



The infallible way of keeping a station to a given frequency is by crystal control. Mr. Arlin, the chief announcer at KDKA, is here seen holding a specimen of Quartz crystal used at this station.

The Frequency Basis

In the meantime there are quite a number of things which we can decide



"Given a correct straight line frequency condenser in a closed circuit, it will be found with the new allocation that stations do actually come in at roughly equal intervals all round the dial."

upon at once concerning the altered conditions, our preparations to meet them, and so on. First and foremost, it is to be noted that the stations are at last to be allocated on the logical basis of a certain separation in frequency between their waves. The minimum practical separation in frequency, as has often been explained in these columns, is ten kilocycles between the frequencies of adjacent stations, and this has been adopted in working out the new scheme at Geneva.

The first result is that the actual wavelengths of stations when given in metres almost all contain a fraction, which may seem a little awkward unless we get into the way of referring to them in kilocycles. This, however, is by the way, and the principal effect of this system of allocation will be found in the fact that the case for the straight line frequency condenser for tuning purposes will be very greatly strengthened. Given a correct straight line frequency condenser in a closed circuit, it will be found with the new allocation that stations do actually come in at roughly equal intervals all round the dial.

Common Waves

The choice of condensers is a question more affecting the builder of a new set, or rather the designer thereof, but there are a number of points which will affect us all in the use of existing receivers. We hope, of course, that one of the first effects of the new scheme will be to clear up a great deal of the heterodyne mess in the ether, and permit us to receive a greatly increased number of distant stations, but for the British listener there is a qualifying clause to this statement.

It will be observed that in the scheme as it stands at present certain stations are allotted the same frequency, Birmingham and Aberdeen, for example, being placed upon the same spot in the scale. It is to be feared that the result of this will be that both these stations will be practically impossible to receive at any great distance, and the same reasoning applies to the case of the greater

(Continued on page 318.)



JUST LIKE THE REAL THING

By A TEST-ROOM ASSISTANT

An article which deals with the important question of the tone of the loud-speaker, and explains how the addition of a few refinements can sometimes bring about a marked improvement.



HERE comes a time, so to speak, when in our receiving careers we are not altogether satisfied with the quality of reproduction which we obtain from our loud-speaker. Volume, selectivity and range may be there, but if that undefinable something, which makes listening a real pleasure, is lacking, the full pride of possession is not ours. At first we may be content with intelligibility, which may satisfy us until the newness has worn off, but reproduction should not be considered perfect until absolutely natural tone, which, when one closes the eyes, makes it appear that we are present at the concert or talk which is being given, is obtained.

Shortcomings

When reproduction is not good there are degrees of poorness, sometimes that full roundness of tone is lacking, the general effect being thin and tinny, or, on the other hand, signals may be woolly and lifeless.

Tinniness

Thin and tinny reproduction is due to unequal amplification, the higher musical frequencies being brought out to a greater extent than the lower. Although it is not possible to bring back the lower tones which are cut off when reproduction is thin, it is not difficult to effect a better balance by reducing in intensity the higher notes, and here we can call to our aid a useful characteristic of condensers. The impedance, or what we may regard as the "stopping effect" of a given condenser, decreases as the frequency of the signal current increases. A condenser, therefore, will block the passage of a direct current, but will have less and less effect to alternating currents as their frequency increases.

By-Pass Condensers

Utilising this quality of condensers,

we can arrange that given condensers, in various parts of the circuit, will allow currents of high-frequency to pass through readily whilst resisting, to a large extent, the passage of currents of lower frequency.

The Loud-Speaker

When reproduction from the loud-speaker is high pitched, quality may be improved by connecting a suitable condenser in parallel with the loud-speaker windings. Here, with high resistance instruments, values of .001 to .01 microfarads should be tried. As

condenser of between .0001 to .0005 should be tried across the first anode resistance, and if the coupling condensers between plates and grids of note magnifiers are small, improvement may be effected by utilising larger ones, or by connecting further condensers in parallel with those in use. Here I personally find values from .01 to .25 to give satisfactory reproduction.

Where the note magnifiers are transformer-coupled a by-pass condenser across the first primary will also produce the desired change of tone, but larger condensers, for example, of .0005 to .002 may be required.

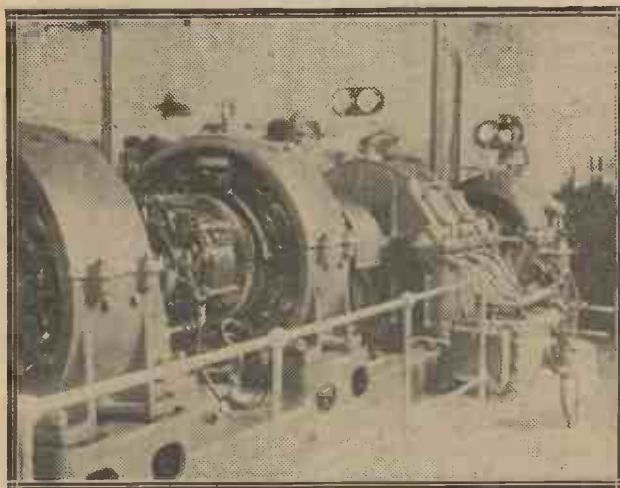
Low-Frequency Oscillation

Transformer-coupled note magnifiers in particular are prone, if an unsuitable choice of transformers is made, to oscillate, and this oscillation may take place at audio-frequency, in which case a continuous whistle is heard or may occur above the limits of audibility, when usually quality and volume are exceedingly poor. When it is considered likely that this fault is present, the effect of reversing leads to transformer primaries, and also secondaries should be tried, a comparison being made after each reversal. Suitable resistances across the secondary windings of the transformers will generally

give the required degree of stability, values of 1 megohm down to 100,000 ohms being suitable.

Valves, H.T. and Grid Bias

Poor reproduction, accompanied by blasting and distortion upon the stronger passages, is generally due to the employment of unsuitable valves or to inadequate H.T. and grid bias. In the last note-magnifier stage of the set, when strong signals have to be handled, a suitable power valve capable of dealing with a large grid swing is to be advised.



Part of the complicated machinery in the turbine and boiler building at the Leaffield Station. Leaffield, it will be remembered, is one of the links in the Imperial Wireless Chain.

the size of the condenser is increased the tone will tend to become rounder and more mellow, until a stage is reached where the signals are woolly and fluffy in nature, crispness of speech being lacking.

In the Set

If, however, the loud-speaker has been tried upon another set and been found to give the desired quality, the trouble is in the receiver itself, and it is best to approach the problem from this viewpoint. If the note magnifiers are resistance-coupled, a small

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Messrs. Ferranti, Ltd., Bush House, W.C.2.

September 9, 1926.

Dear Sirs,—The writer is pleased to state that excellent reports have been received on transmissions in which the two AF.3 Transformers, supplied last June, have been used.

Operators of more than one station have reported that the re-transmissions of 2 L O by G 6 N F were indistinguishable from the original. Considering that five valves, including the oscillator (a 250-watt power valve) were used, these reports prove the distortionless working of these excellent transformers. The speech quality has always been reported as very good.

Another station has reported the re-transmission of 5 X X to be free from resonance or distortion.

Since the tests were commenced, the writer has received numerous QSL cards reporting the excellence of the transmissions.

Trusting that this information will be of interest to you. I remain,
Yours faithfully,
ALFRED D. GAY.

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HERE are some people, I make no doubt, who have been pointing the finger of scorn at Professor Goop of late and saying sneeringly: "Ah, ha! He's getting left behind in all this television business." But the great majority have never for a moment doubted the Professor; they have felt all along that if he did not rush headlong into the limelight with some television apparatus at the very outset, it was simply because he did not desire to raise false hopes or to present to the public any half-baked, and therefore indigestible, scheme.

Another Marvellous Effort

The faith of those who trusted the Professor is now at length amply just-



The Goop Teleblinkers.

fied, for at long last I am able to break the silence hitherto imposed upon me and to give to the world full details of Professor Goop's latest and greatest invention. Thanks to his untiring research work and to his versatile genius, every home in England, stately and otherwise, will shortly have a Gooposcope standing beside the loud-speaker upon the piano, the occasional table, the whatnot or the what-you-may-call-em.

Those who do not care about installing the Gooposcope, which is to television what the loud-speaker is to ordinary broadcasting, will be able to avail themselves of his Teleblinkers, neat little goggles, shortly to be placed on the market in a variety of attractive forms, which can be worn at the same time as the headphones, provided, of course, that the ears of the wearer are sufficiently well developed to provide at one and the same time a resting-place for the 'phone receivers and an anchorage for the hooked thingamejigs of the Teleblinkers.

A Flutter in the Dovecote

Nothing less than consternation was caused at the headquarters of the B.B.C. when Professor Goop walked

The era of television—Professor Goop's "startling" inventions disclosed.

in and announced in the most matter-of-fact way in the world that he had solved the problem of television. You see, up to the present announcers have been, so to speak, voices and nothing more. Except upon the first Thursday in alternate months, when the picture postcard photographers are given sittings, it has been quite unnecessary for them to crease their trousers or to pay any extraordinary amount of attention to the tying of their gents' natty neckwear.

Under the present system of mere oral broadcasting their golden voices and their perfect pronunciation of such verbal gems as obliggatory, and jyratory have won countless thousands of hearts. Now they find that the coming of the Gooposcope and the Teleblinkers will necessitate fresh efforts on their part. In future they will have more to do than to set fashions in accent; it will be for them to lead the male population of this country into the right paths, sartorial, sutorial and tonsorial. They must show us how to clothe our bodies and our feet and how to arrange such locks as the passage of time and the attacks of the income-tax fellow have left upon our brows.

Knotty Points

I understand that on hearing Professor Goop's news the B.B.C. immediately appointed another committee,



"... That brown boots and a bowler hat should be worn with a morning coat ..."

whose duty it is to lay down standards for men's wear. At the first meeting an enormous number of frightfully important questions had to be thrashed out. It was a long process, but in the end decisions quite as satisfactory as

those of the other committee on pronunciation were arrived at. It has been decided, for example, that collars are invariably worn in the best circles, that socks should match the colour of the eyes, that brown boots and a bowler hat should be worn with a morning coat, that there should be three stud holes in a shirt (two in the front of the neckband and one at the back), that spurs may be worn over dancing pumps at hunt balls, and that evening dress dickies are not quite quite.

Another Point

When the question of masculine coiffure styles was discussed the committee almost came to blows, the members recruited from the stage going all out for shingling, whilst the musicians held that bobbing was the last word.



"... That's a Patagonian amateur ..."

Each of these schools was hotly opposed by the more human members of the committee who contended that the Eton crop should be *de rigueur*. These last stuck to their guns, and though the rest raised loud cries of "Philistines!" "Who wants to look like a convict?" and "Get your 'air cut!" they eventually carried the day. I understand that the B.B.C. has now placed a contract with a well-known firm of manufacturers for the weekly delivery at each of its stations of a demijohn of brilliantine and a hundred-weight of bear's grease. It is also reported that another contract has been placed with Messrs. Garing & Willow for one million absorbent antimacassars for the protection of the studio armchairs.

Here We Are!

Let me now describe without further delay the Professor's great discovery. I have known for some time that he has been busily engaged upon the problem of television; in fact, on more than one occasion I had been privileged to lend him a helping hand.

(Continued on next page.)

Jottings by the Way—continued

When I say "privileged" I mean that he said it was a privilege to be sent down to Mr. Spoodle's garage to bring back 300 volts of high-tension accumulator. As I always accept without a question anything that the Professor says, I suppose that he must have been right. However, barring a few hints that he let drop from time to time, Professor Goop kept even me, his most trusty accomplice, completely in the dark. In fact, I knew little or nothing of his progress (except that he seemed to demand a fresh supply of accumulators every day), until on a certain historic evening he said to Poddleby and myself, "Would you care to come round to The Microfarads to-night to see the great fight?" "What do you mean?" we cried in unison (it was not really unison, for Poddleby was a semitone flat). The Professor explained that he had got his televisor working.

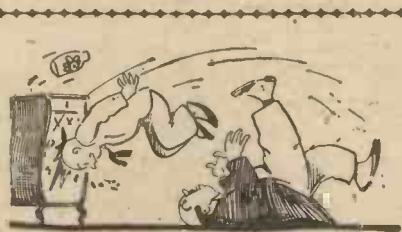
Impossible!

At first we were somewhat incredulous, asking him how it could possibly work if there was no transmitter working at the other end. Professor Goop smiled blandly. "Completely unnecessary," he said. "You do not appear to realise that vision is a matter of ether waves. These are actually picked up and transmitted by the apparatus in any studio; the only reason why we have been unable hitherto to see at a distance is that we have had no means at our disposal of receiving, rectifying, and reproducing them. To-night you shall see for the first time the new apparatus in full operation."

