

CIRCUITS FOR YOU TO TRY

Amateur Wireless

Every Thursday 3^d

And Electrics

Vol. XI. No. 288

Saturday, Dec. 17, 1927

REYNER'S "C.T." FOUR

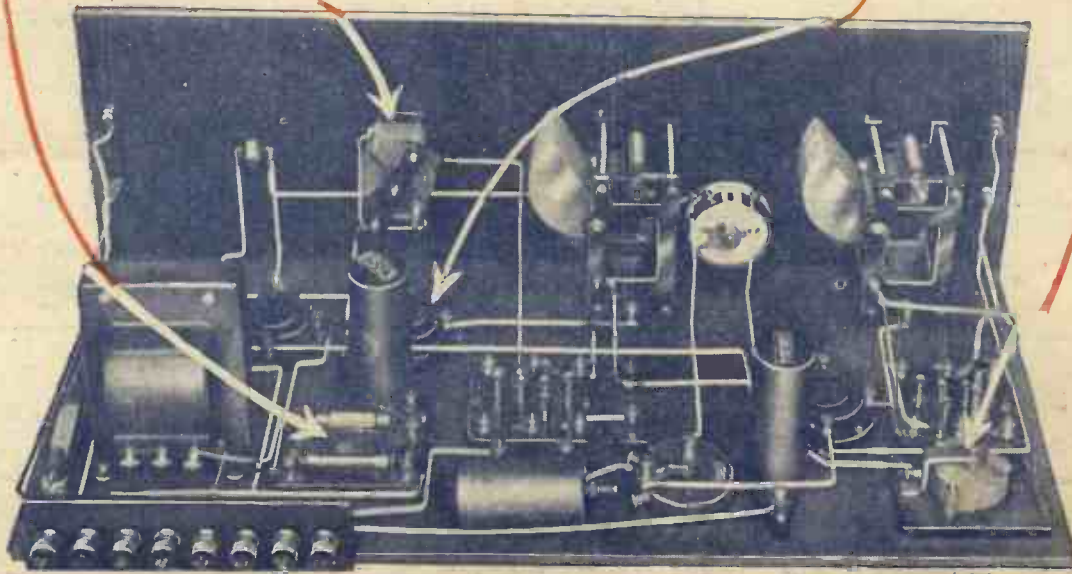
PURITY
L.F.

A Further Special Article on this Unique Receiver incorporating the new Capacity-tap Principle.

BALANCED
H.F.

CONSTANT
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ANODE-BEND
DETECTOR



AN APOLOGY

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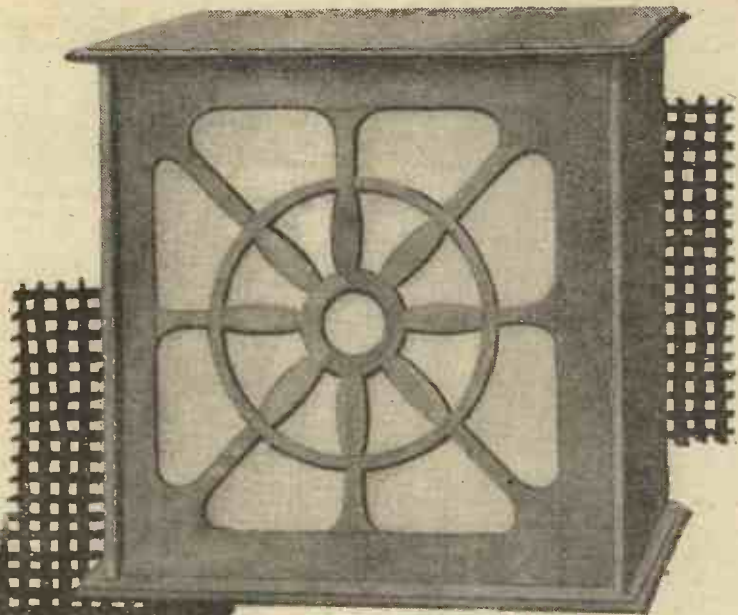
Advertisers Appreciate Mention of "A.W." with Your Order

THE STAR PARTS OF THE COSSOR MELODY MAKER

THE ORMOND S.L.F. CONDENSER

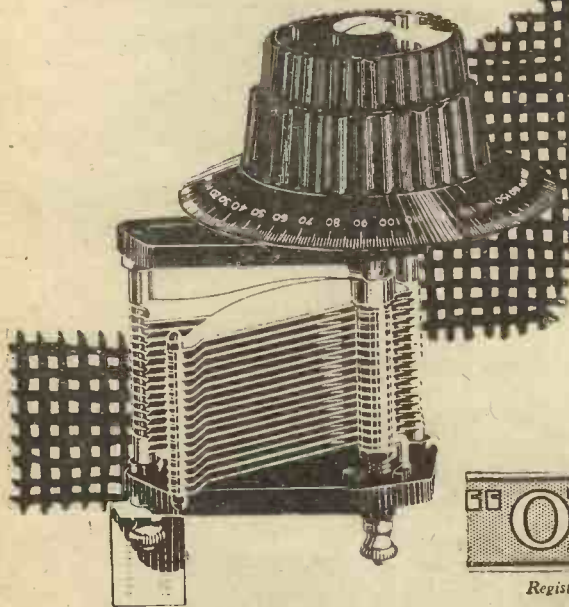
The Variable condensers in the Cossor Melody Maker were selected with care to ensure sharp tuning, fine adjustment and exact capacities — and so the choice fell upon the Ormond S.L.F. Condenser. No other condenser must replace it in this circuit, for upon the delicate adjustment of the Ormond Slow Motion dials depend the razor-sharp tuning and extreme selectivity of the set.

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Amateur Wireless

and Electricians

The Leading Radio Weekly for the Constructor, Listener and Experimenter

Vol. XI. No. 288

Edited by BERNARD E. JONES
 Technical Editor: J. H. REYNER, B.Sc.(Hons.), A.M.I.E.E.

December 17, 1927

5SW's Silence—"Straight-line Three"—"Simpler Wireless" Developments Our Competition—Daventry Junior Again—Can you Beat It?

The "Straight-line Three"

DESIGNED by the AMATEUR WIRELESS Technical Staff, the "Straight-line Three," described and illustrated in this issue, will meet the needs of those listeners who require a receiver combining adequate selectivity with purity of reproduction. The amplification over the whole musical scale is very nearly "straight-line"; but, remember, a good set deserves a good loud-speaker to go with it!

Our Competition

THIS week we are again printing the rules of our competition together with another form for you to fill in. We shall reprint it every week until the closing date, which is December 31. Don't forget! There are few of us who do not have second thoughts, and they say second thoughts are best! Therefore—but the moral is obvious, isn't it?

5SW's Silence

THE performance 5SW put up on Armistice day cannot be said to have been all that could have been expected! The engineers' were aware of this and have been reconsidering the best wavelength for the station. This, coupled with the fact that whenever the wavelength is altered a new aerial is required, explains the silence which has been puzzling some listeners.

Daventry Junior

DAVENTRY JUNIOR'S new aerial has now been completed for some days, but up to the time of writing it has not been used for the regular transmissions, although there has been a good deal of testing going on—testing which kept our old friend



FIRE AT RADIO RESEARCH STATION

The laboratory and test-rooms, and wireless apparatus stated to be worth several thousand pounds, were destroyed by a fire at the Government Radio Research Station at Ditton Park, near Slough, Buckinghamshire, on December 1. A lattice aerial mast 200 ft. high presented a remarkable spectacle as the flames ran up it before it crashed to the ground. Our picture shows the fallen mast on the burnt-out shed.

for the rest of the stations to be built under the regional scheme will be put before the Postmaster-General as soon as 5GB's new aerial comes into use. Are the engineers, then, satisfied with 5GB?

A New 2LO

IF the proposals are approved the first station to be built under the scheme will be a new 2LO. This station will probably be situated at Potters Bar, and will serve London and south-east England.

Can You Beat It?

IT seems that before one earns a fame as an amateur transmitter it is necessary to be something of a champion listener. Gerald Marcuse, for example, whose broadcasts to Australia have made him famous, has a large low-wave super-het with which he can bring in Australian broadcasts on the loud-speaker.

the wireless-equipped car very busy in the Midlands. The new aerial will probably be in use before the year is out.

Are They Satisfied?

THE inner workings at Savoy Hill are seen very much "as in a glass darkly" just lately! It is rumoured that the plans

"Simpler Wireless" Developments

IN next week's issue J. F. Johnston, the inventor of "Simpler Wireless," will give preliminary details of the unit which enables "Simpler Wireless" sets to be worked from A.C. mains. In the first place the rectifying unit itself will be fully described. This unit, which is very inexpensive and easy to build, will entirely solve the current-supply problem for thousands of readers having A.C. electric-light supplies in their houses. It may be used in conjunction with the famous "Special Three" set described in AMATEUR WIRELESS No. 279 (with which readers having D.C. have obtained such extraordinary results), or with a special four-valve set to be described soon.

PRINCIPAL CONTENTS

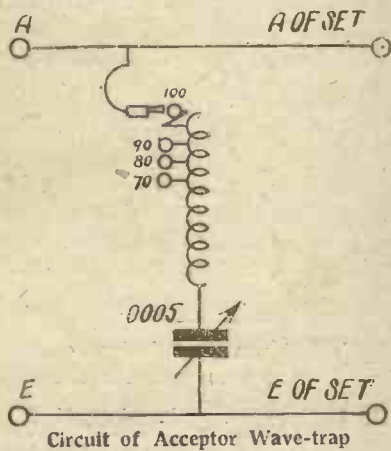
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AN ACCEPTOR-WAVE-TRAP

ON this page are the necessary constructional details of one of the wave-traps dealt with in the article on "Wave-traps and Other Simple Aids to Selectivity" given in AMATEUR WIRELESS No. 286.

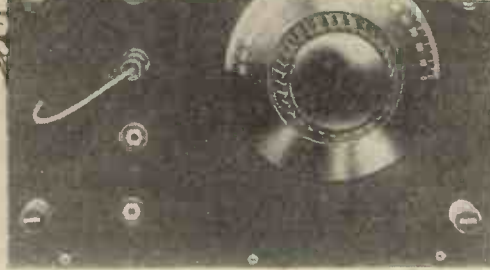
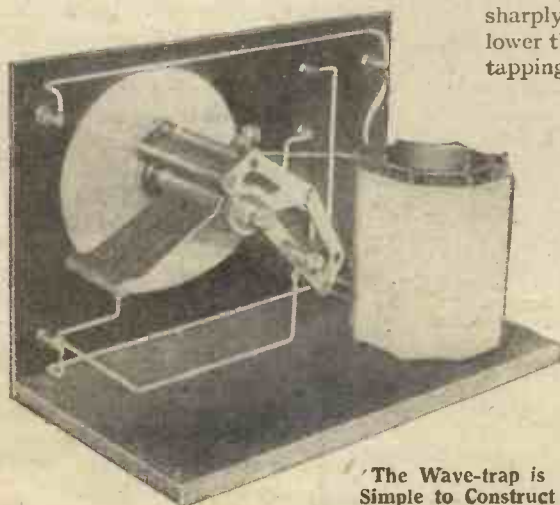
It must be emphasised that this particular trap will prove disappointing if not used in the correct manner. It is intended to be connected across the aperiodic coil of a receiver or across a tapped tuning coil, as indicated in the article referred to.

Constructionally, the "Acceptor Wave-trap" shown offers few difficulties. On a 3½-in. length of 3-in. diameter Ebonart



low-loss former are wound 100 turns of No. 24 d.s.c. wire, tapings being made at the 70th, 80th, 90th, and final turns. The small ebonite panel is drilled to take four Lisenin sockets, the .0005-microfarad variable condenser, and the two "aerials" and "earths."

The theoretical connections are plainly indicated in the diagram. Essentially, the circuit consists of the tapped coil and variable condenser in series, the amount of



coil in circuit depending on the tapping selected, i.e., 70, 80, 90, or 100 turns.

Construction

The layout of the panel and baseboard is also indicated in the combined drilling and wiring plan. The coil is secured to the baseboard by means of a small strip of wood screwed inside the coil former.

It will be seen that on the left of the panel are two terminals, one A and one E. These are simply for convenience in attaching the trap to the receiver. The duplicated A and E terminals on the right are connected to the corresponding A and E terminals of the receiver. The actual aerial and earth leads are then taken to the A and E terminals on the left.