The Demonstration

Punctually at 1 a.m. Poddleby and I reported for duty at The Microfarads. The fight did not begin until two, which was the time at which we were asked to turn up; but as I had begun to feel rather hungry I suggested to Poddleby that it might be as well for us to arrive a little earlier in order to allow time for supper or breakfast—the exact name of the meal depends upon whether you regard that hour as late night or early morning. A successful foray in the Professor's larder produced a most satisfactory repast, after disposing of which we adjourned to his wireless den. "I propose," said the Professor, "to receive from WGY upon 32 metres. The preliminary bouts should now be under way; I will therefore proceed to tune in." He began to waggle knobs in the approved manner. Suddenly a perfectly horrible face appeared upon the screen of the Gooposcope. "Dempsey, the man-eater," I exclaimed. "No, no," said the Professor.

"That's a Patagonian amateur." The face vanished. The Professor did some more knob-wagging.



"... A kick that sent me head first through the glass doors ..."

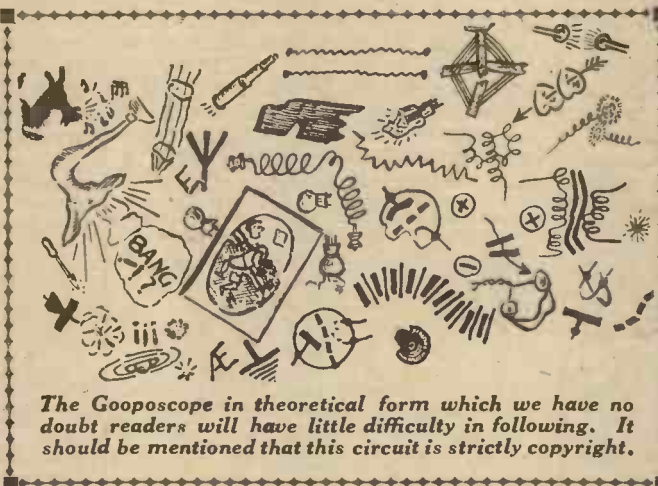
We duly saw and heard Dempsey and Tunney introduced; then the gong went and they were at it. It was the most frightfully exciting thing that I have ever witnessed. We were all of us quite carried away. "A lovely smack," I cried, as Tunney got one home. "He just did like this. . . ." I executed a neat cat-like leap to the right, paused in mid-air, swerved to the left and landed my left fist in Poddleby's right eye, knocking him off his chair on to the hearthrug, where he lay for a fraction of a second.

"No, no," exclaimed the Professor. "You have got it all wrong. What he did was this"—here he picked up the unconscious Poddleby by the scruff of the neck and propped him against the table supporting the Gooposcope. Professor Goop assumed a fighting attitude, lunged at the middle of Poddleby's waistcoat, got his feet entangled, and lurched forward, smiting Poddleby heavily on the mark and bringing him and the Gooposcope crashing to earth. I was just going to borrow Poddleby again to prove to the Professor that he was entirely in error, when our stout friend suddenly recovered consciousness and floored Professor Goop. I naturally rushed to my old friend's assistance, and whilst I was bending over him I received a kick that sent me head first through the glass doors of a cabinet.

Disaster

On extricating myself from my unpleasant position I was about to claim a foul when Poddleby made another rush. The Professor and I flung ourselves upon him, bearing him to the ground. Unfortunately he brought with him the whole of the television apparatus, which was resolved in the twinkling of an eye into its constituent parts. It is for this reason that I am unable to give you a more detailed drawing of this wonderful piece of apparatus than that which accompanies the text. Those readers, however, who have followed the general progress of television will have little difficulty in piecing together the far-flung portions of the apparatus in such a way as to enable them to construct a faithful imitation of the Goop televisor without further help from me.

WIRELESS WAYFARER.



The Gooposcope in theoretical form which we have no doubt readers will have little difficulty in following. It should be mentioned that this circuit is strictly copyright.

The Knock-Out

Suddenly we saw the ropes of the ring, whilst from the loud-speaker came the voice of the announcer telling us that the fight was about to start.



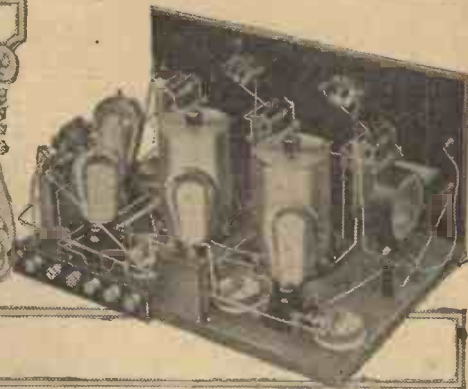
Shown at the Radio World's Fair in New York, this "Official" has a very talkative nature, accounted for, no doubt, by the fact that his whole face consists of a loud-speaker.

LOOK OUT FOR THE MONODIAL!

Secrets of Efficiency in Screening

By J. H. REYNER

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



In concluding his interesting series of articles upon the secrets of modern radio efficiency, Mr. Reyner deals with the use of screens



We saw last week that to secure real selectivity the interaction of one circuit upon another must be prevented. We can do this in two ways, both of which involve "screening" in some form or another. In the first place we can place a static or anti-capacity screen between the various coils. The actual form which such screens would take will be discussed shortly, but it will be clear that if successful they would result in cutting out the capacity effect, so that zero coupling would be obtained between the various coils by placing them at right-angles or by staggering all the coils at a certain special angle at which the magnetic coupling between them is zero. In other words, provided the magnetic coupling is the only one to be contended with, then the spacing of the coils so that coupling between them is zero is a simple matter.

Complete Screening

The other method is to screen the coil completely, so that not only the capacity effect, but the magnetic coupling as well is to all intents and purposes eliminated. If we adopt this latter course, then the difficulties are considerably simplified, because we need not trouble at all about the layout, which may be made to suit

and here the effect is not quite so obvious. The interaction between the various circuits, however, results in certain reaction and counter-reaction effects, all of which absorb energy from the circuit. If the effects more or less cancel out, then the receiver is stable. Under any other conditions the receiver is either dead or excessively lively. Such

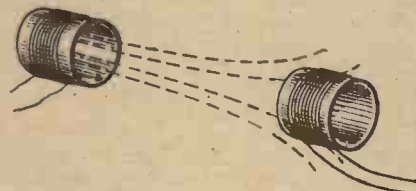


Fig. 2.—With the coils in the position shown strong magnetic coupling will take place.

effects can, to some extent, be balanced out by neutralising, but this is not completely satisfactory, and in many cases does not hold good over the whole range.

The Cascade Effect

Apart from such considerations, however, there is another effect to be considered, which is the "cascade effect" obtained in an amplifier. If

we have a single stage of high-frequency amplification giving an amplification of perhaps 10 over the whole stage, then if we placed a second stage following the first we could arrange for this second stage to give an amplification of 10 also. Now, since these two high-frequency stages are in series, or cascade as it is sometimes called, we should expect the total amplification over the two stages to be 10×10 , i.e., 100. As a matter of fact, it is more likely, with an unscreened circuit, to be of the order of 30 or 40 only, if as much.

In other words, the true cascading

effect is not obtained, due to the energy which is lost and frittered away in the interaction and stray coupling between the various circuits. It has been shown that the only way in which to obtain the correct cascade effect, so that two circuits each giving an amplification of 10 would together give an amplification of 100, is to screen the circuits completely, and the more complete the screening, the more nearly is the true cascading effect obtained.

How It Can be Done

Let us consider the actual mechanism whereby screening can be carried out. We overcome the capacity coupling between the two circuits by interposing between them a metal shield which is connected to earth potential. Any coupling then occurs between the various circuits and the earth plate, but not any further, so that the static coupling between the two circuits themselves is eliminated by this comparatively simple means. Since, as will be seen later, the question of any metal near the circuits themselves tends to introduce damping into the circuit, it is customary to make such capacity screens of a low-resistance metal such as copper.

Magnetic Screening

The question of magnetic coupling can also be solved by the interposition of suitably placed metal shields. In Fig. 2 we have two coils in a position such that their magnetic fields are linked with each other, a state of affairs which would give a strong magnetic coupling between the coils. If we interpose between these coils a copper plate in the position shown in Fig. 3 we shall distinctly reduce the magnetic coupling between these coils. The effects of the field of the first coil will be to set up small circulating or "eddy" currents in the copper screen, and these eddy currents will set up a magnetic field in opposition to that produced by the coil itself. The effect on the second coil therefore will be twofold. First, there is the effect of the first coil, and secondly there is the effect of the eddy currents set up in the screen.

Now it is found that the eddy currents in the screen are such that they produce a magnetic field equal and



Fig. 1.—Capacity coupling between two circuits can be overcome by interposing between them a metal shield connected to earth potential.

the components in use to the best possible effect. Even if the coils are placed absolutely up against each other no ill effects will ensue if they are completely screened.

We have not yet discussed the effect of screening on signal strength,

**SECRETS OF EFFICIENCY
IN SCREENING**

(Continued from previous page)

opposite to that of the first coil itself. In other words, these two fields tend to cancel each other out, and, as far as the field which actually passes through the screen is concerned, they do cancel each other out to all intents and purposes.

Complete Screening Needed

The trouble is that the magnetic field has other paths by which it can travel from one coil to the other round the edge of a simple screen, such as is shown in Fig. 3, and it has been found that it is only by enclosing one coil, or both, completely in a metal box that the effect of the magnetic coupling between the two coils can really be eliminated.

Now the presence of the copper near the coil introduces extra damping into the circuit. The eddy currents which are set up in the copper screen have to come from somewhere, and the energy necessary for their production manifests itself as an extra loss in the coil. On the other hand, the further away we go from the coil the less is the magnetic field, and, consequently, the smaller will the eddy currents have to be in order to produce a suitable counter-magnetic field outside the screen. The smaller the eddy currents, the less will be the energy absorption, and, consequently, the less will be the loss introduced into the coil.

Position of Screen

Thus, if we could place the magnetic screen at a considerable distance away, making the metal box very large in dimensions compared with the coil itself, we should introduce very little damping into the circuit, but such a solution would not be a suitable one for utilisation in a receiver.

We have, therefore, to strike a compromise, and this is what has been done in designing the screened coils now on the market. Provided the screen is at least half an inch away from the coil at the side—i.e., in a radial direction—and $\frac{3}{4}$ in. to 1 in. away at the end of the coil, then the extra loss introduced into the circuit is only comparatively small.

The extra losses introduced into the circuit by the screens are more than compensated for by the increased overall amplification which is obtained, due to the fact that the energy is confined to its proper channels, and is not allowed to stray by the various paths which are normally open.

Metals Used

Many people imagine that in order to screen the magnetic field of a coil the metal of the shield must be magnetic, such as iron. This is by no means the case. The eddy currents necessary to produce a field are set up just as well in copper, and, in fact, rather better than in iron, and, in order to minimise the loss introduced into the circuit, a low-resistance material is essential. If iron is used, the combined effect of the actual resistance, and the fact that hysteresis losses occur in the iron, causes the losses introduced into the circuit to be many times greater than if copper or aluminium screens are utilised.

Pick-up

There is one final point about these screens which is worth remarking on, and that is the elimination of direct pick-up. The coils of a wireless receiver act as miniature aeri-als. They have a capacity to earth, which causes them to act as very small aeri-als, and the coil effect also causes them to act to a small extent as frame aeri-als.

The result is that if a receiver is being operated fairly close to a powerful transmitting station, energy is received on the coils themselves, as well as on the aerial.

The effect of this upon any filtering action which is being set up in the circuit will be obvious. The actual tuned circuit may be such as to cut down the strength

of an interfering station to a reasonable degree, but on top of this we have the direct pick-up of signals from the interfering station on the coil itself, and the filtering action can have no control whatever over this. In such circumstances the problem of obtaining selectivity is a somewhat difficult one, and screening is invaluable in this connection.

Great Benefits

It stands to reason that, if a coil is completely screened so that no magnetic or capacity coupling is possible between that coil and any of the other coils in a circuit, then conversely the coil must be impervious to wireless waves from a near-by transmitting station. This is actually found to be the case, and it is found that exceptionally good selectivity can be obtained when operating a mile or so from a transmitting station.

This elimination of direct pick-up is only obtained by complete shielding, and is not produced with simple capacity shielding. This latter will reduce the direct pick-up to some extent, but complete shielding is necessary in order to eliminate it altogether.

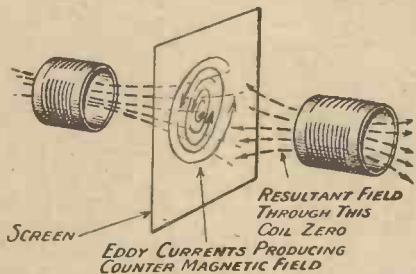


Fig. 3.—The effects of the field of the first coil will be to set up small circulating or "eddy" currents in the copper screen.



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HOW TO TRY THE PARALLEL FEED CIRCUIT

By GEOFFREY ELTRINGHAM

Some simple instructions which will enable you to try an interesting circuit in an existing receiver. The circuits given can also be tried on the bench in hook-up form.



TO my mind, one of the greatest pleasures of wireless, and the one which makes it superior to all other hobbies, is the fact that one can always be adding to and improving one's receiver, and even trying out new circuits constantly without very much alteration.

Great improvements have taken place of late in our high-frequency amplifying circuits, and one of the most interesting things to try in one of the older types of receivers is the modification of the circuit to one of the newer ones, quite apart from the pleasure which one derives upon discovering that the results are much improved by the alteration.

An Interesting Circuit

One of the most interesting of the newer types of high-frequency coupling arrangements is that known as the "parallel feed circuit," and this is particularly easy to try in an existing set, since very little modification beyond an alteration of connections is necessary. It is proposed in this article and in future contributions to describe how the parallel feed arrangement, either neutralised or not, may be tried in various types of existing receivers of the older types.

Converting a Tuned Anode

This week, it is intended to take the type of receiver employing tuned anode coupling, which is now regarded in many quarters as being practically obsolete. A typical tuned anode circuit consisting of one high-frequency valve and detector is given in Fig. 1, which gives just the essential parts of the circuit. No intentional reaction arrangement is shown, but it is to be understood that in most cases a reaction coil is included in the anode circuit of the detector valve, and coupled either to the coil L_2 or to the anode coil L_3 . It is also to be noted that in most cases a potentiometer is used to stabilise the first valve, and this again is not shown in the skeleton circuit of Fig. 1, which is

confined to the essentials which will be required in our description.

Equivalent Currents

It is to be understood that the anode current of the high-frequency valve V_1 consists of a direct current, upon which there are high-frequency fluctuations superimposed, and it is customary to regard these latter as the equivalent of an actual high-frequency oscillating current superimposed upon

feature of the parallel feed method of coupling that an alternative path is provided for these currents.

An Example

Fig. 2 shows how the separation is carried out, and it will be seen that there is a high-frequency choke included in the anode circuit of the H.F. valve, which is intended to prevent the high-frequency current from taking the usual path round through the high-tension battery. The direct current travels by way of the H.F. choke without difficulty, but since this path is one that offers a high impedance to high-frequency currents, they would sooner take any alternative that is offered to them. Such an alternative is provided, in the form of the condenser C_2 , and the tuned circuit L_3, C_3 , which, it will be seen, is connected between anode and filament with the first-mentioned condenser in series.

The high-frequency component of the anode current of the H.F. valve will now take this alternative path to filament, and in so doing will throw L_3, C_3 into oscillation in the ordinary manner, so that signals will be handed on to the second valve. As before, reaction can be applied from the anode circuit of the detector valve, either to the grid circuit of the H.F.

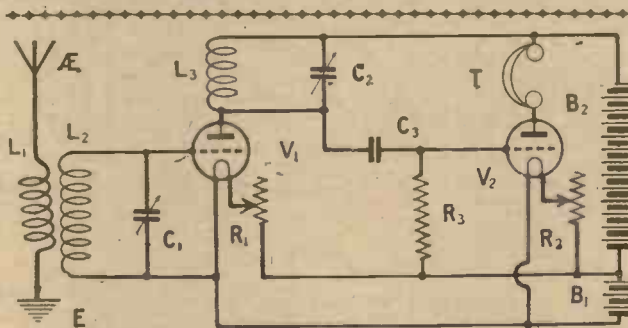


Fig. 1.—This is the basic circuit for the modifications which the author suggests.

the direct current. Both these currents pass through the anode circuit, and when it is tuned to resonance the signals are passed on in the familiar manner to the next valve.

How it Works

The parallel feed arrangement consists in its essential of a separation of these two currents, a different path being provided for the high-frequency component from that taken by the direct-current component. It is convenient to imagine that the high-frequency component is a current trying to get from the anode of the valve to the filament circuit via the easiest path. Normally, it is made to go through the whole anode circuit, and right round through the high-tension battery, before it gets to the filament, and it is the essential

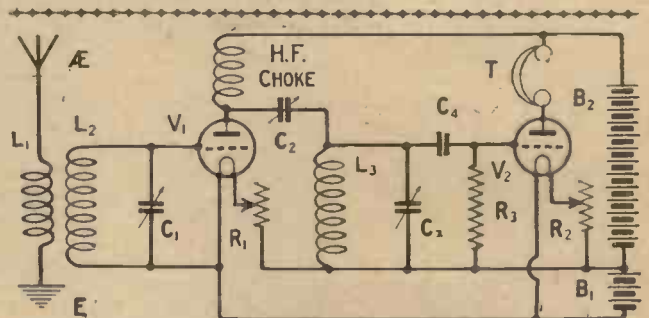


Fig. 2.—To try this simple kind of parallel feed circuit only slight alterations are needed.

valve or to the grid circuit of the detector valve, this latter being the circuit L_2, C_1 .

(Continued on page 308.)

G do you remember — the first radio unit you made?

how you bought a sheet of ebonite and hacked it to size (or thereabouts) with a hack saw?

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How to Try the Parallel Feed Circuit—continued

Stability

As regards stabilising, the primitive method of a potentiometer need no longer be used, and therefore a somewhat greater degree of selectivity can be obtained. In order to prevent the first valve oscillating, it is possible to adjust the condenser C_2 to such a value that an insufficient amount of energy is fed back by way of the plate to grid capacity of the first valve to cause self-oscillation, and this condenser is often made of quite a small capacity, just sufficient to pass on the signals, and yet not large enough to permit the circuit to oscillate.

The circuit illustrated is quite a practical one, and has been used with considerable success; but it is found that with valves of the very freely oscillating type it may be necessary to reduce the value of the condenser C_2 below the point at which good signals

include an H.F. choke in the set, to incorporate a condenser of suitable value for C_2 , and to use for L_2 , instead of the original plain anode coil, a tapped coil, which can be either home-made, or one of the centre-tapped coils now available in many makes. If a centre tapping is used, it is advisable to use a variable condenser for C_2 , but if a coil is available with a number of tapping points for L_2 , a fixed condenser of .0001 or .0003, or some available value of that order, can be used for C_2 . This latter arrangement is probably the easier one to incorporate when modifying an existing set, since it does not involve the addition of a variable condenser to the receiver.

It will be seen that the grid leak in this last circuit (Fig. 3) is connected in the parallel position—that is to say, straight across the grid condenser, and it is interesting to realise that this arrangement is permissible with

tween this point and the grid of the first valve, and this is quite easily done.

Opposing Potentials

What we must do is to so arrange our coupling circuit that there is a point which will naturally be at opposite H.F. potential to the anode of the amplifying valve, and this can be done by connecting the centre tapping point upon the coil to filament, the grid of the detector valve to one end, and the feed connection upon the anode of the H.F. valve to the other end. How this is done may be seen in Fig. 4, where a fixed condenser C_5 is the blocking condenser through which the H.F. currents are fed from the anode of the H.F. valve to the coupling circuit L_3 , C_3 .

The upper end of the coil L_3 will now always be at opposite H.F. potential to the lower end, and since the lower end will be at nominally the

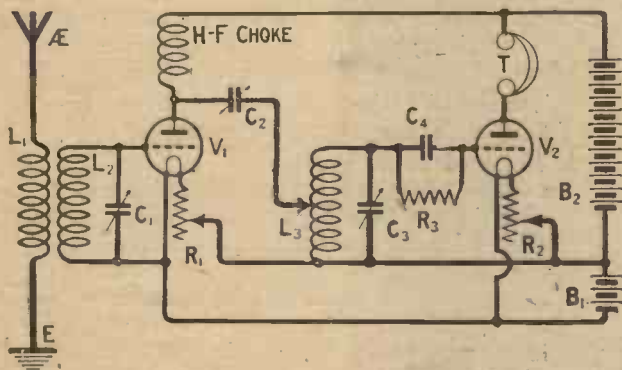


Fig. 3.—A variable auto-transformer effect is obtained in the circuit L_2 C_3 by taking the feed connection from the anode to a tapping point upon the coil.

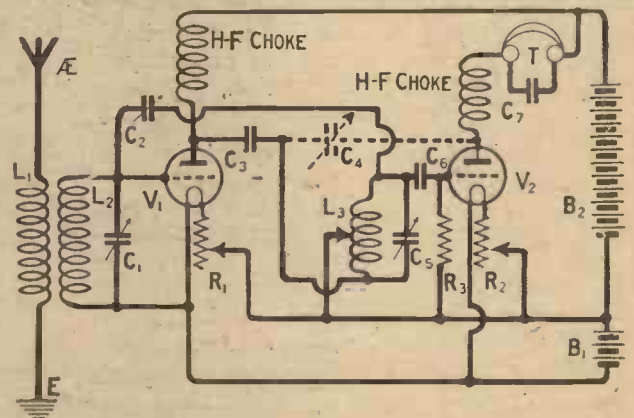


Fig. 4.—In the final circuit a scheme of neutralisation is adopted and a capacitive control of reaction.

are obtained. In other words, it becomes too small to permit the energy to be passed on easily. If the condenser is increased above this value, the first valve tends to oscillate, and it is evident that some further means of stabilising should be adopted.

Auto-Coupling

A useful modification of the previous circuit is seen in Fig. 3, in which it is possible to obtain a variable auto-transformer effect in the circuit L_2 , C_3 by taking the feed connection from the anode circuit of the previous valve to a tapping point upon the coil. In this way a good degree of stability can be obtained, with a larger value of the condenser C_2 , and in many cases it is found that this arrangement gives considerably stronger signals without loss of stability.

To modify the circuit of a tuned anode receiver to employ this arrangement, it is obviously only necessary to

parallel feed circuits, since the coupling circuit between the valves is now isolated from the high-tension supply by the blocking condenser C_3 .

Neutralising

So far, we have considered merely methods of preventing self-oscillation which depend upon so arranging the coupling circuits that the energy which can be passed back into the grid circuit of the H.F. valve is limited in amount, so that there is little risk of self-oscillation. While we are making our modifications, however, it happens to be quite an easy matter to add one of the modern methods of neutralising, so that we may just as well add this refinement also while we are about it. What we have to do is to find a point upon the coupling circuit between the valves which is at any given moment at opposite potential to the anode of the high-frequency valve, and to connect our neutralising condenser be-

same potential as the anode of the high-frequency valve, we have found our point for the provision of neutralising potentials. A neutralising condenser C_5 is therefore connected between the upper end of L_3 , and the grid of the H.F. valve, and it will be found that it is quite easy to adjust the circuit to a condition of complete stability.

Reducing Detector Damping

It will be noted that the detector valve is now really only connected across half the circuit L_3 , C_3 , and this is actually somewhat beneficial as regards selectivity, since the damping of the grid current of the valve will now not have so great an effect upon the tuning of this circuit. There is a slight loss of signal strength consequent upon connecting the valve across only half the circuit, but it is not nearly so great as one would expect.

(Continued on page 325.)



THIS remarkable effort appeared recently in a prominent New York daily paper, in a column dealing with the World's Radio Fair competition for home constructors:—

"The second prize was awarded to John Black, Jr., thirteen, of Boreham Wood, England, whose 'New-Flex' (!) receiver of his own invention (!) and construction stood out from the thirty-seven British sets. The judges agreed that Black's work was remarkable for one so young."

The set, of course, was actually a "Mewflex" receiver, the design for which appeared in *Modern Wireless* for September! The American reporter is truly a wonderful fellow, but it is pleasing to see that he did not omit to quote the well-deserved tribute paid by the judges to the young constructor.

ILISTENED to the first National Concert from the Albert Hall from beginning to end, and, beyond one very small criticism which hardly seems worth mentioning, I thought the whole thing was very fine indeed. The B.B.C. seemed to have cut out just the right amount of echo; what was left was just sufficient to convince the listener that the transmission was not being made from the studio. I enjoyed the whole evening. The one little criticism is that the control engineer seemed a little too enthusiastic now and then. As a matter of fact, listeners via Radio had a better time than some of those who were actually present, since the latter were disturbed on occasions by a serious echo.