A flexible lead with an attached Lisenin plug is brought through a hole in the panel so that it can be plugged into any of the four sockets. The top socket is the 70th-turn tapping and the lowest socket the 100th tapping. The wiring is done with Glazite or Junit wire in accordance with the wiring plan.

Using the Trap

When using the wave-trap, the coil tapping selected will depend on the wavelength of the station it is required to trap. For most stations the full 100 turns are required, because, it must be remembered, the .0005-microfarad variable condenser is in series with the coil. At one particular condenser setting the local fades out, although the point of "fade out" is not sharply defined as in other traps. The lower the trap coil losses and the better the tapping adjustment, the more critical is the "fade out" point.

There is room for experiment in the adjustment; sometimes the most satisfactory "eliminating" adjustment is not satisfactory as far as bringing in another station. When properly adjusted, however, and used in conjunction with an auto-coupled tuner circuit, the results are all that are required—elimination of the local in favour of a more distant transmission.

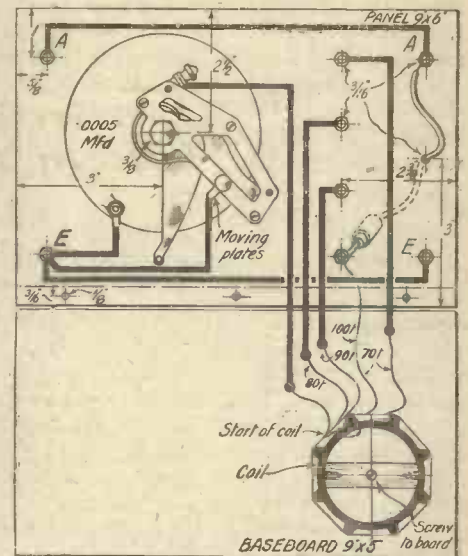
Experiments are now in progress with other forms of trapping arrangements, and

should these result in an improved trap circuit it will be duly recorded.—A. H.

B.B.C. versus THEATRES AGAIN!

THAT the B.B.C., as chief rival to the theatres, should not allow adverse theatrical criticisms to form part of its programmes, is the contention being voiced at the present time by some London theatrical managers. This growing objection has culminated in the receipt by the B.B.C. of a letter of protest from one of the leading London managements.

An official of the B.B.C., discussing the question with an AMATEUR WIRELESS representative, stressed the fact that the B.B.C.'s first duty was to its large body of

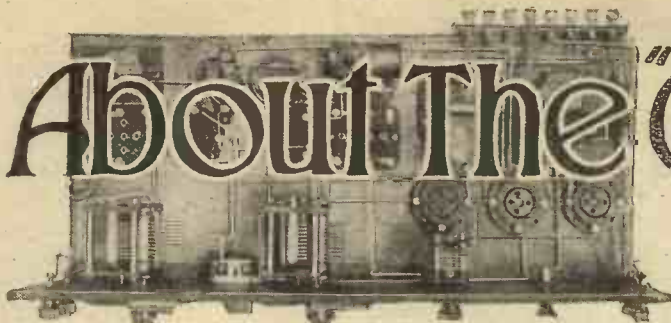


listeners and not to the theatrical managers. Moreover, it employed experienced critics of the arts, including the drama, for the guidance of listeners, as it has a perfect right to do.

The B.B.C. itself is not always above criticism and certain theatrical managers have criticised the programmes by means of burlesques and in other ways. One manager, according to the *Daily Express*, had asked "what the B.B.C. would think if every theatrical manager stood in front of the curtain and told the audience that they were not to listen-in as the B.B.C. was the dullest and most inept institution in the country."

The fact remains, however, that theatrical managers did not do foolish things of that sort, although the B.B.C. as an institution seems to provide them with material for mirth-provoking burlesques.

More About The "C.T. Four"



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

I HAVE just been looking over the cost of the "C.T." Four receiver and have been agreeably surprised to find that this works out at about £7 10s. only, not including the cabinet. When I first laid out the components of the receiver in their correct positions, I was rather pleased with the comparative simplicity of the layout and the low first cost serves to confirm that the circuit really is simple and consequently cheap to construct.

By the way, two slow-motion Ormond dials are required to complete the list of components.

If Cyldon condensers are used this should be mentioned when ordering the dials, as special adaptors are provided to fit $\frac{1}{4}$ in. spindles.

Those readers who wish to make their own coils will be able to do so from the details given herewith. The windings on the coils are simple single-layer windings in all cases, tappings being taken at appropriate points. Two-inch Paxolin formers are employed in all cases.

The actual winding details are as follows:

Short Waves

Aerial Coil.—65 turns of 28 d.s.c. wire wound as follows: Commence the winding at pin No. 2. Wind on 6 turns and take a tapping to pin No. 3. Wind a further 4 turns and take a tapping to pin No. 4. Then wind on 55 turns, making 65 in all, and connect the end to pin No. 1.

H.F. Coil.—95 turns of 28 d.s.c. wire wound as follows: Start the winding at pin No. 6. Wind on 30 turns and take a tapping to pin No. 2. Then wind 65 turns more and take the end to pin No. 1.

Long Waves

Aerial Coil.—300 turns of 40 d.s.c. wire wound as follows: Start the winding at pin No. 2, wind on 40 turns and take a tapping to pin No. 3. Wind a further 30 turns and take a tapping to pin No. 4. Then wind a further 230 turns, making 300 in all, and connect the end to pin No. 1.

H.F. Coil.—390 turns of 40 d.s.c. wire wound as follows: Start the winding at pin No. 6 and wind 90 turns, after which take a tapping to pin No. 2. Then wind a further 300 turns, taking the end of the winding to pin No. 1.

Particulars are given of the dial settings for a number of stations which have been obtained. It should be pointed out that the actual setting of the condensers will not necessarily correspond exactly either on the long or the short waves. The H.F.

tuning circuit is affected by the presence of the fixed .002 condenser, and there are commercial variations in the values of such condensers. Thus a degree or two on either side may possibly be experienced in receivers made up by readers.

Selectivity

Some details as to the valves to be used in this receiver are desirable. The high-frequency valve should be of the normal H.F. type, having a fairly high impedance. This is important, in order to avoid valve damping on the following (detector) circuit. I used a Cossor H.F. valve, or any corresponding valve can be used with satisfactory results. The impedance should be of the order of 20,000 to 30,000 ohms, with the best amplification factor possible. Slightly better selectivity will be obtained by using a rather higher impedance valve, such as a DE5B for example, and with such a valve Cardiff has been received on the "C.T." Four during London's transmission. Incidentally the best selectivity is obtained with the earth tap on No. 3 terminal, while slightly better signal strength is obtained on tap No. 4.

The detector valve should be a fairly high impedance valve, such as the PM5B or a DEH type. For the first L.F. valve, a medium impedance L.F. valve must be employed. A power valve is not suitable in this stage if the R.I. super transformer is used. This instrument has a very heavy winding, giving a primary inductance of 122 microhenries, and in consequence it is not possible to pass much current through this winding or the iron circuit will begin to saturate. As a matter of fact, a current of 4 milliamperes can be handled with safety, but an ordinary power valve will pass a greater current, particularly if a high anode potential is used, and this should not be employed.

Those readers who prefer to use power valves in the first L.F. stage should utilise a different transformer. Any good transformer having a step-up ratio of between 2-1 and 4-1 and capable of carrying a heavy primary current would be suitable in

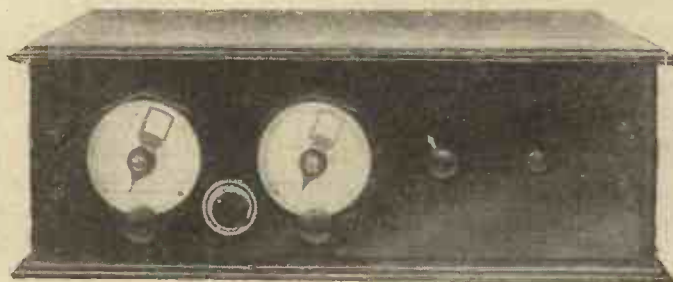
such circumstances. The last valve of the series should be a power or super-power valve. The latter should preferably be used, owing to the better quality which will result, but it must be remembered that the

high-tension current consumption will be increased if this is done.

H.T. Consumption

As a matter of interest, the high-tension consumption was measured with the following valves in use: Cossor H.F., PM5B, ES5L.F., and Cosmos SP50R. The anode voltage was 120 and the current consumption was 25 milliamps, which is about the average for a receiver using a super-power valve in the last stage.

Provided that suitable impedances are obtained, either 2-, 4-, or 6-volt valves may be used. It must always be remembered however, that owing to the shorter filament, it is not possible with 2- and 4-volt types to obtain the same amplification factor for a given impedance. This means that, other things being equal, the selectivity with 2- and 4-volt valves will be slightly less than with a 6-volt valve for



The "C.T." Four is of neat appearance

the same signal strength and vice versa. This is a point which is not fully appreciated, and it is idle to maintain that the results will be quite as good with 2- or 4-volt types. At the same time, excellent reception can be obtained using these types of valves.

Test Report

The following stations were obtained at my laboratories at Elstree at various times on the loud-speaker. They were not all tuned in at one sitting, and only about half the number given can be tuned in at any one time owing to heterodyning and similar interference. The full list is given as an indication of the capabilities of the receiver.

The aerial dial read about 20 degrees above the H.F. dial. It was, therefore, adjusted to give the same reading on
(Continued on next page)

Hamburg, and it then remained approximately the same as the H.F. over the whole scale.

MEDIUM WAVES

Dial Setting.	Station.	Dial Setting.	Station.
7	Gavle	*91	Leipzig
18	Karlstad	*92	Bergen
20	Strasbourg	*94	Madrid
22	Belgrade	96	Stuttgart
29	Muenster	97	Manchester
35	Eskilstuna	100	Toulouse
38	Kiel	102	Hamburg
40	Toulouse	105	Glasgow
45	Bratislava	107	Bern
48-50	Relay Band	109	Goteborg
53	Dortmund	111	Cracow
57	Radio Lyons	113	Frankfurt
60	Radio Vitus	116	Frederiksstad
63	Nuremberg	119	Brunn
64	Belfast	121	Rome
67	Newcastle	124	Oslo
69	Lahtis	125	Catalana
70	Dublin	127	Langenberg
72	Breslau	130	Ecole
73	Bournemouth		Supérieure
75	Koenigsberg	132	Witzleben
78	Copenhagen	134	Daventry
80	Petit Parisien		Junior
82	Barcelona	137	Tromso
83	Prague	139	Brussels
89	London	142	Rosenhugel

Dial Setting. Station.

147	Munich
150	Sundsvall
155	Budapest

Dial Setting. Station.

158	Vienna
163	Zurich
* London not working.	

LONG WAVES

Dial Setting. Station.

61	Hilversum
69	Kbely
73	Kalundborg
88	Königswusterhausen

Dial Setting. Station.

95	Motala
133	Daventry
142	Radio Paris
157	Huizen

Following a series of experiments in two-way wireless telephonic communication between the German liner *Columbus* and the Norddeich coastal station, a new public service is to be installed on German transatlantic steamers. The State cabins, which are already equipped with ordinary telephone receivers, will be connected up with the liner's wireless cabin. By this means any ordinary subscriber on land will be able to communicate with the steamer through the medium of his local exchange, and the Norddeich station at Emden.

ACCUMULATOR TREATMENT

If properly cared for, the normal life of a lead accumulator should be in the neighbourhood of fifteen years. The more constantly they are kept in use, the better they like it. Prolonged rests are bad for them, even when kept fully charged. Sulphation is bound to set in if the cells are kept stagnant, and this means permanent deterioration.

Discharging at an excessive rate, or at a rate very considerably below their rated capacity, also tends to sulphation. When being charged, both the negative and positive plates should gas freely, though excessive or prolonged gassing is to be avoided, as this tends to loosen the active material in the plates. The rate of charging should be that laid down by the makers. Rapid charging causes the lead oxide to expand too quickly, and leads to "buckling."

B. A. R.

New York now possesses a broadcast transmitter which has been erected by two Italian wireless associations.

IMPOSSIBILITIES! By JAY COOTE

A SCOTSMAN wrote to his local broadcasting station declaring that he was getting full value for the 10s. he had paid for a wireless licence.

A listener who telephoned to a B.B.C. station complaining of the quality of the transmission, was promptly informed by the chief engineer that the fault did not lie with his receiving apparatus.