IT is curious that, just as the B.B.C. started thinking about increasing the power of 5XX, complaints should start pouring in to the effect that Daventry's signals have become weaker of late. I must confess that I have

not noticed this, neither have any of my radio acquaintances. I have heard a suggestion that listeners may possibly be comparing with the Strike period, when Daventry increased

further it should give us quite a "name" in other parts.

I HAVE a strong suspicion that something is going to happen very shortly. Whenever I approach a member of the Editorial staff he seems to be extremely careful what he says to me, and, beyond much scratching of heads and muttering of the word "Monodial" I can't find out what is the reason. This mysterious word has cropped up several times just recently, but nothing I can do or say will elicit any more information as to what it means. I shall simply have to wait and see.



Sir Alan Cobham broadcasting from the Terrace of the Houses of Parliament after his arrival from the remarkable flight to Australia and back. This photograph was printed and in the hands of the Editorial department within two hours after the event.



Did you hear the first of the great national concerts organised by the B.B.C.? Although the broadcast version was excellent, those present in some parts of the hall were not so fortunate, the chief trouble being that the acoustical properties of the Albert Hall are somewhat peculiar.

modulation and seemed considerably more powerful for a while. Many Continental listeners seem to prefer Daventry to their own "local," so that if its power is pushed up still

afraid he must have a grudge against the amateur transmitters in America!

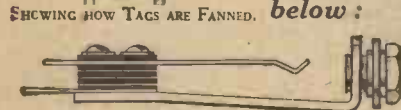
(Continued on next page.)

Cheaper and Better Jacks

Ashley Radio Jacks are made of nickel silver springs, with pure silver contact and Bakelite insulation throughout. Tags are tinned and spread fan wise for easy soldering.



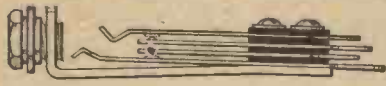
Note the Prices below:



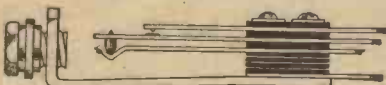
JACK No. 1. SINGLE CIRCUIT (OPEN). 1/3



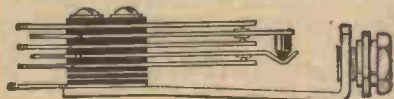
JACK No. 2. SINGLE CIRCUIT (CLOSED). 1/6



JACK No. 3. DOUBLE CIRCUIT. 1/9



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Ashley Radio

Ashley Wireless Telephone Co. (1925), Ltd.
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The Week's Diary

(Continued from previous page)

AN American inventor has developed a very interesting form of burglar alarm. Probably all my readers have at some time or other had a set which brought stations in beautifully, but screeched at them as soon as they took their hands away from the controls. Conversely, if a station could be tuned in with the hands well away from the set, it would have screeched when the hands were brought up to it. Now, perhaps, I have made the principle clear. In front of the safe, and under the carpet, is a plate. The other side of the condenser is the safe itself. Other requirements — one radio receiver. When the burglar steps on the carpet and extends his greedy hands towards the safe, even if he is wearing rubber gloves, he alters the capacity in circuit and operates a relay which gives the alarm!

school but cannot spare the time for evening classes.

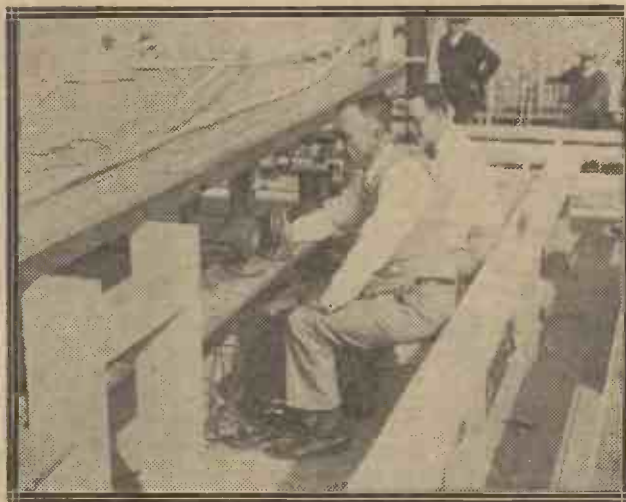
ALTHOUGH I do not believe things are quite settled, however definite the daily Press is on the subject, it seems extremely likely that the Chairman of the new B.B.C. will be



Mr. Emerson, whose "Elstree Six" won the premier award at the Amsterdam competition, is here seen explaining the connections of one of the "Dimic" coils to M. Bontekoe Irving.

"EDUCATION by wireless," said a friend to me the other night, "is a laudable idea, but what I don't like is the idea of Uncle Rex telling Tommy Smith to go and stand in the corner until he has permission to come out of it!" That is exactly what has

the Earl of Clarendon, who is at present Under-Secretary to the Dominions. The new body will also probably include Lord Gainford (the present Chairman of the B.B.C.).



Testing the apparatus for broadcasting from the ring-side during the Dempsey-Tunney fight.

been puzzling me for some time. I suppose one day some of these super-intelligencies will solve this problem in one swish of the pen. Nevertheless, radio instruction classes will be a boon to many, especially to those who are anxious to "carry on" after leaving

I PREDICT that, as a result of the R.S.G.B. low-power tests which are being held in November, much useful information will be gathered on the subject of the "skipped distance" that is one of the most puzzling features of short-wave work at present. There is little doubt that much work with Australia and New Zealand will be carried out during the tests, even with power so low as 10 watts. Perhaps the G.P.O.'s next short-wave station may reflect the results of these tests, and use something less than the customary 20 kilowatts!

WAVE-TRAP.

WHAT IS THAT MONODIAL?



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It is when you actually use a "HART" WIRELESS BATTERY that you most appreciate its merits.

Amplly proportioned, built to give steady discharge and long life, the "HART" Accumulator is the model you can use with confidence for either Low or High Tension Supply. It ensures the best possible results. There are many types for every wireless purpose.

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"... no less than five American Stations .. with one LOUDEN."

Here is a letter from Mr. France, of Rotherham, who tells us he began experimenting long before broadcasting started. Your enthusiasm for DX work may not lead you to search the ether until 2 a.m., but if you are keen upon the reception of strong, clear signals you will find, as Mr. France has done, that the Louden is the valve to use every time.

"Dear Sirs,
"Some time ago Messrs. Woodhead Bros., Electricians and Wireless Dealers, brought me one of your blue top valves, and asked me if I would try it and give them a report: I gave them a good report and backed it up by buying four more.
"At 2 a.m. the following morning I received music and speech from no less than five American Stations, and I have a very nice letter from WGY confirming my report, and this with one of your blue-topped valves used as a Detector with reaction as usual, standard, straight Detector.
"The next day I received the following stations, all British Main Stations: Sheffield, Nottingham, Leeds Relay Stations, and Frankfurt, Zurich I had on for 55 minutes; it was especially good, and music could be heard distinctly and perfectly 30 ft. from the Loud-Speaker."
"ALFRED FRANCE (Rotherham)."

Louden Valves are made by British labour in a British factory with British capital, and can be depended upon for the finest volume, range and silver clearness. They can only be offered at such low prices because of our well-known policy of selling direct to the public and cutting out the middleman's profit.

Order your Louden Valves by post to-day.

<p>4/6 Bright Emitters. L.F. Amplifier. F.1. H.F. Amplifier. F.2. Detector. F.3. 5.5 volts 0.4 amps.</p>	<p>8/- Dull Emitters. L.F. Amplifier. L.E.R.1. H.F. Amplifier. L.E.R.2. Detector. L.E.R.3. 2 volts 0.2 amps.</p>	<p>8/- Dull Emitters. L.F. Amplifier. F.E.R.1. H.F. Amplifier. F.E.R.2. Detector. F.E.R.3. 4 volts 0.1 amps.</p>
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Postage and packing: 1 Valve, 4d. 2 or 3 Valves, 6d. 4, 5 or 6 Valves, 9d.

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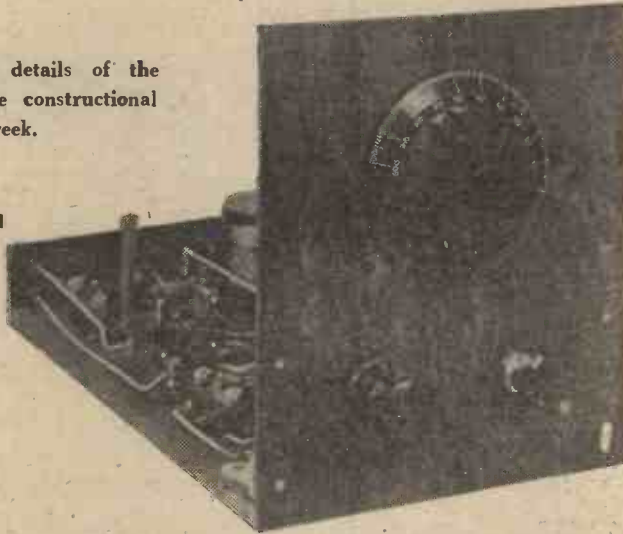
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BUY DIRECT AND SAVE MONEY

OPERATING THE "FOUR VALVES, ONE DIAL" RECEIVER

Some further practical details of the receiver described in the constructional article last week.

By JOHN W.
BARBER



CONTINUING with the coil sizes, it will be necessary to change the high-frequency transformer for one of larger size when we desire to receive the high-power signals from Daventry. The Resistaformer is made in suitable sizes to cover all wavebands at present used for broadcasting.

Filament Control

Turning now to the filament circuit, the fixed resistors may be a source of worry to some readers, who may wonder in what manner to determine the correct value of resistance required for their valves. If you are working five-volt valves off a six-volt accumulator you have to get rid of one volt in the resistance. Supposing the valve to be of the quarter-ampere class, we must now divide the volts to be dropped by the current taken; that is, we divide one by a quarter, and the answer, obviously, is four ohms in the resistance. This is the value of resistance required for the

The small knob at the lower left-hand side can be regarded as a volume control.

D.E.5 class of valve, which may be used in this set with success.

H.T. Values

There are three separate terminals for supply of high-tension to the valves, the first being next to the H.T.-terminal, and serving both the high-frequency amplifier and the detector valve. The voltage to be applied here will, obviously, depend upon the valves in use, but with the majority of valves 60 volts will be an approximate figure. The second H.T.+ terminal is connected to the third

valve, through the choke Z, and the voltage here may be up to 120, while the maximum voltage is applied to the last valve by means of the terminal H.T.+3. Suitable values of negative grid bias will be applied by means of the terminals provided, such voltages depending, obviously, upon the actual value of H.T. voltage in use. In all cases the makers' instructions should be adhered to in this respect.

Safety Tests

The usual tests of the filament and high-tension circuits should be carried out in order to guard against the possibility of damage to the valves by reason of a slip in the wiring. For the benefit of those who may be unfamiliar with this test, it may be stated that it consists in seeing that the valves light correctly when the accumulator is joined up to its proper terminals. The accumulator is then joined across the high-tension ter-

(Continued on page 321.)



This general view of the World's Radio Fair, New York, conveys an impressive idea of the great scale of the exhibition.

WITHOUT BACKLASH AND WHY!

The L. & P. Universal Coil Holder offers the finest control of coupling ever achieved. The moving coil holder is actuated by specially-cut worm and pinion gearing. No matter what the size or weight of the coil its movement is easy, direct and certain. It cannot possibly slip under any circumstances. The bare possibility of backlash is entirely removed by the strong spiral spring which also balances the weight of the moving coil, and which is concealed in the moving coil block. This patented feature is one of the many reasons for L. & P. supremacy. Superb workmanship. One-hole fixing.

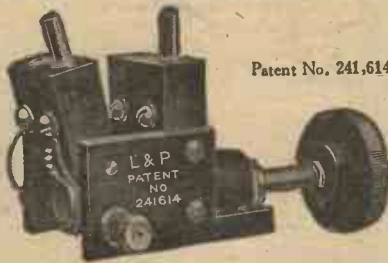
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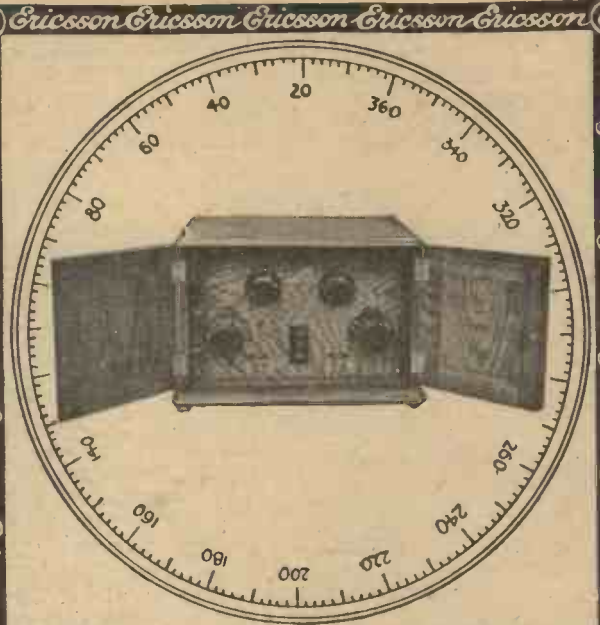


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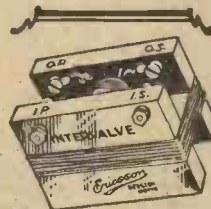


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EVERY component in a set, to give lasting satisfaction must pull its full weight—the transformer must do its duty by the valves, the condenser must be smooth and clean moving and possess no "backlash" and the reaction must be gradual and "sweet."