A publican posted to Savoy Hill a round robin signed by all his customers with the request that they should be given twice weekly, either Handel's *Messiah* or *The Creation* in its entirety.

At a public dinner the Editor of an important London newspaper expressed the opinion that broadcasting companies in every country should be given priority of news.

A London wireless manufacturer, when describing the qualities of the apparatus he sold, admitted that he could not cut out 2LO.

A visitor at the B.B.C. headquarters, when shown over the studios, expressed no desire to see the control room.

In an interview a famous violinist who took part in a series of classical concerts, frankly admitted that his instrument was not a Stradivarius.

A Cabinet Minister, when asked to give a twenty-minutes' talk on his pet subject, modestly intimated that he did not believe that one of his lectures could interest the general public.

A wireless amateur, having built a new receiver; from which he failed to get a

squeak, immediately owned up to the fact that the fault did not lie with the circuit published in his wireless paper.

A celebrated dramatic soprano was found to be quite as pretty as her voice was beautiful.

A wireless pirate, suffering remorse, hastened to the local post office, and bought a licence for his crystal set.

A writer to a wireless publication, having submitted a special article to the Editor, was informed by the great man that the contribution was the best offered to him in the whole of his journalistic career.

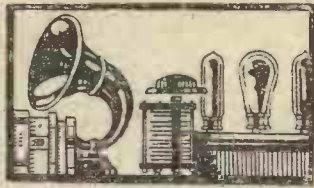
A young blood who danced at one of the London cabarets, the music of which was being relayed, "yaled" three times around the microphone without the desire to shout: Hello! Eva, Maud, or Ethel, as the case might be.

A wealthy inhabitant of Auchtermuchty (N.B.) on a recent evening, monopolised a telephone trunk line for a period of six minutes in order to inform the London studio that a joke broadcast from that station on May 26, 1925, had now dawned upon him. (This counts two on a division!)

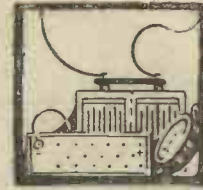
In response to a claim submitted to the post office authorities, a Yorkshire listener was granted a rebate of 5s. on his wireless licence as he was deaf in one ear.



John Henry without his Wheelbarrow



PRACTICAL ODDS & ENDS



Cutting Screws

HERE is a tip for cutting screws. Often one finds that the only brass screws that one has are too long for the required purpose. The obvious way to shorten them is to cut them with a hacksaw; this usually produces an edge like that shown at A. The better way is to take



A Method of Cutting Screws

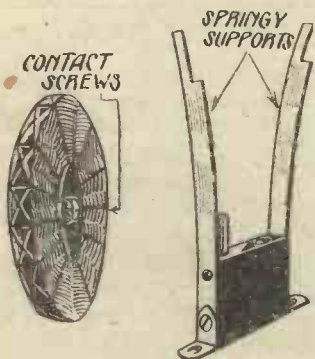
a small three-sided file and cut into the screw at the required place (B). Then break the piece off with a pair of pliers (C). This is only applicable to 4- and 6-B.A. screws, but as these are the most used by wireless fans, this should be of interest to readers. By the way, the screw will be ready for use and not need filing, when treated thus.

C. M. B.

Improved Plug-in Coils

MANY amateurs make use of basket coils for experimental purposes, despite the fact that it is usually rather difficult to mount coils of this type securely in conventional coil-holders. If the coils used be provided with circular ebonite centres, however, it is quite a simple matter to provide easy plug-in arrangements, rendering the basket coils very handy for experimental receivers.

The ebonite centres should be drilled and tapped to take two small metal



Basket Coil with Holder

screws, and these should be inserted leaving the heads and about 1/4 in. of the thread projecting. Coil connections should be soldered to the screws.

Two short lengths of springy brass should be clamped to the side contact screws of

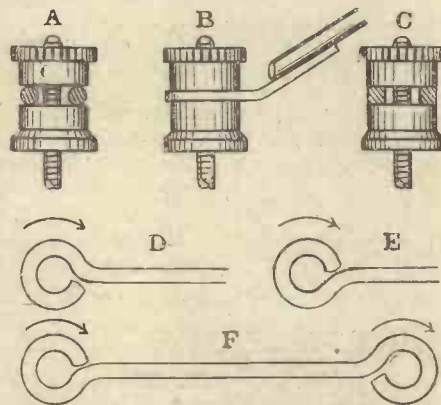
an ordinary type coil-holder, and short pieces should be cut from the top of each limb to provide a firm hold for the coils.

A. B.

Making Efficient Connections

WHEN making connections to the terminals of components it should be remembered that bad contacts mean losses caused by unwanted resistance.

One of the most inefficient methods of making the connections is shown at A, where the contact between the terminal and the round-section wire is very poor. The use of simple soldering tags, as at B, constitutes an improvement; but the best of soldering tags are only intermediate connecting points, or otherwise combinations of clamped and soldered joints. Wherever possible, it will be found the best plan is to use square-section busbar wire, as at C,



Ways of Making Connections to Terminals

and thus acquire a direct contact, which is equally as simple as the diagram A arrangement, but obviously far more efficient.

The loops on the ends of leads should be made with round-nose pliers, and always in the manner shown at E, so that they are not opened outwards when tightening the terminal nuts, as would be the case if they were placed over the shanks in the reverse position, as at D. When fitting a lead between two terminals, as in F, it is a good plan to think of the letter "s." O. J. R.

These "Odds and Ends" were sent in by Readers.

Have you any in use?

We pay at the usual rates for any published.

A Screw Gauge

MOST constructors have, at some time or other, wished they had some means of checking the size and thread of a screw. This can be done with the easily made gauge shown in the diagram herewith.

Obtain from a dealer a complete range of nuts from 1 to 8 B.A., tin two opposite



A Screw Gauge

facets of each, and arrange them in order on a piece of iron and heat over a gas flame. This will solder the nuts together.

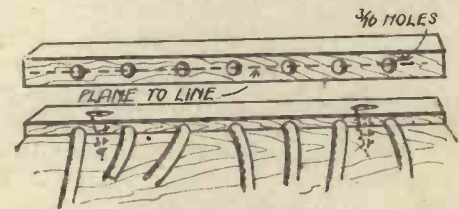
If desired, a small brass handle may also be soldered on.

I. D.

An Interesting Wiring Method

IT is recognised that joints, soldered or otherwise, should be avoided as much as possible. These may be reduced to a minimum if, instead of having a row of terminals at the back of the baseboard, rubber-covered flexible is taken to the various components or points and then carried under or over the baseboard direct to the batteries.

The flex leads are clamped tightly in position by means of a wooden cleat on



LEADS TO COMPONENTS

An Unusual Wiring Method

the back edge of the baseboard. This will prevent strain on the leads and hold them firmly in position.

For making the cleat, obtain a piece of wood about 1/2 in. square and drill 3/16 in. holes spaced to requirements. After drilling cut or plane the wood down until the holes fit tightly over the flex, and finally drill the holes to take the screws to secure the cleat to the baseboard.

H. G. E.

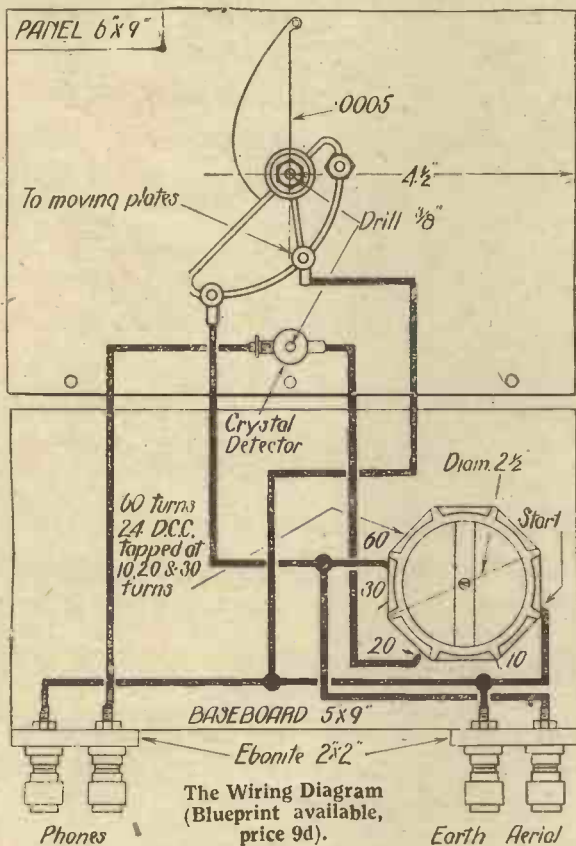
THE "SUPER" CRYSTAL RECEIVER



Rear View of Panel

HERE is a crystal receiver that will work two pairs of headphones at good strength, when the aerial and earth

is in to don the headphones. The importance of using a sensitive pair of headphones with any crystal receiver is frequently ignored, but in the choice of the phones lies the balance between mediocre and really good reception.



The Wiring Diagram (Blueprint available, price 9d.)

in use are reasonably good.

These results can be obtained up to a distance of approximately twelve miles from a main B.B.C. station and half that distance from a relay station.

The special features of the "Super" crystal receiver are simplicity of operation and unusual strength of signals.

The simplicity of operation is largely due to the incorporation of a "permanent" crystal detector that does not require frequent adjustment.

No Adjustments

Thus the main disadvantage of the crystal set is eliminated and the only control is the tuning condenser, and even this only requires an initial setting, and after the

crystal detector, i.e., one-third of the way up the coil from the earth end. In general, this tapping will give optimum signal strength, but those experimentally inclined will want to try the tenth and thirtieth points.

Components Required

To build the "Super" crystal set, the following parts are required:

Permanent crystal detector (R.I. and Varley, or Jewel Pen Co.).

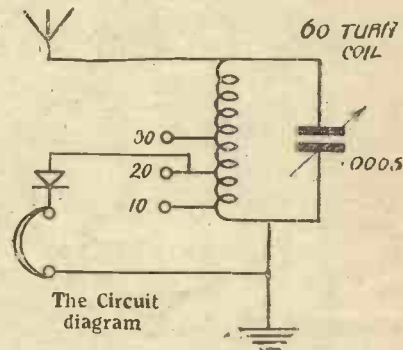
One .0005 variable con-

denser (Burton, Cyldon, Jackson, Centroid, or Formo).

One 2 1/2 in. length of 2 1/2 in. diameter low-loss coil former (Ebonart or Becol).

Four terminals, one each marked, A, E, and two marked Phones. (Belling & Lee). Ebonite panel, 9 in. by 6 in. by 3/16. (Radion, Becol, Peto-Scott or Raymond).

Two ebonite terminal strips, 2 in. by 2 in. by 1/4 in. (Becol).



The Circuit diagram

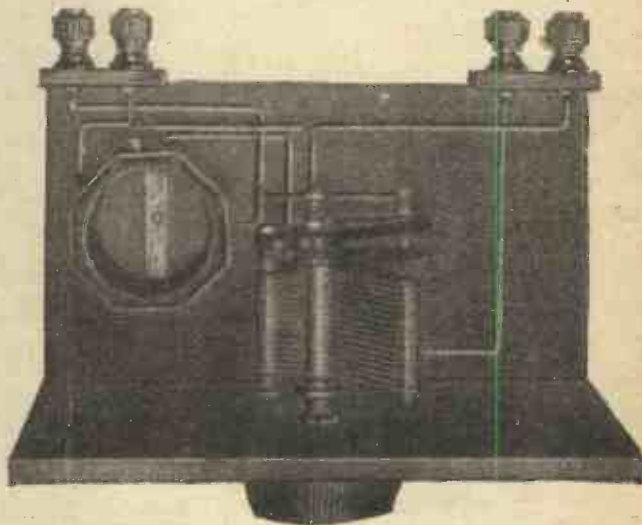
Two ounces of 24-gauge Lewcos d.c.c. wire (London Electric Wire Co.).

Construction

As the panel is a standard size, this will require no "treatment" and is ready for drilling. The variable condenser and permanent crystal detector are mounted on the panel as shown in the drilling and wiring diagram, whilst the phones and A, E terminals are mounted on small ebonite strips at the back of the baseboard.

The baseboard accommodates the tapped tuning coil, which is wound as follows: A small hole is drilled about 1/4 in. from one end of the coil former and the end of the

(Concluded on page 952)



This Efficient Receiver is particularly easy to construct



The wonderful Mullard P.M. Filament

A filament with gigantic emission—steady, enduring and powerful, bringing positively improved reception to *any* radio receiver.