The close attention paid to these all-important items in the Ericsson "Family Two" has resulted in a set of astonishing range, purity and volume.

There is no straining to receive 5XX up to 150 miles, or any B.C. Main Station at 30—at good I.S. strength.



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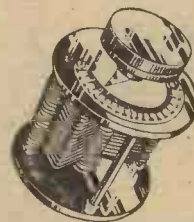
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FAMILY TWO
LOUD SPEAKER
RECEIVER

THE INTERNATIONAL PRIZE-WINNERS TELL THEIR STORIES

On these pages appear accounts from the pens of Messrs. H. E. Hassall and R. W. Emerson of their reasons in choosing Radio Press designs to compete in the International Contests in which they won signal honours.



Mr. Emerson (centre) explains the details of his "Elstree Six" to two of the officials of the Amsterdam Festival.

The sets which won the prizes in New York and Amsterdam described by their constructors

tivity in the background. This is a convenient means of approaching the problem, so far as average conditions in the British Isles are concerned, but in the writer's opinion, a

An All-British Six

THIS receiver, which gained third prize in the Multi-Valve Class, International Amateur Set Building Contest, held a fortnight ago at the



Mr. Emerson's "Elstree Six" won this gold medal (the premier award) at Amsterdam.

Radio World's Fair, New York, consisted of 6 valves—3 H.F. Det. and 2 L.F.

As a preliminary step in the making of the set, the whole circuit field was explored, and it was finally decided to use the "Elstree Six" circuit (described in *Modern Wireless*, June and July, 1926) as a fundamental around which a receiver could be developed, capable of competing with the best American designs.

American Requirements

From an exhaustive study of the U.S. technical journals it appeared that extreme selectivity and sensitivity, combined with good tonal reproduction, were a *sine qua non*. And as, according to the latest lists, there were over 65 broadcasting stations in the city and surrounding

county of New York, it was appreciated that conditions over there were somewhat different from those obtaining on this side of the ocean.

At that time, the "Elstree Six" was the most efficient receiver in this country, but it was thought that the selectivity, whilst being ample for home conditions, was not critical enough for America. Under these circumstances it was decided to use the screened coils evolved by Mr. J. H. Reyner at the Elstree Laboratories. Each H.F. stage was therefore completely shielded.

Experimental Work

A large amount of experimental work had to be undertaken before the transformers gave the necessary selectivity and the overall voltage amplification, which the writer considered necessary. Whilst the copper shields and bases were orthodox, the H.F. transformers finally used were different from the standard type, and a provisional patent has been taken out, covering the method devised to bring down the capacitance coupling.

Selectivity

It has been usual when designing

receiver to compete on level terms with



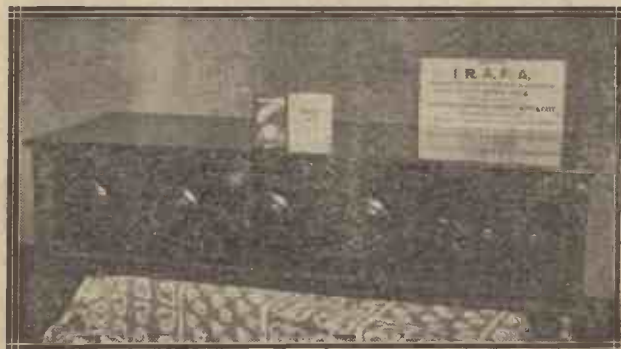
A recent portrait of Mr. H. E. Hassall, who won the third prize in the multi-valve class at the World's Radio Fair, New York.

the American position must not only have the utmost amplification possible, but selectivity of the same order. One can get selectivity at the expense of the side-bands, with the resultant distortion corollary, which, of course, could not be tolerated. Shortly, these were the main problems to be overcome, and they were tackled in the manner already indicated.

Every component in the set was of British manufacture, and it will tune over all wavelengths.

A Handicap

Practically all American sets are designed to cover the broadcast band of 250-550 metres, and it is probably



Mr. Emerson's receiver occupying the place of honour at Amsterdam, with the gold medal which it won.

the H.F. side of a set, suitable for receiving distant stations on the L.S. to put amplification first and selec-

**THE PRIZE-WINNERS TELL
THEIR STORIES**

(Continued from previous page)

possible to design a more efficient receiver with a fixed wavelength of this range, because of the losses set up by plug-in transformers, sockets, etc., necessitated by an all-wave range. It is an important point, and one would be glad to know if it was considered by the judges of the competition.

It is gratifying to find that the receiver is considered at any rate comparable with American practice. This is particularly interesting in view of the following remarks appearing in the October issue of the New York *Radio News* editorial:—

“A European set could not perform in the United States at all, because it would, very likely, not tune sharp enough.”

After this, comment would be superfluous.

H. E. H.

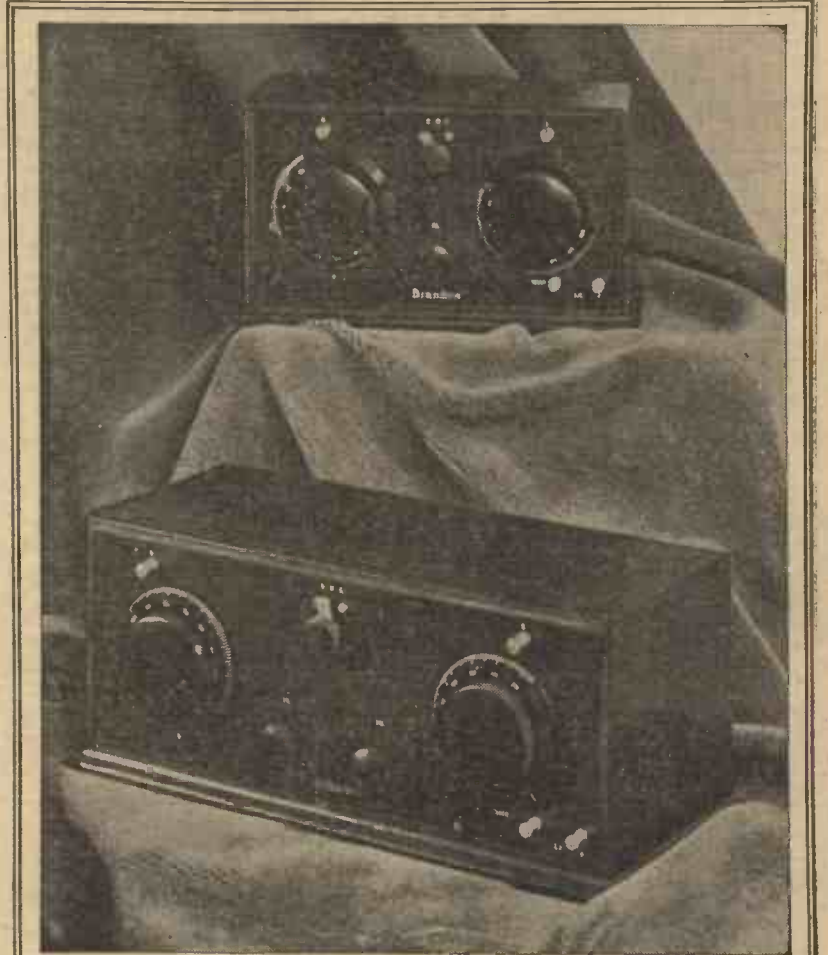
Mr. Emerson's Story

I have been asked by the Editor if I would give Radio Press readers an account of my visit to the Amsterdam Radio Exhibition, also as to why I chose the “Elstree Six” for the competition.

First of all, as to why I chose the Elstree Six. When the basis of this circuit appeared in *Wireless Weekly* on April 7, 1926, Vol. 8, No. 8, I was rather impressed with its possibilities, especially as to the elimination of the parasitic oscillations which are sometimes present in split coil neutrodyne circuits, but I decided to wait a little (as I was still experimenting with another receiver) to see if Radio Press went any further with this, and I was very pleased to see it arrive in the circuit of the “Elstree Six” which appeared in the June number of *Modern Wireless*. I then decided to leave the other set and make up one stage of H.F. on this principle before making the set to see how it functioned, and I then tried it in front of a five-valve set, and found it quite good and stable. This settled it, so I started and made a set of coils, and built up the set, but, unfortunately, my first attempt was a complete failure, as I was only guided by the wiring diagram, and as I did not get the exact distance between the coils the set failed absolutely to neutralise, but eventually I was able to obtain a full-size blue print, and I made the set again after measuring this, and when it was finished and I had put the last wire on and connected up, it neutralised first time. Although my aerial is screened on all sides and 60ft. long, and no down lead at all and an earth lead of about 40 ft. to an earth tube,

(Continued on page 317.)

EXPERTS IN RADIO ACOUSTICS SINCE 1908



TWO NEW SETS

THE BRANDESET II

The new Brandes 2-valve set is designed for ease of operation, real compactness, and thoroughly efficient loud speaker work. It is simple to operate, and will bring most excellent results from local broadcast stations, and the high power station. It will give good loud speaker results during long range work, depending, of course, on the efficiency of your aerial and earth. It is of the same excellent quality of all Brandes' products, and is reasonably priced

£6:10

(Exclusive of Marconi Royalty and Accessories)

THE BRANDESET III

Like the 2-valve set, the new Brandes 3-valve receiver is designed for ease of operation, marvellous compactness and guaranteed efficiency. If loud-speaker results of great purity and volume are expected from a number of outlying stations, its performance in this direction is unequalled. Both sets have but three controls on the panel, and can easily be operated by a novice. The 3-valve set has, of course, a greater range, but in other respects its characteristics are as the 2-valve set

£8:10

(Exclusive of Marconi Royalty and Accessories)

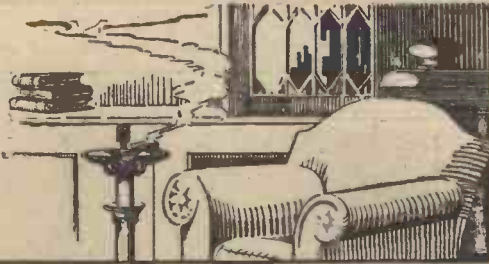
Brandes

From any reputable Dealer.

BRANDES LIMITED, 296 REGENT ST., LONDON, W.1.

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.

Biscuit Tin Reception

I have long intended to try receiving through two casual condenser plates, and at last I had the leisure to make the experiment. I hung outside the window attached to the aerial an old bit of tin I happened to have by me, about three-quarters of a square foot, and inside the window I placed the lid of a biscuit tin upon an insulated stool with glass legs (a survival from frictional electricity days over forty years ago). 5XX was received on the loud-speaker without the slightest difficulty, with the plates about 8 in. apart, and remained quite audible up to a foot or more.

Slight retuning of the aerial circuit was, of course, necessary, but the arrangement was not particularly critical, though it sharpened tuning a little. I am not at all sure that I shall not adopt it permanently for 5XX and the family five-valver, as it will

save me the trouble of disconnecting or earthing the aerial at night.

H.T. Batteries

I see the old controversies are arising about the life of dry-cell batteries. Two of mine have just come to an end. One has lasted eight months and the other a good deal more, and I think with reputable makes and reasonable use one can expect this. I bought a cheap German battery once, and it never even started. When one comes to demands of the 10 milli-amp order there is nothing for it but accumulators or being satisfied with two months' life. The intelligent use of grid bias will reduce the consumption even of power valves to something quite modest. Care also counts: I always pull out my wander plugs and put the lid on at night, and one shouldn't leave dry cells either in the sun or on top of a radiator.

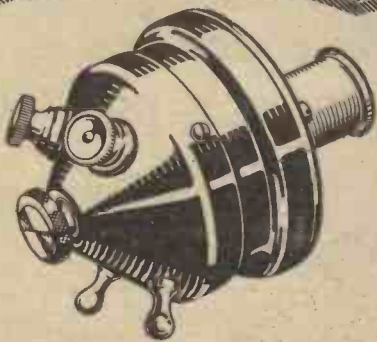
The New Season

The Exhibition is over, and I understand was a great success. It is fairly obvious that the winter season has begun with plenty of go and enthusiasm, from the time it takes to get components from the manufacturers. The amateur and constructional interest in wireless does not really seem to be showing any sign of diminution, and this is all to the good, because the greater the demand the lower the price at which manufacturers will be able to supply. Already one gets three or four times the value for the money that one got two or three years ago.

Giving One's-self Away

I see that Edison is reported to have said that wireless was perfectly hopeless in the transmission of music, and that he had never heard a soprano worth listening to. Is he not really rather giving away the American indifference to purity of reception and the comparative poorness of their L.F. stages? At the same time I cannot believe that all reception in America is as bad as his remarks would lead one to believe, or that Americans will really be driven to rush to the gramophone in order to obtain music fit to listen to.

WHAT IS THE MONODIAL?



hear this new T.M.C. GRAMO-SPEAKER

THE pure rich tone and ample volume of the new T.M.C. "Gramo-speaker" will astonish you.

It can, in a moment, transform your gramophone into a splendid Loud Speaker. By the addition of a home-made horn you can have as good a Loud Speaker as many a one sold at five times its price.

It is not an adapted "earpiece," with a diaphragm held in place by a screw-on cap, ready to loosen through its own vibration. It is a real Loud Speaker Unit with an adjustable magnetic system (Loud Speaker size) fitted with permanent magnets of cobalt steel and a diaphragm firmly clamped between ground metal surfaces.

Go to your local wireless dealer. Ask him to put a horn on the GRAMO-SPEAKER . . . hear why it is the most perfect of its kind.

Price

13/6

THE T.M.C. "JUNIOR" LOUD SPEAKER

THIS popular little fellow is better than ever. Its copper horn is responsible for its rich mellow tone. No "throatiness" . . . no blasting . . . pure liquid music and speech.

You'll like the T.M.C. Junior . . . but it's not made to look at . . . hear it . . . then you'll know why it is so popular.

Price £1 - 17 - 6

There is a T.M.C. Loud Speaker to suit every pocket. Ask for the new T.M.C. Catalogue at your local wireless shop—or we will send a copy free on request. Please mention the name of your usual dealer.



OTHER T.M.C. RADIO SPECIALITIES.

LOUD SPEAKERS.

- "Concert Grand" . . . £5 10 0
- "Standard" . . . £4 5 0
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From 12s. 6d. to £2 7s. 6d.

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Telegrams: "Bubastis, Dulcrox, London."

**THE PRIZEWINNERS TELL
THEIR STORIES**

(Continued from page 315)

I can have Bournemouth any day free from London and as loud, and only being one mile away from 2LO's aerial think this speaks very highly for the set, and I have a choice of 20 stations any evening, weather conditions permitting, but I have tuned in over 40 stations on the loud-speaker.

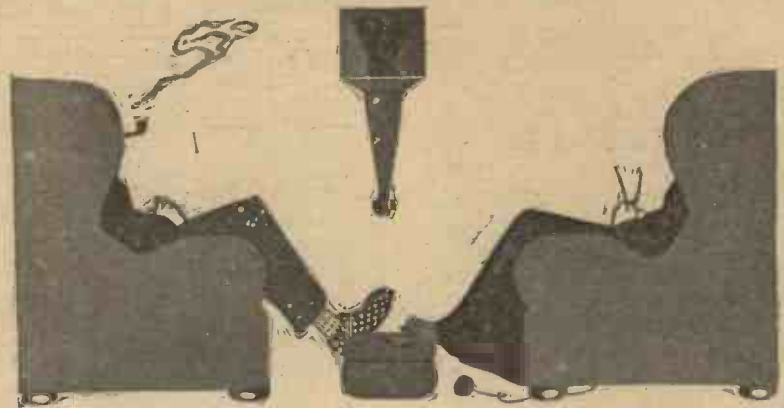
The tuning is fairly sharp, but easy, as the dials can be set to give the same setting for each condenser, and I would advise any reader who is in doubt as to what set to make to set about it now and make one, and I am sure they will not be sorry. If any such reader lives within riding distance of my house I should be pleased to demonstrate this set to him, and give him every assistance to make a success.

Now regarding my visit to Holland, I was very much surprised to receive a message to the effect that I had won premier prize in the International Competition, which was the gold medal, and I thought it only right that I should go over and receive this signal honour at the hands of the Society, so I wired to the Secretary to the effect that I would come over to receive same, also to bring greetings from British amateurs. I arrived at Amsterdam at 8.30 a.m., where I was met by the Chairman and Treasurer of the Amsterdam Radio Society, who escorted me to the Belle Vue Hall, where the Exhibition was taking place, and on my arrival, as a mark of esteem, was greeted with God Save the King by the band. I was then introduced to all the committee and some of the judges, including Herr Idzerda, the owner of the celebrated PCGG station, of whom British amateurs have all heard before broadcasting commenced.

At 8.30 on Sunday evening the distribution of the prizes took place, and I was duly presented with the gold medal, and this was added to by a very kind speech of congratulation by the Chairman, which was translated into English for me by him.

On Monday morning I made a tour of all the stands to see the sets and components that were being offered, which sets were mostly of the straight type and 5-valve Aperiodic 2H.F. type, but I was rather disappointed at the small amount of components that were made by the Dutch manufacturers, the majority of components being either German or American, but there are a few British parts there; also loud-speakers. During the afternoon I was taken round the town and shown the interesting parts, also the Rembrandt Galleries, by Herr Kroon, and after the Exhibition was entertained by several of the exhibitors at the Hotel

(Continued on page 319.)



**Build your own loud speaker
for the week-end**

DO YOU KNOW you can build yourself a loud speaker for less than the price of a pair of telephones, which will yet be equal to any expensive loud speaker you can buy at the price?

Tens of thousands of people have done this—and what they have done you can also do.

Go to your dealer—ask him to put on his most expensive loud speaker. Then put 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—easily—from the full size diagrams and clear instructions given with each unit, thus providing yourself with a complete instrument equal to any expensive loud speaker you have ever heard, and saving you many pounds.

The LISSENOLA is obtainable and demonstrated, like all Lissen Radio parts, at all good radio stores. Or send postal order direct if any difficulty. No postage charge, but please mention dealer's name.



The "Lissenola" instantly converts any gramophone into a radio loud speaker.

Price **13/6** each.



Full directions for making this horn are given with every "Lissenola."



The "Lissen" Reed Attachment (patent pending) for use with cone diaphragm loud speakers. Price 1/-.



A cone diaphragm loud speaker can easily be constructed. The illustration shows one method of mounting to the "Lissenola."

The LISSENOLA

Hear it before you buy—at your dealer's—before the week-end.
LISSEN LTD., 18-22, FRIARS LANE, RICHMOND, SURREY.
Managing Director: T. N. COLE.

HOW THE NEW WAVELENGTHS WILL AFFECT YOU

(Continued from page 299)

number of the relay stations, which are also grouped upon a single frequency. This step has been taken, of course, because there are, unfortunately, an insufficient number of individual channels for all the stations which have to work, but it is a point which affects the long-distance enthusiast.

The Relays

The main practical effect of the new scheme, so far as the British listener is concerned, lies in the fact that the relay stations are being moved down to a new wavelength which is considerably lower than most of us are in the habit of regarding as necessary in the range of a local receiver. The new wave is actually below 300 metres, being in the neighbourhood of 238 metres, and some of us may need to make some slight alterations in our sets to get down to this new point.

When these alterations come into force, Daventry is to be regarded as a stand-by for those in difficulty anywhere in the United Kingdom.

The B.B.C. state that the arrangements have been made so that the necessary alterations will apply to the minimum number of persons.

The new wavelengths are as follow: Aberdeen and Birmingham, 491.8 m.; Glasgow, 405.4 m.; Manchester, 384.6 m.; London, 361.4 m.; Cardiff, 353 m.; Belfast, 326.1 m.; Newcastle, 312.5 m.; Bournemouth, 306.1 m.;

Leeds (relay), 297 m.; Bradford (relay), 254.2 m.; all other relays, 288.5 m.

Altering Your Set

In most cases it is probable that no alteration to existing receivers to tune to the revised wavelength of the local station will be needed. This applies particularly to the newer types of sets incorporating special coils which cover a wave-range of, say, 200 to 500 metres, with another unit for Daventry, but in the case of sets using plug-in coils, and perhaps a plain parallel-tuned aerial circuit some slight modification may be required.

What May Be Needed

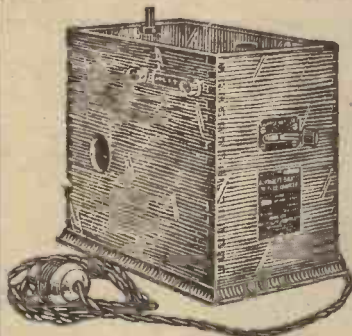
When plug-in coils are employed it may be necessary to use one size smaller in the various sockets of the tuned circuits in order to receive the relays on the new common wave.

Where parallel tuning is used in the aerial circuit there may be a little difficulty in getting down to this wave on a large aerial. In such cases three simple remedies are available, the first being to alter the wiring to give series tuning; the second, to adopt one of the various tips which have been given for incorporating "aperiodic aerial" tuning; while the third, and perhaps the simplest, is to include a fixed condenser of .0001 in series in the aerial lead (outside the set).

G. P. K.



Completely screened receivers were a feature of the World's Radio Fair held recently in New York. The screen of the Bosch Company's receiver is here seen cut away to show the simultaneous control gear.



No. 484, 100-120 volts, 50-80 cycles, with filler and gauge. £2 18 0

No. 489, 200-240 volts, 50-80 cycles, with filler and gauge. £2 18 0

The Burndeft range includes everything for Radio reception from Components to Complete Installations.

Head Office and Factory: Blackheath, London, S.E.3. Phone: Lee Green 2100. Grams: Burnacott, Phone, London.

Every Owner of a Wireless Set should have a

BURNDEPT

BALKITE TRICKLE CHARGER

which slowly TRICKLES electricity into the accumulator all the time the receiving set is not in use. It cannot over-charge and costs less than 3d. per day.

THE utility, simplicity and economy of this appliance appeals instantly to users of Valve Receiving Sets. With it the L.T. Battery can be kept always at full strength. It charges from the ordinary lighting mains at the rate of approximately half an ampere and comes into operation immediately the set is switched off. It is suitable for 2, 4 or 6-volt accumulators and is for A.C. Mains only.



AGENTS AND BRANCHES EVERYWHERE

In principle it is similar to the Burndeft Balkite Battery Charger. Beautifully made and finished with the usual Burndeft quality.

London Offices and Showrooms: 15, Bedford St., Strand, W.C.2. Phone: Gerrard 9072. Grams: Burndeft, Westrand, London.

THE PRIZEWINNERS TELL THEIR STORIES

(Continued from page 317)

American, where the health of the British amateurs was toasted, and hopes expressed that the relationship between the Dutch and British amateurs would be more firmly united.

During the evening I proposed giving a special demonstration of the Elstree Six for the benefit of the exhibitors and public, but although I tuned in several stations, atmospherics were so bad that reception was absolutely spoilt, but they heard sufficient to show the capabilities of the set, and I made several of the persons present work the set themselves, and as a result I have got to send sets of parts to assemble there for demonstration purposes! I was unable to repeat this on Tuesday, as the set had to be packed ready for despatch to London on Tuesday morning.

I should especially like to thank Herren Verkoeven, Nassau, Tooren, and Bontikoe Irving for the way they did everything to make my visit a success, including arranging visits to valve works, high-power stations, and other points of interest, and for the way they studied my personal comfort.

As a final paragraph, I was given a message to deliver to Radio Press readers to the effect that should they be in Amsterdam, if they will call at the office at Achterburgwae 75, they will receive a cordial welcome.

St. John's Wood,
London, N.W.8.

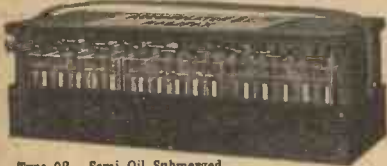
Next Week

Mr. Black, Jr., whom, it will be remembered, won the second prize in the junior class with a "Mewflex," constructed from instructions given in *Modern Wireless* for September, will tell his story in our next issue.

H.T. ACCUMULATORS

60 Volts.—Price 32/6

DO YOU REALISE that light weight and low cost may be linked up to high efficiency? The inexpensive 60 volt—3 amp hour ELITE—High Tension Accumulator which actually costs under a 4d. to recharge will do all that the more expensive types will do and are never done. Therefore look before you leap at our Descriptive Folders, which will be forwarded per return on application.