A filament of astonishing strength—tough, shockproof and so ductile that it can be tied in a knot long after 1000 hours' use.

A MASTER filament consuming only 0.075 amp. filament current and giving rich, full, clear volume filled with life. A British filament found **ONLY** in Mullard P.M. Radio Valves.

Mullard

THE · MASTER · VALVE

**For the
Cossor Melody Maker**



REDFERN'S

**"Ready for Assembly"
Set of Component Parts**

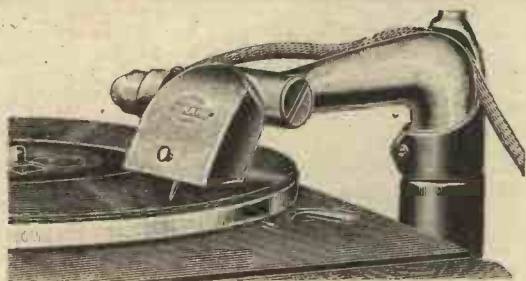
Drilled Panel and Terminal Strip, Low Loss Coil Former, 3 Redfern Valve Holders.

The Set complete:—

- With Ebonart Mahogany panel 25/6
- With Ebonart Black panel - - 23/6
- With Matt Ebonite panel - 21/-

Your Dealer can supply you

**REDFERN'S
RUBBER WORKS LTD.
HYDE CHESHIRE**



**A new field of experiment
for you!**

That old gramophone you have got tired of can be made to give reproduction many times better than it ever did before and all for a very small outlay.

Merely replace the soundbox with the

IGRANIC-PACENT PHONOVOX

and connect to the amplifier and loud-speaker of your wireless set. The result is far better quality than either of them gave alone. What it amounts to is that you obtain electrical reproduction such as is being used in all de-luxe gramophones.

Get the Phonovox for Christmas and provide excellent quality dance music for the family. Remember the volume is only limited by the capacity of your amplifier.

THE PHONOVOX, Price 37/6

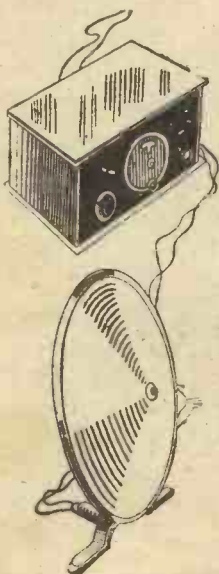
The following are optional:—

Plug Adaptor, 5/- Volume Control 7/6

Send for List No. D.73 for further particulars.

The range of Igranic Radio Devices is the most complete in the world. They are always stocked by reputable dealers. All reports received by us of difficulty in obtaining them receive immediate attention.

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Works: BEDFORD



**THE BURTON PANEL
RHEOSTAT**



Panel Mounting Rheostat, 6, 10, 15, 30 ohms.

2/3
complete

C. F. & H. BURTON,
Progress Works,
BERNARD STREET,
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Phone 560



FLUXITE



UNITES

IT SIMPLIFIES SOLDERING

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All Hardware and Ironmongery Stores sell FLUXITE in tins, price 8d., 1/4 and 2/8. Another use for Fluxite—Hardening Tools and Case Hardening. Ask for leaflets on improved methods.

FLUXITE LTD.
(D.P. 332) Notherhithe, S.E.16



HANGING UNCLE GEORGE

Talking about Marconi Valves we might claim that the filament was strong enough to hang Uncle George's portrait. But who cares?

We might claim that it was long enough to dry the week's washing on. But surely you've got a clothes-line?

No. We prefer to talk about what the Marconi Valve does. To tell you that very little juice goes in at the input end for what comes out at the output. We prefer to state that, operated from Marconi Valves, the loud-speaker suffers neither from loss of voice nor nasal catarrh.

And, what's more, that Marconi Valves keep on working for a very long time indeed. They're built for power, they're built for truth, and they're built for time.

Users of 6-volt accumulators are assured of superlative results by employing the following new 6-volt Marconi Economy Valves.

FOR GENERAL PURPOSE.

Marconi Valve—
Type D.E.H. 610 ... (10/6) or
" D.E.L. 610 ... (10/6)

FOR THE LAST STAGE.

Marconi Valve—
Type D.E.P. 610 (12/6)—a power valve.

An amusing but informative booklet entitled "Back Chat" may be obtained by posting the coupon below.

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—do everything that a valve should do

The
Marconiphone
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Road, London, W.1.

Please send me copy of "Back
Chat." Thank you.

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Address

A.W.6

1d. stamp if unsealed

Build the

"L & P 3-20 EXPRESS"

Price - 14/6

Price with-
out Slow
Motion Dial
11/6



(3 VALVES,
20 STATIONS,
EXPRESS
TUNING.)

One-dial Tuning—Razor-sharp Selectivity
—No Coil changing for High Waves—
Real Music—20 Stations on Loud Speaker
—Cost of Components £5 14 0, including
the L. & P. High-Low Coil Tuner.

That's what you're looking for, isn't it?
And it's a straight quick job for any
beginner.

This amazing simple circuit is becoming
the rage of the season, and is already the
envy and despair of H.F. screening and
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Free Construction Sheet and Wiring
Diagram. If your dealer cannot supply,
we will send you copies post free.
Mention your dealer's name in applying.

LONDON & PROVINCIAL RADIO
COMPANY LTD., COLNE, LANCS.

The L. & P. Variohm
—the finest Resis-
tor money can buy
—is included in
above estimate.



Zero to 10
ohms,
Scaled, with
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CAN BE BUILT WITH LISSEN PARTS

*Congratulations to Messrs. Cossor
on an excellent set*

It has been definitely proved that LISSEN parts can be used for this Set with eminently satisfactory results, as well as for every other type of Circuit which may be popular at a given time, and which requires Standard parts of recognised quality.

LISSEN parts are guaranteed to give satisfaction every time they are used. Test the LISSEN TRANSFORMER against any other, and if you are then willing to part with your LISSEN, and return it within seven days of purchase, your money will be willingly refunded.

Use the other LISSEN parts as well, resistances, condensers, rheostats, valve-holders, batteries, etc.

Lissen parts for the Cossor Melody Maker

- 1 Lissen L.F. Transformer (price 8/6).
- 1 Lissen .001 Fixed Condenser (to be put across the primary of the L.F. Transformer) (price 1/6).
- 1 Lissen Baseboard Rheostat, 7 ohms (price 1/6).
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- 2 .0003 Lissen Mica Fixed Condensers (Grid Leak Clips are included) (price 1/- each).
- 1 Lissen .0001 Mica Fixed Condenser (price 1/-).
- 1 Lissen .001 Mica Fixed Condenser (price 1/-).
- 1 Lissen .002 Mica Fixed Condenser (price 1/6).
- 1 Lissen Mansbridge Type Condenser, 2 mfd. (price 3/6).
- 1 Lissen Grid Leak, 3 megs. (price 1/-) and 1 Lissen Combinator (price 1/-).
- 1 Lissen Grid Leak, .25 megs. (price 1/-).
- 1 Lissen Grid Leak, 4 megs. (price 1/-) and 1 Lissen Combinator (price 1/-).
- 3 Lissen Valve Holders (price 1/- each).
- 1 Lissen 9-volt Grid Bias Battery (price 1/6).

Also use the Lissen H.T. Battery

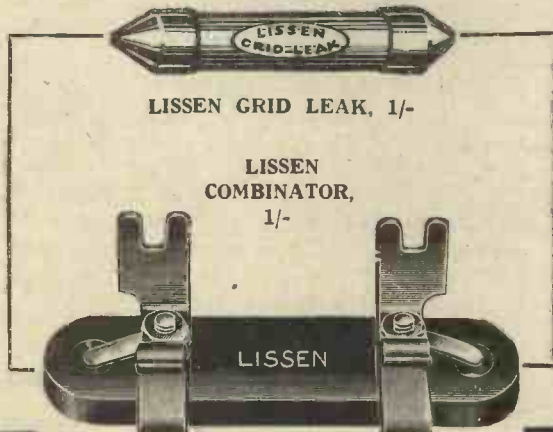
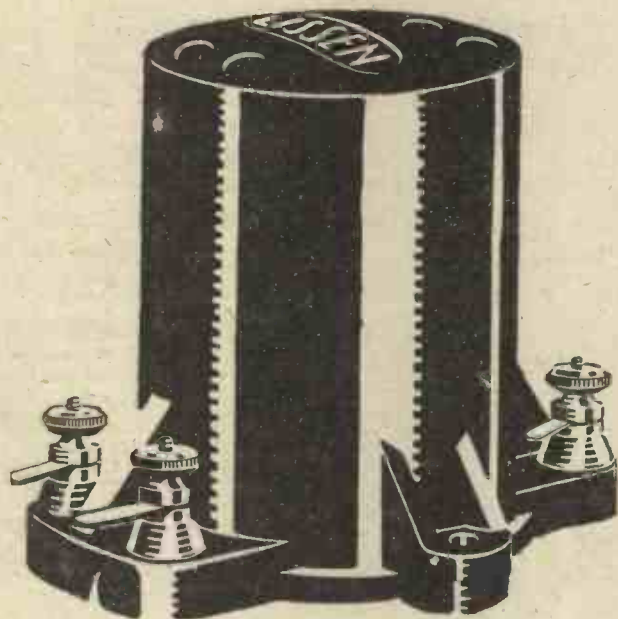
All these Lissen parts for the Cossor "Melody Maker" are obtainable from 10,000 radio dealers throughout the country. Ask for Lissen parts in a way that shows you will take no other and be sure of perfect results.

LISSEN

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MANAGING DIRECTOR: THOMAS N. COLE



On Your Wavelength!

Another Mystery

I ALWAYS seem to be hitting mystery stations now. I heard a man the other day calling in a loud voice for liquid refreshment; at least, he said B.S. several times and then relapsed into silence. A few seconds later he started out with four B's, twelve T's (twelve long dashes), and finally finished up with four B's again. After a brief rest of ten seconds—possibly in order to sample the liquid refreshment—he came on again with the same programme. The whole business occupied about fifty seconds, so far as I could judge, and there was then a ten-second break.

A Pure Note

THIS was about 9 or 10 at night, as far as I remember. The note was exceptionally pure and was modulated; so that I did not have to oscillate in order to receive it. If the receiver was permitted to oscillate the familiar tonic-train note was obtained, indicating that this was a modulated C.W. transmission. I should have said that this occurred on the long-wave band (I was testing Mr. Reyner's "Phoenix Five" at the time, of which more anon), and a wave-meter check showed that the wavelength was a little above 1,000 metres—1,020 to be precise.

More of Them

DURING the intervals of this transmission I could hear another station, on a slightly different note, transmitting a jumble of H's and long dashes, but I could not quite "copy" him. I thought no more about it, beyond being somewhat interested; but, to my surprise, the next day, when I tuned in about 1 o'clock on the same waveband, I found a whole crop of stations playing this new game. In all, there were four, as follows:—

Four B's, twelve T's, four B's.

Four X's, thirteen T's, four X's.

Three G's, eleven T's, three G's.

Six H's, thirteen T's, five H's.

Incidentally, the last one was the only one of the four which was not symmetrical. In the middle of all this bright selection I could hear a man calling TI, TI, TI, reminding one of certain songs of one's youth!

All these stations had the characteristic pure note to which I referred earlier and were quite pleasant to listen to. But what on earth are they? That is the question, and one which I am really anxious to find out. Can any reader assist?

A Unique Receiver

I SAID that I was using the new "Phoenix Five" for this test. This is certainly a most fascinating receiver. It is a real bang

up-to-date edition of a gang-control five, and it will receive both long and short waves without any coil changing. Our Technical Editor ought to know something about it, because he designed the original "Solodyne" a year ago, which was the first practicable gang-control receiver published in this country.

Many people must have felt that the "Solodyne" was difficult to beat for general performance and simplicity, but there is no doubt that this receiver has gone one better. To be able to select any of the principal stations broadcasting in Europe by the turn of a single knob, whether they are on the low or high wavebands, is undoubtedly a useful property for any receiver, and I imagine this new set will be as popular as its distinguished forerunner.

America and Ourselves

AN editorial contained in the organ of American amateur radio, known as *Q.S.T.*, has caused a little concern in this country. It seems that E. K. Warner, the secretary of the American Radio League, had an interview with certain British officials who were attending the Washington Convention, in the course of which the British representatives gave him to understand that the British authorities did not recognise the status of the amateur in this country and that they had not heard of the existence of the vast number of amateurs who are active in the United States. The result was that Mr. Warner appears to think that the accredited representatives of amateur radio in this country have not done all that they should have done in the matter of securing recognition, and in the course of a vigorous article upbraids the British amateur for failing to keep British officials "up to the mark."

The Facts

I HAVE since had an interview with the persons who were responsible for the arrangements made as regards representation of the British amateur, and I understand that everything possible was done to see that he should have adequate representation at Washington, and that if the British delegation was ignorant before the conference commenced, it was fully acquainted with the position before the meeting had proceeded very far. We do not yet know the result of the conference, as no official news is to hand. It seems unlikely that the matter will be discussed here until the question of ratification arises. It does seem clear, however, that the British amateur has nothing to fear from the results, as the Post Office authorities are inclined to favour adherence to existing

arrangements so far as Great Britain is concerned.

5XX

A POINT of interest to broadcast listeners is that the long-wave station 5XX had a narrow escape from obliteration, and only by a narrow majority was it possible to arrange for a very small band for this and other stations to operate on the long waves. It seems that the commercial interests and certain others are very keen to get all broadcasting moved from off these wavebands.

Have You Heard It?

A NEW star appeared in the radio firmament on Sunday, December 4, in the form of the high-power Polish transmitter opened at Cattowitz. As it is rated at some 12 kilowatts, you will easily realise that, if anything, its concerts are more easily received in the British Isles than even those of the Warsaw broadcasting station. Whether it will keep its wavelength of 422 metres I do not know; but for the present, at least, it is not difficult to clear its transmissions from those of Frankfurt, although the latter is a 4-kilowatt and very much nearer to us.

The Call

WHEN heard there should be but little difficulty in identifying the new Pole, as he—or, rather, she—repeats her call at frequent intervals: "Allo! Allo! *Polskie Radio Kattowice*," and between items puts on the air a very distinctive signal—that of a slow bell-like metronome. It is nothing like the usual clock tick to which we have been treated by far too many Continental studios lately, but more closely resembles a very regular stroke on a silver bell. I can think of no other closer comparison.

Warsaw

WARSAW now would also appear to be dissatisfied with the output of its own station and the *Polskie Radio* is taking steps to secure more powerful broadcasting plant; it is stated that the authorities will not be content before they possess a transmitter radiating some 10 kilowatts aerial energy. Should the various plans put forward by the Continental countries mature in a practical manner, it seems to me that in the near future an ordinary two-valve amplifier added to a crystal set may rope in all Europe!

Ups and Downs

FOR some reason, short-wave reception has not been very good of late; in fact, except for the giants KDKA, 2XAD, and 2XAF, there has been really very little to

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On Your Wavelength! (continued)

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listen to from the other side of the Atlantic. Signal strength on the wavelets does vary in the most astonishing manner; on one night stations come in so powerfully that there is not the slightest difficulty in tuning them in, and in many cases a change may be made from telephones to the loud-speaker. On another there seems to be practically nothing doing, and such stations as you hear are so weak that you can hardly make out their call-signs.

A Possible Reason

THE reason is, I believe, this. The big fellows mentioned use a considerable amount of power—2XAF is rated at 10 kilowatts—and therefore manages to get across pretty well, even when conditions are not very favourable. Most of the others, however, do not exceed half a kilowatt, and therefore reception of them in this country is very dependent upon ether conditions. I hear, too, from an American friend that a good many short-wave broadcasting licences have recently been withdrawn, so that there are probably not quite so many stations on the air now as there were a little while ago.

Short-wave News

YOU are probably pretty familiar with the short-wave transmissions of Radio Malabar on 17 metres. Have you heard him lately, though, on 33 metres? He is using this wavelength experimentally at times, and it is most interesting to compare the differences in fading and signal strength of the longer and shorter wave signals. Generally speaking, the 33-metre signals are better early in the day, but tend to "go off," whilst those upon 17 metres are at their best during the latter part of the afternoon.

Experimental Short-wave Transmissions

MORE European stations are now at work conducting experimental transmissions. Amongst these I would mention Radio Lyon, who may be picked up on most days of the week between 4 p.m. and 5 p.m. The French station comes in extraordinarily well, signal strength at my station being tremendous. For quite a long time Germany has not been doing very much short-wave work, but now she is at it again. Nauen is transmitting fairly regularly on 56.7 metres. Signal strength and quality are both excellent. I would also recommend you to make use of your set on Sunday afternoons and to explore with it the band in the neighbourhood of 43 metres. You will there find numbers of our own amateurs at work.

Wave-traps Again

TIME was when the wave-trap was an exceedingly popular fitment. Then, as high-frequency circuits of an ultra-

selective kind were evolved, many of us discarded them temporarily, having, as it appeared, no further use for them. If you want good quality in reception, selectivity can be overdone. Nowadays big magnification without knife-edge selectivity is possible in the H.F. stages, which means that distant transmissions are much more pleasant to listen to. But the wipe-out effect of near-by stations is apt to be rather noticeable.

Almost a Necessity

NOW that 5GB is at work I find it better to return to my wave-trap when I want to hear stations such as Berlin Witzleben and others in the immediate neighbourhood of the big home station's wavelength. If the regional scheme ever comes into being it is quite possible that the wave-trap will become a normal fitting for every receiving set incorporating one high-frequency stage. A good wave-trap costs very little to make, and if one suffers from wipe-out it increases enormously the number of stations that may be received.

New Screened Valves

BY the time that this note appears in print screened-grid valves of a new type will probably be on the market. I have been trying out an advance model, and I must say that I am delighted with it. The normal amplification factor is 200, which is pretty useful, is it not? Not the least of its advantages is that it can be fitted into an existing set without it being necessary to make any extensive alterations. What I like about the "S.G." valve is that you have so much real honest-to-goodness high-frequency amplification in hand that you don't want reaction, except possibly to sharpen up at times the tuning of the rectifier.

Another Old Friend

I HAVE commented before on the way in which we so often in wireless abandon some component or circuit in favour of new things, only to go back again to our old love at a later date. That ancient friend the tuned anode is a case in point. At one time it was considered the very last word in high-frequency couplings and everyone swore by it. Then fresh developments were made and we all swore at it. We removed it from our sets, substituting for it highly efficient transformers of the most ultra-modern design. The tuned anode in fact became almost as out of date as the coherer or the billi condenser. But when the screened-grid valve made its appearance we tried it with H.F. transformers and found that it would not work properly.

Going Strong

WE had to resurrect the old tuned-anode circuit, which is now going as

strongly as ever. Grid-leak and condenser rectification, too, was rather under a cloud until recently where quality was desired. In fact, it was no good boasting about the purity of your reception if an expert friend could point with a shrug of the shoulders to a leaky-grid rectifier in the set. We have found, though, that the anode-bend method can distort to beat the band in certain cases, whilst if care is taken over the design of the grid-leak and condenser arrangement and if the components are properly selected it need produce no distortion that really matters. The strong points about the leaky grid system are that it is far more sensitive than the other and that it makes proper reaction effects much easier to obtain.

How Do They Do It?

I CANNOT help referring once more to the little Swedish relays, for I find that heaps of people have not yet tumbled to the fact that they can be received in many parts of this country with a strength and purity that are little short of phenomenal, considering the tiny power that most of them use. It is rather difficult to identify them, since they all relay the same programmes, and they hardly ever seem to give their call-signs. As they come in near the bottom of one's condenser scales the calibration chart is not such a help as it might be in tracing them by means of their wavelength, for very few condensers are anything like straight-line during the last dozen divisions or so of the scale.

The Best

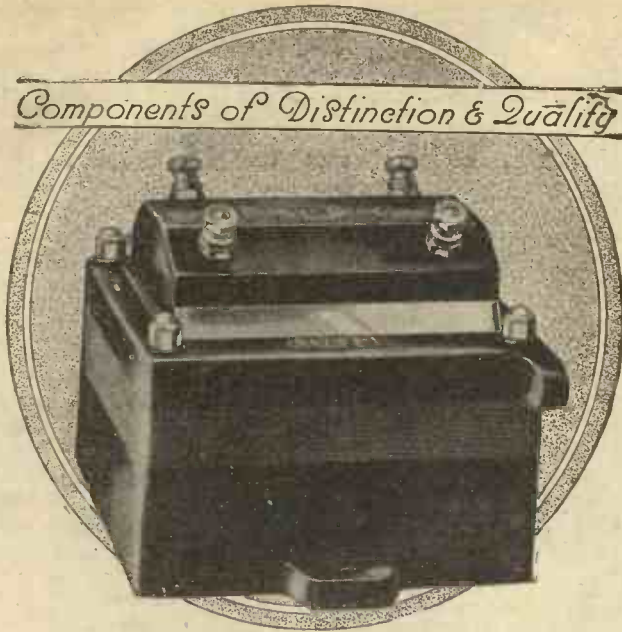
THOSE that I find best are the ones that can be picked up a little below the settings needed for Münster. One of them, which appears to be Örebro, is a splendid signal, and there are three others almost equally good rather below the settings needed for Stettin. In the ordinary way the Stockholm programmes are sometimes a little difficult to receive. When atmospherics are bad Motala may be seriously interfered with, and the Stockholm station cannot be received direct, as a rule, owing to interference from Rome and Paris PTT.

For This Relief . . .

I NEVER was very fond of headphones, though for my sins I am compelled to use them a good deal. I have one beautifully sensitive, but rather heavy, pair, which used to make me feel, after an hour or so of wearing them, that I was carrying about a ton weight on the top of my head. I have managed to relieve the discomfort considerably by means of a tip which I pass on to fellow-sufferers. Obtain a very small rubber sponge; shape it, if necessary, with scissors, and then fix it inside the top of the headbands, using a packing needle and some tailor's strong thread for the purpose.

THERMION.

Components of Distinction & Quality



Low Frequency Transformers

Two years ago we decided upon the design of this Transformer but the cost of turning out a component capable of so high a standard of performance was prohibitive. Since then, however, we have so lessened manufacturing costs that it is now possible to produce it at an economic price. The windings of heavy gauge wire are sectional, giving a very low distributive capacity. The core is of "Stalloy" while the case is "Bakelite."



TWO SPEED DIAL
With Station Recorder
9/-

284 3 to 1 Ratio £1 2 6
285 6 to 1 Ratio £1 5 0

L.F. Transformer Multi Ratio £1 7 6
Ratios 1·8, 3, 3·66, 4·5 and 6 to 1

L.F. Choke Triple Impedance £1 0 0

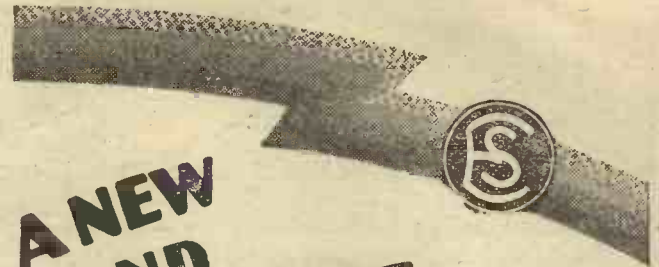


VARIABLE RESISTOR
5 ohms or 30 ohms
3/-

Send 1½d. in stamps for the new Bowyer-Lowe Catalogue



BOWYER-LOWE CO. LTD., LETCHWORTH



A NEW AND DIFFERENT LOUD SPEAKER



THE EDISWAN ONE-DER LOUD SPEAKER
FULL SIZE MODEL

Coloured a deep brown tone, the ONE-DER is a speaker of such refined appearance that it will tone with almost any scheme of decoration.

Fully licensed under Patent Nos. 239331, 243431 and 243432.

PRICE:
£2 . 10 . 0

Ask your dealer for a demonstration, or write to us and let us arrange it for you through a local dealer.

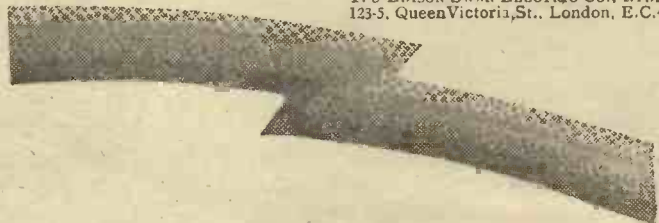
If you have A.C. current you can charge your own batteries with the Ediswan Low Tension Accumulator Charger. Save time and money. Ask your dealer.



EDISWAN VALVES
CLEAREST-STRONGEST LAST THE LONGEST

A type for every purpose.