Type 02. Semi Oil Submerged.

60 volts Complete as illustrated 32/6 or 5/- per 10 volt Unit.

ACCUMULATORS ELITE,

32, KING CROSS STREET, HALIFAX.
Tele.: 1304. Trade Supplied. Telegrams: Elite, Halifax.
London Distributor:
CECIL FOHLMAN, 77, Great Portland Street, London, W.1.

The H.T. Battery that helps your Loud Speaker—

Valves and loud speakers are often wrongly blamed for an ineffective high tension battery.

If your loud speaker lacks life and tone, decide to get the LISSEN New Process Battery. This gives your loud speaker a new power smoothness which makes its reproduction noticeably clearer, more powerful, more enjoyable than ever you have known it before.

Insist upon your being given the LISSEN New Process H.T. Take no substitute—if any difficulty send remittance direct—no postage charged, or will be sent C.O.D. by return. Please mention dealer's name and address.

10/6

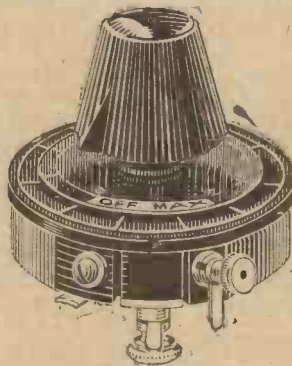
rated 60 volts.

Price would have been 13/- but for our new direct-to-dealer policy of distribution which cuts out all wholesale profits.



ALWAYS INSIST ON THE LISSEN NEW PROCESS BATTERY
(POPULAR BLOCK TYPE)

PREFERRED RHEOSTATS—



You have seen many wire rheostats and potentiometers, but the LISSEN range offers you something from which every discriminating buyer will choose one in preference to all others.

You want in a wire rheostat a contact brush which gives firm, sure electrical contact, yet which moves smoothly along and is pleasant to use. This you have in a LISSEN. In addition, the turns of the wire cannot move and short circuit - - - you cannot get any chattering or any arcing. There is no flimsy spring. The photo engraved dial and combined knob and pointer which when mounted fits flush with the dial gives an extremely neat appearance. And these LISSEN rheostats will stand knocking about - - - they are robust as well as good looking.

The reduced prices are the last irresistible appeal that compels you to buy a LISSEN after comparison with all others. Note the large reductions made possible by our new direct to dealer distribution policy which cuts out all wholesale profits.

	Previously.	Now.
LISSEN 7 ohms, patented	4/-	2/6
" 35 " " "	4/-	2/6
" Dual " " "	6/-	4/6
" Potentiometer, 400 ohms, pat.	4/6	2/6

AND EVERY ONE LISSEN ONE-HOLE FIXING, OF COURSE

IMPORTANT TO

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

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Managing Director: T. N. COLE.

RESULTS OF THE MULLARD P.M. FILAMENT COMPETITION

CORRECT SOLUTION

A—400	..	D—2000
B—1570	..	E—1823
C—1010	..	F—942

1st PRIZE - - - - £25

Solution

Supt. Ernest Marr Vickery, 49, Milman Street, King's Road, S.W.10.	{	A 725	..	D 1926
		B 1450	..	E 1750
		C 1450	..	F 1000

2nd PRIZE - - - - £10

Solution

G. Cole, Esq., 424, Uttoxeter New Road, Derby.	{	A 210	..	D 1560
		B 1500	..	E 1500
		C 786	..	F 793

3rd PRIZE - - - - £5

Solution

Miss Phyllis Waddilove, Bridge End, Wilsill, Pateley Bridge, Yorks.	{	A 625	..	D 1580
		B 1200	..	E 2000
		C 1187	..	F 1200

25 CONSOLATION PRIZES OF A P.M. VALVE TO SUIT THEIR CIRCUIT

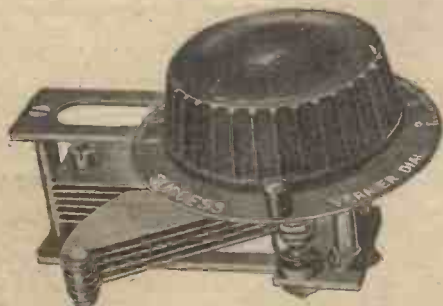
Cyril George Lansom, 3, St. Mark's Road, London, W.11. (—) Dronsfeld, 32, Rupert Street, W. R. H. Watson, 57, Mount Avenue, Ealing. Hilda Pound, Maudsley Hospital, S.E.5. Ernest John Wm. Warren, The White Cottage, Rayleigh, Essex. Albert Goldenfeld, 134, Bethune Road, Stamford Hill. William Vine, Rowans, The Chase, Watford. F. C. Lugat, 15, Cleveland Park Crescent, W. Hulbert C. Gurment, 1, South Gertern Avenue, Edmon-ton. James Fredk. Perrin, 99, Knights Hill, S.E. 27. George H. Nonson, 97, Spring Bank, Hull. Victor Dupere, "Corram," Lee Road, Harpenden. Gerald A. Ewen, Ryde House, East Twickenham. F. A. Callow, 23, Croindene Road, Norbury, S.W. 16. Vernon Harris, 70, Lancaster Road, Stroud Green, N.4. H. Sunnerhayes, 275, Cricklewood Lane, N.W.2. Fred Holland, 27, Custom House Street. Fred Chalker, 171, Lower Richmond Road, Richmond. Fred Hale, 190, Droop Street, W.10. Albert Evans, 20, Cranmer Road, Hayes, Middlesex. P. J. Collet, 4, Ashburnham Road, Kensal Green, N.W.10. P. Tounsend, 2, Duke Street, London Bridge. Doris Pound, Kingstone House, Wexham, Slough. Walter John Moran, 153, Victoria Road, Swindon. Harold M. Goldstein, 148, Queen's Park Road, Brighton.

SUCCESS RADIO PRODUCTS

For Perfect Radio Reception

SUPER CONDENSER

ULTRA LOW LOSS S.L.F.



Minimum Dielectric Loss. Skeleton End Plates. Grounded Rotor. Spring Pigtail. Ball Bearings. 100 to 1 Slow Motion. Provision for quick searching. No Backlash.

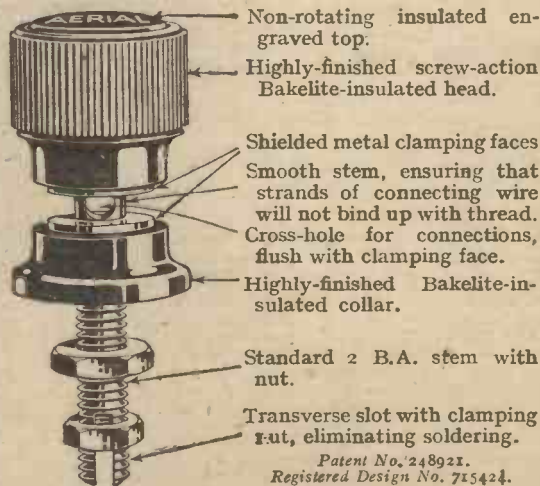
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STANDARD MODEL (Bakelite-insulated) (Type B) 9d. each.

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If you cannot get these at your dealers, send your order to us, enclosing his name and address.

Illustrated Catalogue free on request.

BELLING-LEE PANEL FITTINGS

BELLING & LEE, Ltd., Queensway Works, Ponders End, Middlesex. E.P.S. 13

OPERATING FOUR VALVES

(Continued from page 312)

minals, all positive H.T. terminals being connected together for the purpose of this test, while the telephone terminals are shorted. In these circumstances no valve should light, of course, and if this is not the case an immediate investigation should be made into the cause of the trouble.

Provided that the set has passed this preliminary test it may now be tried out on actual signals. Plug in the coils and aperiodic transformer to suit the band of wavelengths to be received, and join up the aerial, earth and loud-speaker.

Operating the Set

Rotation of the tuning control will result in signals from the local station being easily picked up, when volume may be brought up to the desired amount by adjustment of the potentiometer. Once adjusted, the set may be operated simply by movement of the filament switch, and left for any member of the family to use as may be desired.

Further Results

Tested at four and a-half miles from the London station, the set gave good loud-speaker signals on the writer's small aerial, 12 ft. high, which is badly screened by trees and bushes, while quality was very pleasing when the anode and grid voltages had been suitably adjusted. On a standard P.M.G. aerial, 40 ft. high, at the same place, a large O.A.V. loud-speaker was operated at full strength, signals being clearly audible on the ground floor with the instrument on the second. In this case the volume was too great for comfortable reception in a medium-sized room, and recourse to the volume control was necessary.

NEWS IN ADVERTISEMENTS

Messrs. Fellows request readers to write for their 48-page illustrated catalogue (No. 34).

A new Lock Switch is being marketed by A. F. Bulgin & Co.

An interesting letter upon the reception of the Dempsey-Tunney fight is the feature in Messrs. Igranio Electric Co., Ltd.'s advertisement.

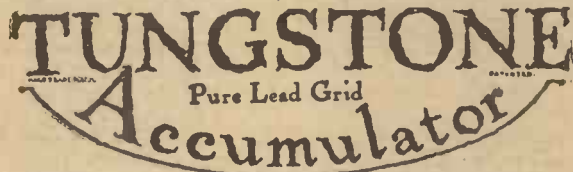
A new S.L.F. Condenser is announced by Messrs. Beard & Fitch.

Messrs. New Wilson Electric Co., Ltd., invite readers to send for full particulars of the Microphone Bar Amplifier.

The Newey 4-point Variable Condenser is the subject of an announcement by Messrs. Pettigrew & Merri-man.

UNIQUE Parts BOOKLET

Inaugurating Revolutionary Methods favourable to Battery Users



Entirely of British Origin and Workmanship.

PRICE LIST OF TUNGSTONE

INTERCHANGEABLE AND STANDARDISED PLATES AND PARTS

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

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

NO OTHER ACCUMULATOR MAKER IN THE WORLD has ever been in the position to issue a definite priced Parts List because their make of complete Batteries or Unit 2 Volt Cells are designed, manufactured and assembled on antiquated methods whereby the principles of Interchangeable and Standardised Component Parts could never be practised. For example, Plates and Wood Separators in 2 Volt Cells are (*except in Tungstone*) one indivisible whole. If one plate goes wrong the lot is destroyed.

IMPOSSIBLE TO TAKE PLACE IN TUNGSTONE

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

IMPOSSIBLE TO TAKE PLACE IN TUNGSTONE

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

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

A New Amplifier!

"Vares" New (Pro. Pat.) Micro Amplifier is guaranteed to amplify any crystal or valve set, 3 to 5 times. Simply contained in a small cabinet that is connected by leads to phone terminals of set. No alteration to set, no H.T. Valves, Transformers, &c., only two 1 1/2 v. dry cells required for maximum volume. Interesting to construct and costs but a few shillings to make from our Diagrams. Plans and Instructions 2/6, with prepared electrodes, screws, and correct quantity of filling.

DEBENHAM & CO., 28, Castlands Road, LONDON, S.E.8.

1/9 AERMONIC
 VALVE HOLDER.
 Anti-capacity. Anti-Phonic.
 Don't pay more than 1/9.
 If hard to get, drop us a line.
J. CHRISTIE & SONS, LTD.,
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A HOME FOR YOUR WIRELESS SET

OUR STANDARD CABINETS

are DUSTPROOF and house the whole apparatus, leaving no parts to be interfered with. All you do is UNLOCK and TUNE IN Made on mass production lines, hence the low price. Provision is made to take panels from 16x7 up to 30x18 in.



From £15 0
 Write to-day for descriptive pamphlet and suggestions for adapting your receiver or panel in our Standard Cabinets. Immediate Delivery.
 Dept., 4, Melville Chambers, 50a, Lord St. LIVERPOOL.

Carriage paid and packed free England and Wales.
 Thousand supplied with full satisfaction.
MAKERIMPORT Co.

30 to 3,000 Metres on a Three-Valve Set—Continued from page 298

voltage, but that different values of grid-bias are provided for; different H.T. voltages are, of course, really unnecessary with any of the commonly-used power valves.

The actual values used by the author were: Detector, 45 volts; L.F. valves, 120 volts. The grid-bias for both the note-magnifiers was obtained from the same 9-volt battery, 4.6 volts being used for the first and the full 9 volts for the second.

Coupling Arrangements

The aerial is coupled through a .0001 series condenser to the anode end of the centre-tapped coil. This

the tuning control rotated slowly. It will be preferable to use a loud-speaker even on the initial test, and the local station should come in very strongly.