The EDISON SWAN ELECTRIC CO., LTD.,
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Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

Thousands
of Homes this Christmas will be
made happier by the advent of the
ETHOVOX

the Speaker that first made Wireless popular.

Will yours be one? Will you add to the enjoyment of your family and friends assembled for this greatest of all festivals?

To enhance their pleasure will give you a feeling of contented happiness worth its weight in gold.

And what will it cost you to instal the speaker which will make even the poorest receiving set, if capable of working at loud-speaker strength at all, perfection?

Just £3—for "a round £3" will buy it—and if you prefer to test our statement you can do so NOW.

Your local dealer will demonstrate, or we will gladly do so at our Showrooms at 15 Bedford Street, Strand.

Anyway, don't delay, but ask us for descriptive folder now. Then you will just have time to make another happier home this Christmas.



BURNDEPT
Blackheath
London, S.E.



**Let
your
ear
judge**

CURVES and calculations are all very well in their way. They are useful to manufacturers and to the mathematician.

When the merits of a valve are not audibly perceptible, a few neatly drawn curves may help to convince the buyer that it is a better valve even if it doesn't sound any better.

Fortunately for all concerned, the superiority of B.T.H. Nickel Filament Valves can be appreciated by the dullest ear. They tell their own story. No need for figures—whether of fact or fancy. No call for curves to prove an obvious truth. The B.T.H. Nickel Filament Valve gives a greater volume of sound, of better tone, for a longer period than any other 2-volt valve.

You can prove the first two points very easily by substituting these new valves for those you are at present using.

You are sure to buy B.T.H. Nickel Filament Valves if you let your ear judge.

Your dealer holds adequate stocks.

B. 210H

R.C. and H.F.
Fil. Volts... 2
Fil. Amps... 0.10
Max H.T.V. 150

10s. 6d.

B. 210L

General Purpose
Fil. Volts... 2
Fil. Amps... 0.10
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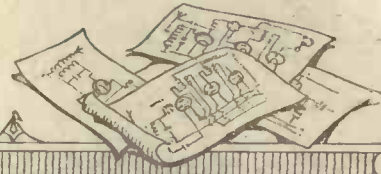
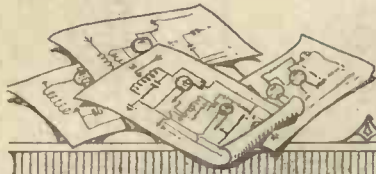
VALVES
NICKEL FILAMENT

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The British Thomson-Houston Co., Ltd.

CIRCUITS FOR YOU TO TRY



One of a regular series of articles by our Technical Editor which will appear about every

month and contain descriptions of various forms of circuit which can be tried out by the experimenter.

It is surprising what results can be obtained by using ordinary plug-in coils if the circuit is correctly designed. The average plug-in coil of course, is not as efficient as the solenoid type particularly when special Litzendraht wire is used for the winding of the latter. The ordinary circuit, however, is influenced largely by the valves in use and extra sources of damping lie in wait on every hand. If proper precautions are taken to reduce the extraneous losses, then the difference in efficiency between the plug-in coil and the more elaborate and expensive variety is not so very marked.

The circuit shown in Fig. 1 is a useful high-frequency and detector circuit which can easily be connected up and will afford an evening's enjoyment. The grid circuit of the first valve contains a simple tuned circuit L1, C2, the aerial being taken through a .0001 condenser direct to the grid of the valve. If desired, a tapped coil can be used for L1, such as the Lissen X coil. In the anode circuit of the valve, we have two paths. One of these supplies the high-tension current and in this lead we place a high-frequency choke. This acts as a barrier to the high-frequency current which

reaction coil, L5 in the anode of the rectifier valve enables the circuit to be brought to the point of oscillation.

This circuit is not neutralised and therefore, its results depend upon having a high quality choke L2 and a small size coil for

have a balanced neutralised circuit.

The high-frequency energy is passed through the circuit C3, L4 on to the secondary of the transformer, and owing to the fact that the first H.F. valve is neutralised, this coupling can be made somewhat tighter than before. As in the previous case, the high-tension is supplied to the first H.F. valve is neutralised, this coupling can be made somewhat tighter than before. As in the previous case, the high-tension is supplied through a choke coil L3, which must again be of high quality in order that there shall be no loss of efficiency.

The detector in this case employs anode-bend rectification, a battery of 3 to 4½ volts being inserted in the negative return, this being shunted with the condenser C5 having a capacity of .01 microfarad. The reaction coil L6 is coupled to L5, this being controlled with a condenser C6, so that smooth oscillation is obtained.

The aerial circuit is coupled by a separate coil L1 to the secondary L2 and by suitable choice of values, this circuit can be made to give very good results. L1 should be 25 to 35 or thereabouts, L2 a centre-tapped 60 or 75 coil, L3 a high-frequency choke, L4 a 30 or 35, L5 a 60 or 75, and L6 a 50. L7 is a second high-frequency choke intended to keep the high-frequency current out of

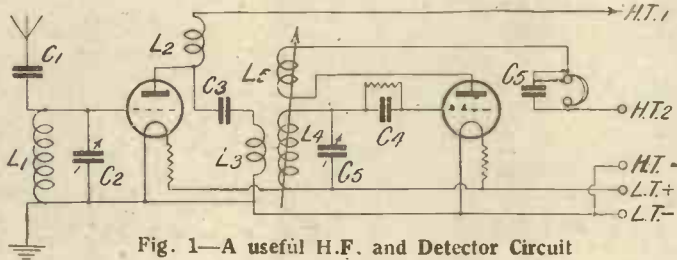


Fig. 1—A useful H.F. and Detector Circuit

L3. Suitable values are L1 and L4, 60 or 75; L3, 25 or 30; L5, 50. C2 and C5, .0005; C3, .01; C4, .0003 with the usual two-megohm grid leak. C6 should be about .0001 in order to provide an adequate bypass for the high-frequency currents. Any number of low-frequency stages may be added to the circuit if desired.

The circuit shown in Fig. 2 is, to some extent, based on the same principle as that in Fig. 1, but several improvements are incorporated. This circuit is capable of being made extremely selective in proper hands and is well worth making up. The

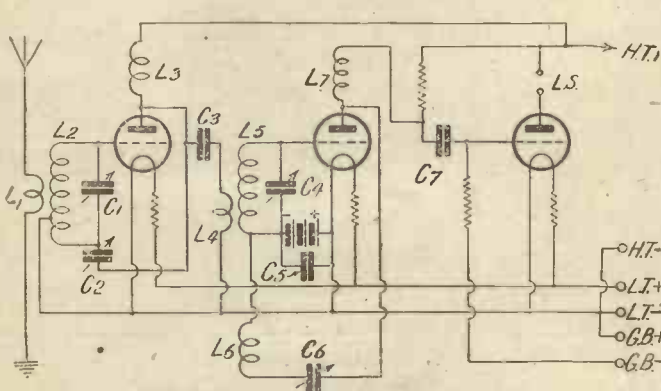


Fig. 2—An Extremely Selective Circuit

therefore flows through the circuit C3, L3, the latter coil being coupled to the tuned circuit L4, C5.

The voltages developed across this circuit are applied to the rectifier valve through a condenser with a leak in shunt in order to obtain the rectification required, while a

first grid circuit contains the coil L2, tuned with the condenser C1. This is a centre-tapped circuit however, the filament being taken to the centre-point of the coil L2. The opposite end of the coil to the grid is connected through a neutralising condenser to the anode of the valve so that we

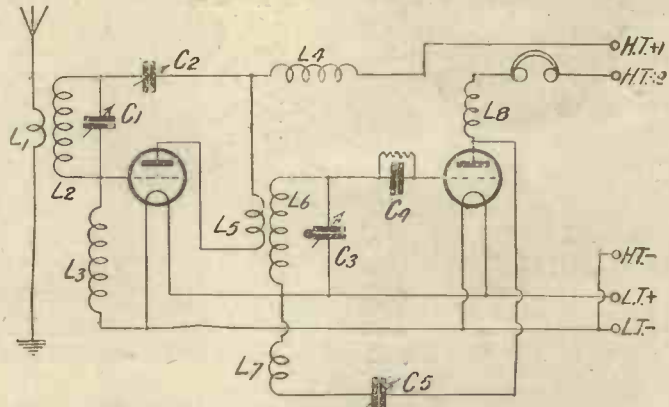


Fig. 3—There are several Novel Features in this Circuit

the L.F. circuit. C1 and C4 are .0005, C2 a neutralising condenser, C3 and C5, .01; C6, .0003.

The detector valve is followed by a resistance-coupled stage of the normal type. The anode resistance should not be too

(Continued on page 953)

L.F. COUPLINGS

Transformer, Resistance or Choke?

WHICH SHALL I CHOOSE

By R. W. HALLOWS

AT one time the expert wireless man devoted much more attention to the high-frequency side of his set than to the note-magnifying stages, which he regarded as simple affairs hardly worth worrying about; there was in fact a kind of feeling that any idiot could make a low-frequency amplifier containing one or two stages! To make a receiving set capable of doing justice at loud-speaker strength to the broadcast transmissions means that a good deal of care and trouble must be spent over the design and construction of its note-amplifying side.

Plate-circuit Currents

In the plate circuit of the rectifying valve and of any note magnifier we have a composite current; there is first of all the direct current supplied by the high-tension battery which flows from the filament to the plate of the valve and then back to the positive terminal of the battery. Upon this is superimposed a ripple which is, or should be, a faithful electrical copy of the sound waves that occur in the studio. Now look for a moment at Fig. 1, which shows a valve whose filament is heated by the battery B2, whilst the battery B1 is there to supply the steady plate potential. The circuit is, however, broken by the gap between the two terminals T T.

potential drop takes place between the filament and the plate. The fluctuations in the plate circuit due to the arrival upon the grid of positive and negative half-cycles are fluctuations of current.

Remove the short-circuiting wire and replace it with an impedance Z, which

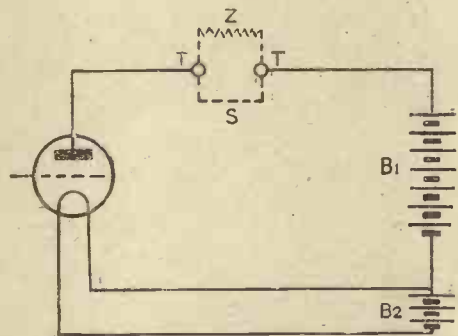


Fig. 1—The Action of Anode Impedance

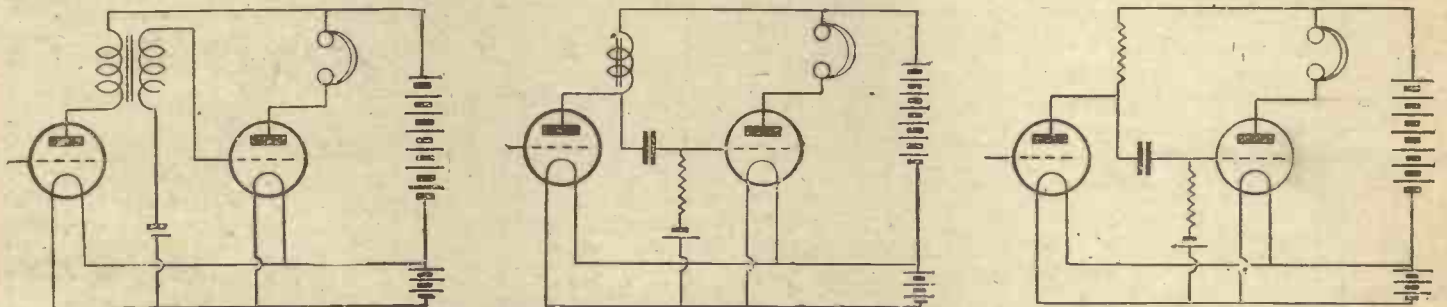
may take the form of a large coil of wire or of a non-inductive resistance. Conditions are now very different. If we consider a train of oscillations of the same frequency we have now two impedances in the circuit: the fluctuating one due to the varying internal resistance of the valve, and the steady one Z. Hence it follows that changes in the internal impedance of the valve cause potential fluctuations across the fixed impedance Z.

At A impedance is provided by the primary of an iron-cored transformer. At B it takes the form of a simple iron-cored choke coil, and at C it is a non-inductive resistance. In the B and C circuits potentials are transferred to the grid of the following valve through a condenser, and since the valve is insulated by this from direct-current potentials we must provide a leak which also acts as a stabiliser.

Transformer and Choke

Personally I have always been inclined to regard the circuit shown at A as almost exactly equivalent to that at B. Certainly the low-frequency transformer is really misnamed, since if the grid of the valve is properly biased, there is no flow of current through its secondary. I have a suspicion, then, that the coupling between the primary and secondary in a low-frequency transformer is mainly by capacity, and that this capacity corresponds exactly to the grid condenser in the B and C circuits. If this is so, we have in the secondary of the transformer an impedance whose main duty is to stabilise the grid of the valve to which it is connected.

In the transformer, however, there is also a magnetic coupling, and it is possible to obtain a voltage step-up by pro-



Figs. 2A, 2B and 2C—Diagrams showing Transformer, Choke and Resistance Couplings respectively

Let us see first of all what happens if we short-circuit these two terminals with a piece of wire as shown at S in dotted lines. When the grid becomes positive the effect is to lower the internal resistance of the valve; when again the grid is negative the internal resistance is raised. The plate potential, however, remains steady, since in either case the whole

It will also be clear that the maximum voltage fluctuations will be obtained when the value of the fixed impedance is infinitely great.

Having once obtained potential changes in the plate circuit of a valve, we can transfer them to the grid of a following valve by any one of three methods shown diagrammatically at A, B, and C in Fig. 2.

viding the secondary with more turns than the primary. For this reason, if we use a well constructed transformer with a primary impedance suited to the preceding valve, we can obtain greater signal strength than is possible with either choke, capacity or resistance-capacity coupling.

It might appear then at first sight that
(Concluded on page 946)

WITHOUT FEAR OR FAVOUR



A Weekly Programme Criticism by Sydney A. Moseley

A WELL-KNOWN radio artiste sent me an account of a funny incident which I pass on to you. First of all, he says that while a large number of listeners complain of too much highbrow music and others dislike too much syncopation, there is room for the entertainer with humorous songs "with something in them."

He himself complains that the *best* of four such songs he wanted to give were cut out at the last moment by the B.B.C. because of a veiled allusion to somebody's fruit salts and to somebody else's under-clothing. "It almost made me weep," he adds. Well, if he wants my comment it is "Bravo, the B.B.C.!" For once let innocent references of this sort go over the ether, and we should have a busy time with the most subtle advertisers of the day! My friend does not appear to realise that not only wireless, but newspapers, are used in the most shameless fashion by artistes, writers, and the peerage to advertise some commodity or another. Obviously, the place for advertisements is in the advertising columns, and the last place in the world is the microphone.

The amusing part, however, of this artiste's letter is his experience at the studio—I shall not say which. "I can take an audience of a thousand easily," he writes, "but at the broadcast I only had two—a lady artiste and her mother." He underlined "her mother." "The latter, a she-dragon, sitting in full view of me, nearly froze me to death and actually almost dried me up in one song. If I ever broadcast again and she was there I would have to have her removed."

This is funny; although, apparently, it was not quite so funny to the artiste. I am sure announcers will see that humorous artistes are not interfered with by mothers and she-dragons in future!

The big things recently were *The Rose of Persia*, *Tilly of Bloomsbury*, and the National Symphony and Hallé concerts.

Sullivan's musical comedy must have come fresh to a good many listeners who are more accustomed to the Savoy operas and to the scintillating libretto by Gilbert. The new collaboration (Basil Hood super-

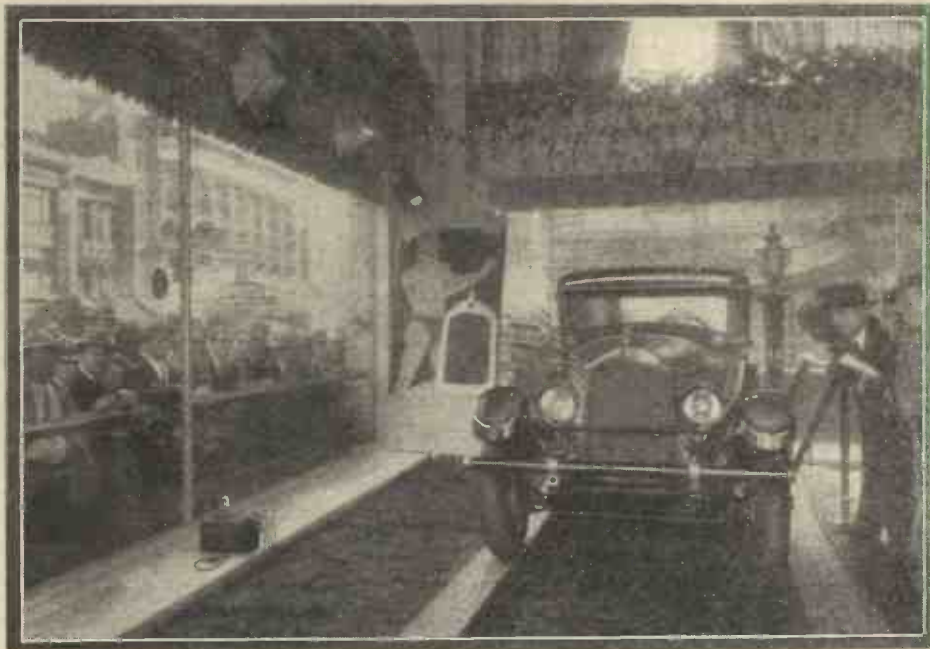
seded Gilbert on this occasion) hardly comes up to the work of the "old firm." The theme of the story is the same as that of *The Vagabond King* and other plays. There were one or two tunes which the errand-boy would probably whistle in the street; but that is all. As for the caste, some of the members sounded more like the East End than Eastern. That is the difficulty in casting these broadcast musical comedies. The voice is the chief concern of the man who does the casting. Quite right, too, except that what one gains on the swings one loses on the roundabouts.

As for *Tilly of Bloomsbury*, I enjoyed the novel "Happy-Go-Lucky" better than the play. I found it difficult to accept the genteel Tilly and her utterly Cockney brother, Percy. One knows that the parentage was mixed, but even with that in mind, one could not conceive either a Tilly or a Percy as the offspring. Tilly should have been more of a "Peg-o'-My-Heart" or "Paddy-the-Next-Best-Thing." The production, however, was good, and Ivor Samson came out well as Bernard.

I have again and again drawn attention

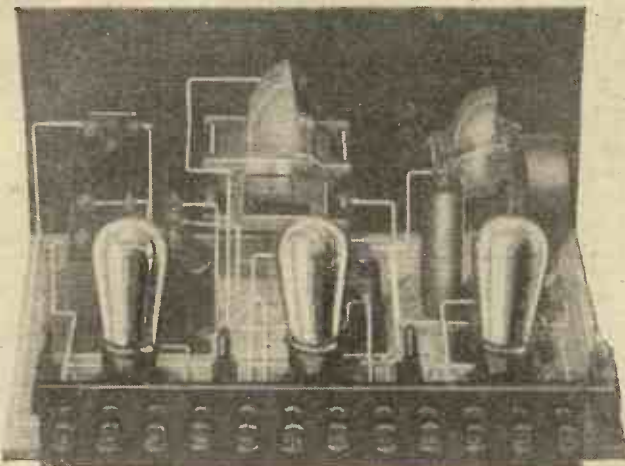
to the problem of putting over celebrities who are not good broadcasters. A glaring case was that of Lion Feuchtwanger, the German author who has sprung into prominence with his notable "Jew Süß." It was a happy inspiration to bring this literary "lion" to the microphone, but it was hardly fair to him, or to his audience, to have permitted him to broadcast a big talk. Herr Feuchtwanger is a great scholar and has a profound knowledge of English, but obviously his German accent made it difficult for him to "get over," and I was very sorry that we were in consequence robbed of some first-class philosophy.

Mr. Brampton Hawkins, who is a dialect entertainer, must go down very well up North, where they understand the lingo. As for us poor Southerners, some of his jokes were quite lost, for the simple reason that the dialect was too good. Lena Copping and Joan Meredith are quite an accomplished pair, although I prefer their playing to their singing, and Tommy Handley made an agreeable announcer, on this occasion cutting down the introductions, as I have suggested more than once in these columns.



STARTING A CAR BY MEANS OF A SHADOW

A recent display in a New York store. A sensitive photo-electric cell was employed and a shadow on the spot on the window caused the car to start.



The Construction is quite Straightforward

IF your present receiver is unselective, if the quality of reproduction leaves something to be desired, if, in fact, you have come to the conclusion that the general performance of your receiver is below par, then the time has come to start rebuilding;—and there are few three-valvers we would so unhesitatingly recommend as the "Straight-line Three."

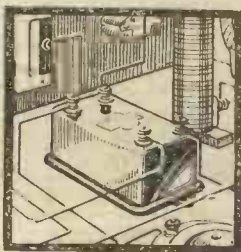
We believe that the circuit arrangement embodied in the "Straight-line Three" constitutes a very practical way out for the average listener, who requires the local station and 5GB or 5XX, free from mutual interference and from a musical standpoint pleasing to listen to.

Selectivity is not a theoretical ideal—it is simply a question of tuned circuits. Three tuned circuits will give extraordinarily selective tuning, and if the separate stages are linked together with valves the sensitivity will be enormous, although the volume will be disappointing to those listeners whose only experience of four valves is a combination consisting of a detector followed by three low-frequency stages.

But, generally speaking, the high order of selectivity given by three tuned stages is not required, and as the tuning difficulties would be very considerable, some simpler scheme is usually adopted.

Reinartz Circuits

The original Reinartz coil, with the aerial and reaction coil as a common winding, is a fine remedy for flat tuning. The various "modifications" gain in simplicity, in that plug-in coils can be used instead of a specially wound coil. But, as a rule, the selectivity of these arrangements is not so good as in the original scheme.



There are several tapped

tapping is made at the sixth and tenth turns.

If we tune the 50 turns and connect the remaining 10 turns as shown in the circuit diagram, we obtain the original Reinartz reaction arrangement. The aerial circuit consists of the 10 turns of the tapped plug-in coil in series with the aerial and earth. The variable reaction condenser is connected between the aerial and the anode of the detector valve, thus utilising the small aerial coil as a reaction coil as well.

The reduced damping of the tuned portion of the plug-in coil brought about by the aperiodic aerial coil arrangement enables sufficient reaction to be obtained with a few reaction turns and a small reaction condenser.

Where a heavily damped aerial-earth system is in use the .0002-microfarad fixed condenser in the aerial lead will add to the selectivity, but this can be omitted if a good aerial is available.

The adoption of the system outlined results in good selectivity with the minimum of expense and complication.

The L.F. side of the "Straight-line Three" is different from the usual arrangement. Bearing in mind an essential requirement—purity of reproduction—we have tried to keep the low-frequency amplification as "straight-line" as possible. Low notes are reproduced, but not at the expense of the high notes.

Straight-line Coupling

The "straight-line" amplification of the whole musical scale is no mean task, but the arrangement embodied here is a near approach to the ideal. The first L.F. valve is coupled to the detector by means of an R.C. coupler, but there is nothing unusual in this part of the circuit.

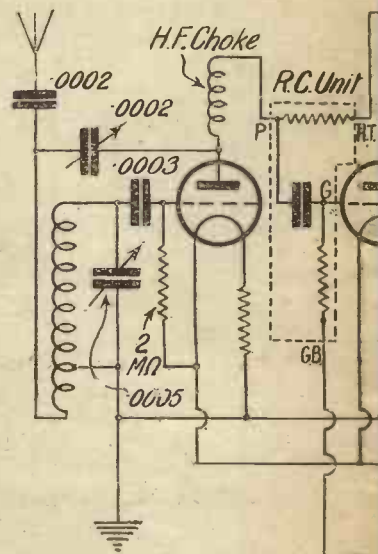
Between the second and third valves is a stage of true-scale coupling, a system developed in this country by the Formo Co. and used by Mr. Reyner in his powerful Gramo-Radio receiver described in a recent issue of AMATEUR WIRELESS.