Reaction Control

Reaction is now controlled solely by means of the condenser C_2 . Detuning slightly from the local station, increase the setting of the latter very cautiously until a rushing sound, or perhaps a very slight "plop," is heard. The set is now oscillating, and the reaction condenser should, of course, be used at a slightly lower reading than this. It should not need much re-adjustment over the whole range of tuning.

condenser is at earth potential, omission to see to this is rather apt to lead to trouble. The screen is very useful in preventing capacity effects, and should certainly be used.

Since only one-half of the coil is being tuned, much larger coil sizes than usual will be required to cover the normal wave-bands, and this should, of course, be borne in mind.

Should there be any overlap present when the set is first tried out, it may be found helpful to use even a slightly higher value of grid-leak than that specified. Much of this depends upon the valve used for the detector, however.

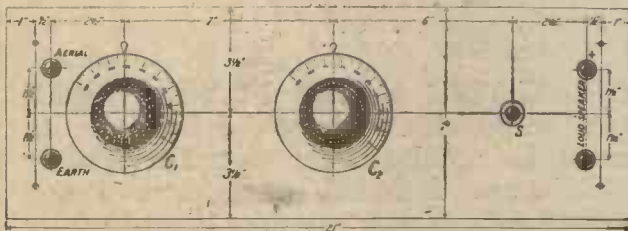
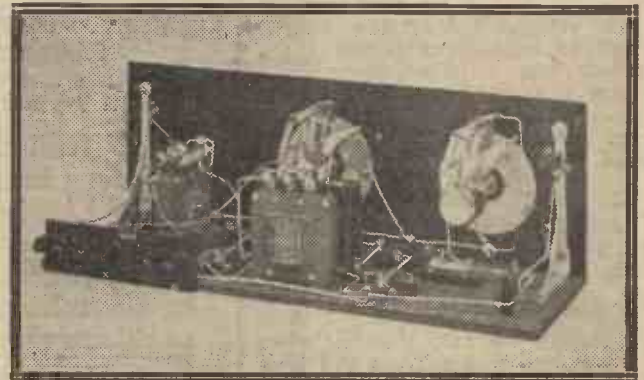


Fig. 3.—The condenser C_1 is that which tunes the grid circuit, while C_2 controls reaction.



The shields mounted between the panel and the variable condensers are to minimise hand-capacity effects.

arrangement gives extremely good selectivity and has less effect upon the tuning of the grid circuit than if it were tapped on to the grid end. The positive side of the L.T. battery is earthed, as also are the screens on the two variable condensers.

Having made all the external connections necessary, the set should be switched on with a Gambrell C or D centre-tapped coil or its equivalent in the socket. The reaction condenser should be set near its minimum, and

although if a different size of plug-in coil is used for the purpose of covering another waveband it will certainly need to be altered slightly.

A Warning

In connection with the reaction condenser, special care when mounting it should be taken to see that the ebonite bush supplied for the purpose of insulating the screening disc from the condenser is really doing so. Since the disc is earthed, and neither side of the

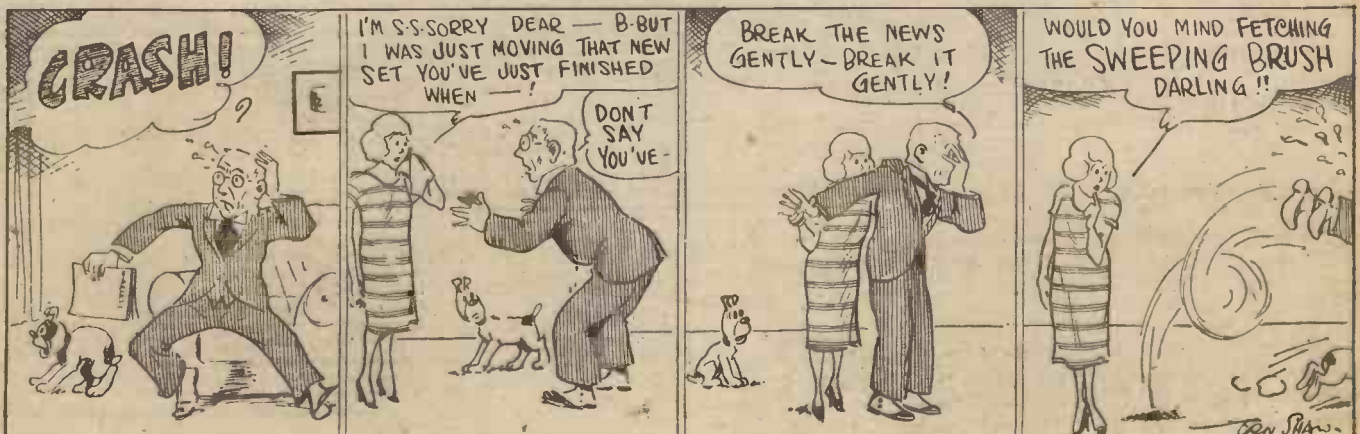
On Short Waves

For short-wave work the Igranite short-wave coils may be used, the lead normally taken to the centre tapping being then furnished with a clip and taken to a suitable point on the bare-wire coil. Actually, for the reception of WGY the largest of the set (a 9-turn coil) is used, and the filament tap is taken five turns up from the grid end. When the 6-turn coil is used for shorter

(Continued on page 328.)

No. 47.

Breaking It Gently!



THE Newey 4 Point "Condenser"

"The finest engineering production of the year"—an unsolicited testimonial. We reproduce below one of the numerous letters we have had from users of the Newey 4-point Condenser: in every case there is the same enthusiasm regarding the perfect design and workmanship of this famous Condenser.

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yours Truly
S.P.W.

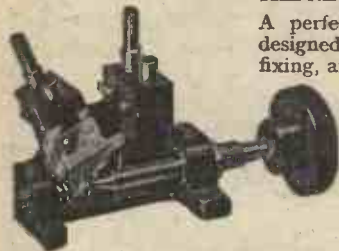
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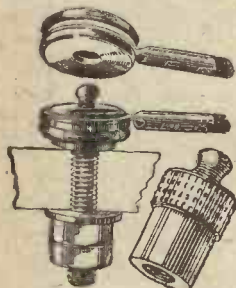
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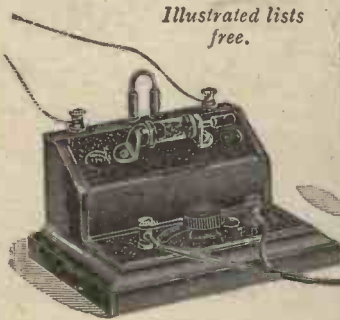
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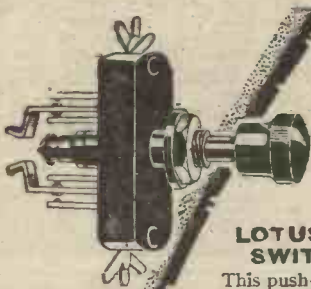
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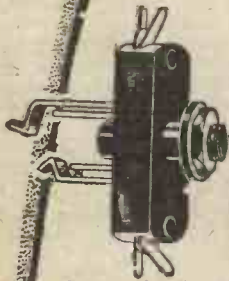
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HOW TO TRY THE PARALLEL FEED CIRCUIT

(Continued from page 308)

The reduction in damping permits the circuit to oscillate more freely under the impulse of incoming signals, and so not nearly so much is lost as might be expected.

Reaction

Reaction can be added to the circuit with considerable advantage, and whatever scheme is used in the set it can readily be modified to suit the new arrangement. For example, if a swinging reaction coil is provided, this can be used, being connected in series in the anode circuit of the detector valve, and coupled to the coil L_1 . (It should be noted that reaction into the circuit $L_2 C_2$ is much to be preferred to reaction into the previous grid circuit $L_2 C_1$, and that the second H.F. choke coil should be omitted.)

Although an existing swinging magnetic reaction coil can be used, it is much to be preferred to incorporate one of the better schemes of reaction controlled by means of a variable condenser. These methods are to be preferred, since they give a smoother control, and have very much less effect upon the tuning of the circuit than a moving coil. Such a scheme is shown dotted in Fig. 4, the condenser C_4 being provided to produce reaction. This method gives a really smooth control, and quite a small condenser will do for C_4 , one of the larger types of neutralising condenser being quite adequate in most cases. The only other modification to the set necessary to incorporate this scheme is to include a high-frequency choke in series with the anode circuit of the detector valve, so that two chokes will be needed in the final modification.

Parts Required

To modify our original tuned anode receiver to the Fig. 4 arrangement is by no means a difficult matter, and it will be seen that all we require is two high-frequency chokes, two neutralising condensers, a centre-tapped coil instead of the original plain anode coil, and a fixed condenser C_4 of perhaps .0003 capacity. The result will be a receiver of quite reasonably modern type, giving greatly improved selectivity and sensitivity, and I venture to say that anybody who makes this modification will feel that his trouble has been well repaid.

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118, BUNHILL ROW.

30 TO 3,000 METRES ON A THREE-VALVE SET

(Continued from page 322)

wavelengths still, the tap is taken four turns up from the grid end.

The condensers used are on the small side (.00025), in order to make the set reasonably simple to handle on the short waves. They will be found quite large enough on the broadcast band, however, since the numbers of turns used (half the coil) in the grid circuit are not quite the usual, and an occasional change of coil can be made. It is usually unnecessary to make use of the slow-motion drive on the broadcast waves, but it is quite indispensable for the shorter bands.

When to Listen

Using the 9-turn Igranite coil, KDKA may be found near the top of the scale (his wavelength being about 65 metres), and slightly lower (at 58 metres), a strong German station, at present unidentified by the writer, transmits dance music, starting at about 10.30 p.m. every night. KDKA and WGY can seldom be heard well until after 11 p.m., but the set was tested out while B.S.T. was in force. A fairly safe time to listen for them should now be about 10.30 p.m. (G.M.T.).

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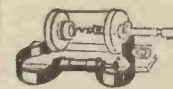
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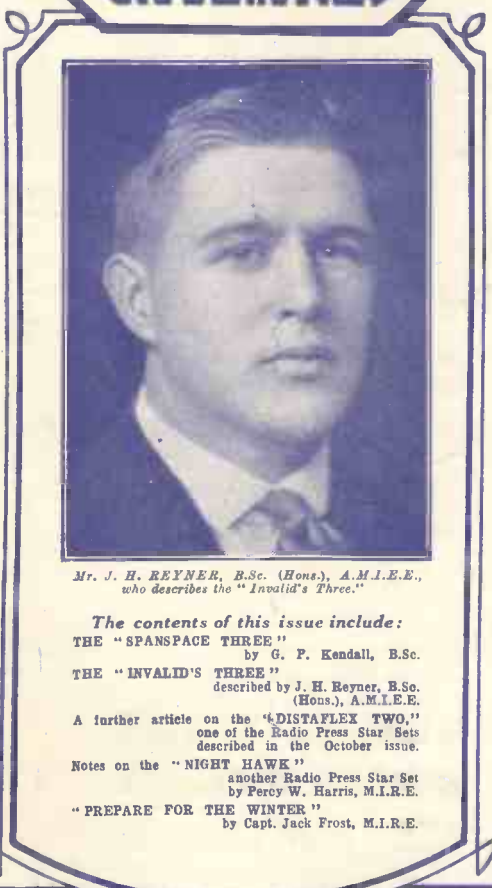
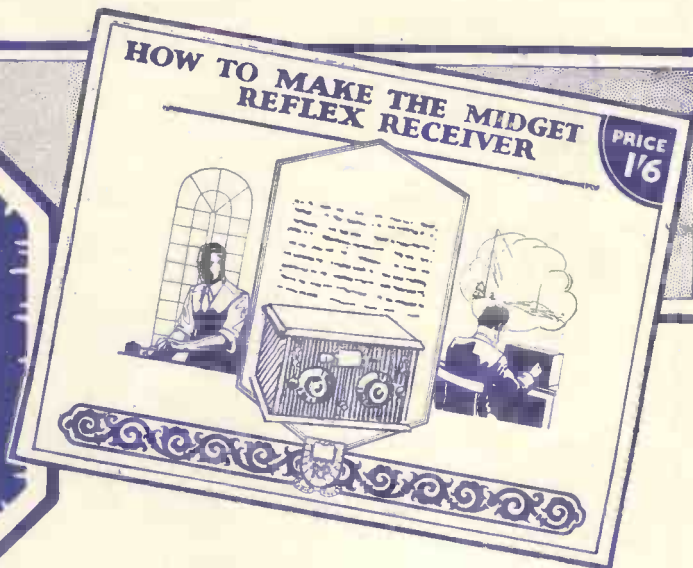
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