The STRAIGHT-

BY THE "A.W." TEAM

The Straight-line

THERE are two outstanding characteristics—true purity reproduction, and The good quality is due to a unique capacity and true-scale L.F. coupling obtained by an ingenious adapted plug-in coil. This is one of the best to build and eminently satisfactory



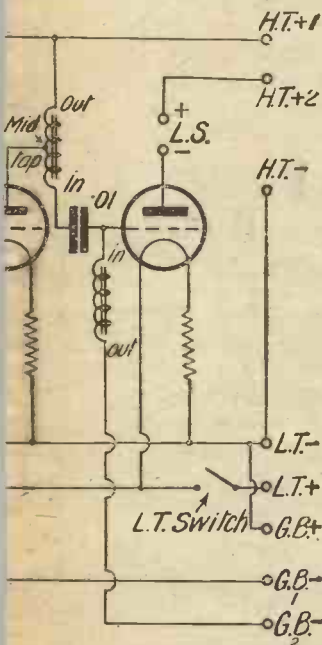
The tuning is controlled by a slow-motion dial, which is varied by the knob on the left. The tuning switch is shown on the right.

LINE THREE

TECHNICAL STAFF

Three Circuit

Characteristics of this receiver selectivity above the average. The combination of resistance-couplings. The selectivity is that of the well-known tapped 'sets of the season,' simple and satisfactory in operation.



Controlled by the filament dial on the right.



Instead of an anode resistance, a tapped L.F. choke having a very high inductance is connected, as shown, through a .01- or .1-microfarad coupling condenser. The usual grid leak is replaced by an L.F. choke which has a high inductance. The advantages of this system as compared with R.C. coupling are threefold: (1) Greater overall amplification, (2) no possibility of "grid-choking," and (3) very small voltage drop across the anode impedance.

The combination of R.C. coupling and dual-impedance coupling works out well in practice, high and low notes being reproduced in a very pleasing manner, and, provided the specified valves are used, there is ample power to work a large loud-speaker from the local station and 5GB. Let us run over the remaining few points of note in the circuit diagram.

Fixed Resistors

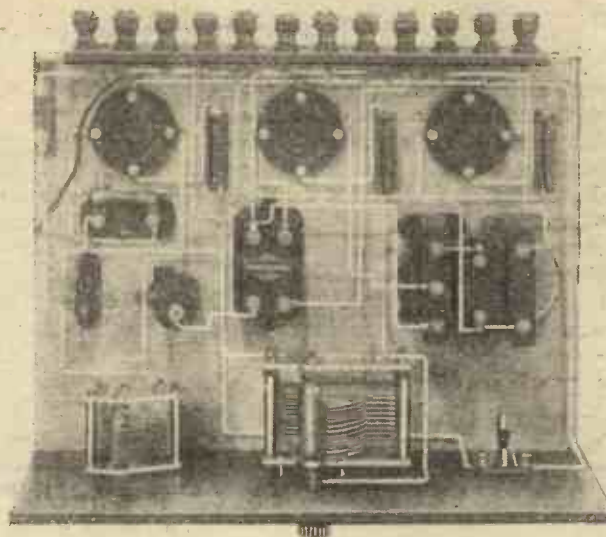
Fixed resistors are shown in each filament lead, each having a value of 2 ohms. The value chosen depends upon the voltage of the accumulator and the rated working voltage of the valves in use.

If you use an accumulator with a higher voltage than is recommended for the valves, the value of resistance required can be arrived at by dividing the difference between the voltage of the accumulator and the voltage of the valve by the filament current of the valve. Thus, to work a .1-amp valve at 1.8 volts from a 2-volt accumulator the resistance is $2 - 1.8$ volts divided by $.1 \text{ amp} = 2$ ohms.

The grid leak and condenser for the detector valve have the usual values—a .0003-microfarad fixed condenser and a 2-megohm grid leak. A .0005-microfarad variable condenser tunes the larger portion of the tapped coil, and a .0002-microfarad reaction condenser in series with the remainder of the tapped coil and the anode of the detector valve gives a good variation of reaction.

An H.F. choke in series with the detector anode and the anode resistance of the R.C. coupler is necessary for good reaction effects.

Two H.T.+ tapplings are shown, one common to the detector valve and first L.F. valve, with a separate feed for the power valve.



Wiring is Particularly Simple

As fixed resistors are used, the "on-off" control of the filament supply is governed by a simple filament switch.

Suitable grid bias is applied to each L.F. valve, and two G.B.— terminals are provided for this purpose.

Components

The following components will be required for the construction of the set:

Ebonite or bakelite panel, 14 in. by 7 in. by $\frac{1}{4}$ in. (Becol, Ebonart, Raymond, Pertinax).

Variable condenser, .0005 microfarad (Cyldon, Burton, Formo, Ormond, Centroid).

Reaction condenser, .0002 microfarad (Cyldon, Keystone, Bowyer-Lowe).

Filament switch, push-pull type (L. & P., Trix, Wearite, Lissen).

Three anti-microphonic valve-holders (Lotus, Lissen, Benjamin).

Three fixed resistors, 2 ohms (Centroid, Keystone, Template).

One single baseboard coil-holder (Lissen).

One .0002 fixed condenser (Dubilier, Lissen, C.D.M.).

One .0003 fixed condenser (Dubilier, Lissen, C.D.M.).

One .01 fixed condenser (Dubilier, Lissen, C.D.M.).

One H.F. choke (Trix, R.I. & Varley, Lissen, Wearite).

One resistance-capacity unit (Marconi-phono, R.I. & Varley, Lissen, Dubilier).

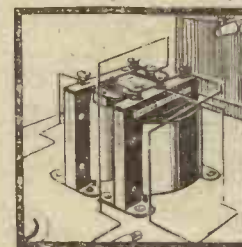
One tapped anode impedance (Formo).

One grid impedance (Formo).

.01 fixed condenser.

Connecting wire (Glazite or Junite).

Ebonite strip, 12 in. by 2 in. by $\frac{1}{4}$ in. (Becol).



Terminals (Belling-Lee, Eastick).
 Slow-motion dial (Ormond, Harlie).
 Dial indicator (Bulgin).

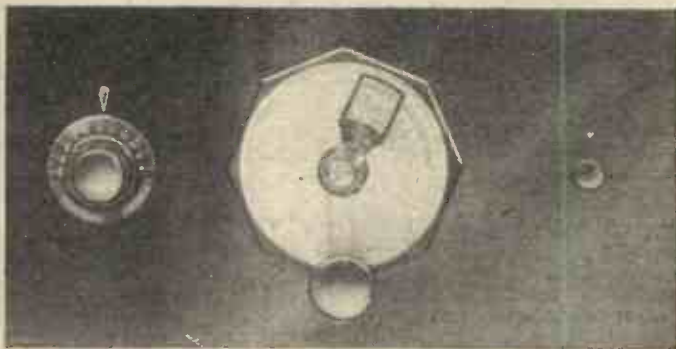
Construction

The panel and baseboard layouts are well planned, and are the result of some considerable experiment; so readers are advised to adhere to our instructions so far as possible. A full-size blueprint of the "Straight-line Three" has been prepared by the AMATEUR WIRELESS draughtsmen, and as a clear and foolproof constructional aid this is strongly recommended. The full list of parts required is given in these pages.

On the panel are three components, the .0005-microfarad variable condenser, the .0002-microfarad variable reaction condenser, and the filament switch. The blueprint can be used as a panel-drilling template. The slow-motion dial chosen is

easily fitted if the maker's simple instructions are followed.

The panel is screwed to the front edge of the baseboard and the baseboard utilised for the rest of the components. A 12-in. length of terminal strip is screwed at the back of the baseboard to take the aerial, earth, loud-speaker, and battery terminals. Looking from the back of the set, the three valve-holders are screwed in a line behind the terminal strip, with the fixed resistors neatly arranged at the side of each holder. At the extreme right-hand end of the baseboard, near the aerial terminal, is the



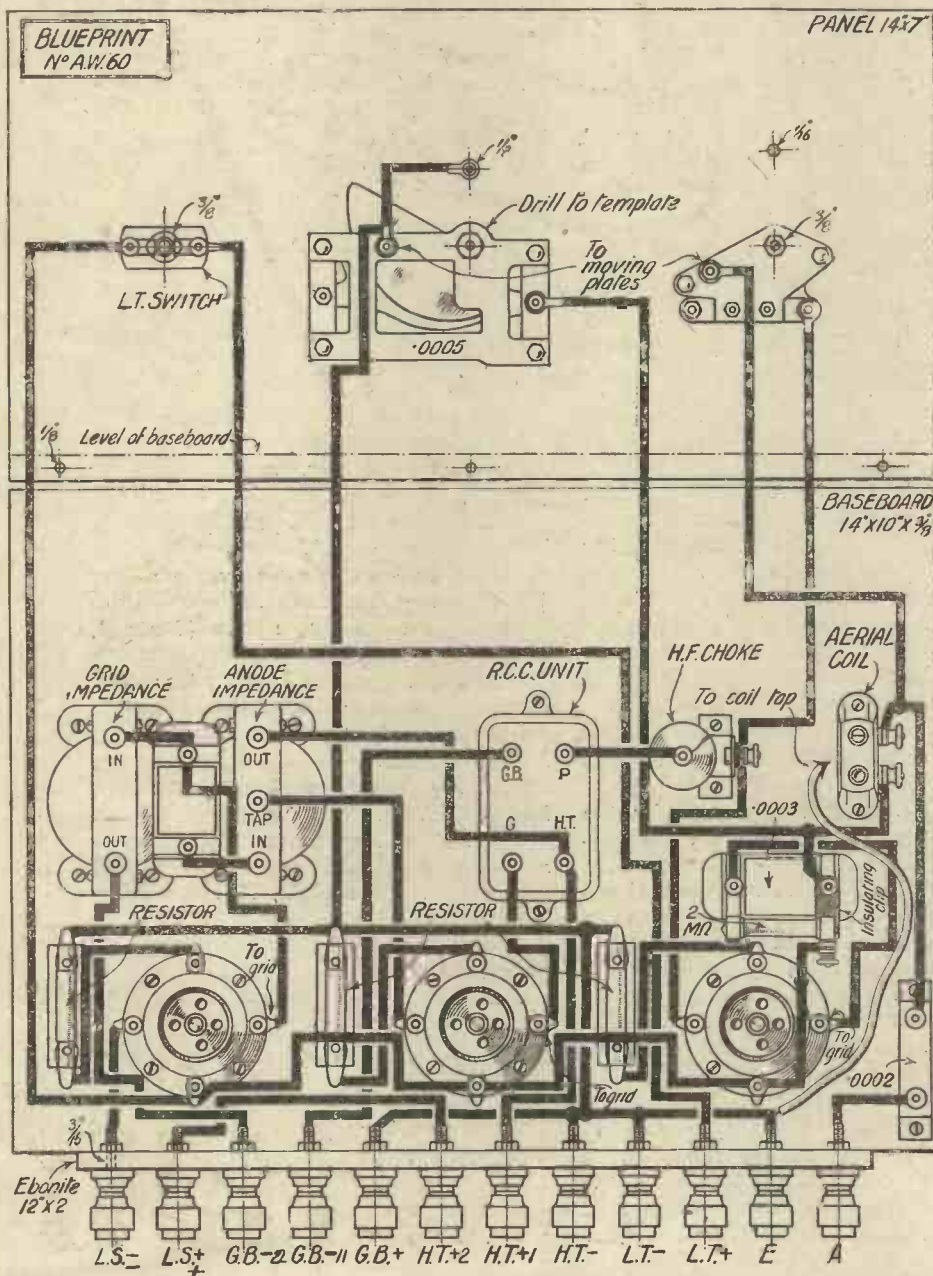
The Panel of the Straight-line Three

baseboard, and the R.C. coupler, H.F. choke, single-coil mount, and grid-leak and condenser disposed as indicated.

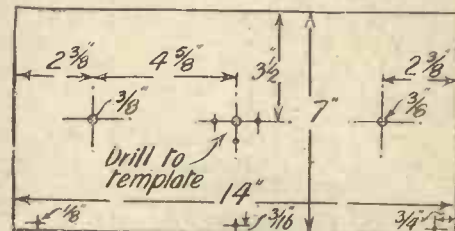
The tapped-anode impedance for the "true-scale" coupler is enclosed in a red case and the grid choke in a blue case. The coupling condenser is not secured to the baseboard, but is held in position by the stiff Glazite wires.

Wiring

Wiring up is a straightforward business, especially if the blueprint is carefully followed, or its reduced reproduction shown in these pages. Note that as the grid leak is connected between the grid and L.T. +, an insulated clip is provided for the L.T. + grid connection. Covered Glazite wire, stretched in the way shown last week in the "Set Building in Pictures" pages, makes a good sound job, although bare wire, such as Junit, is quicker to work with.



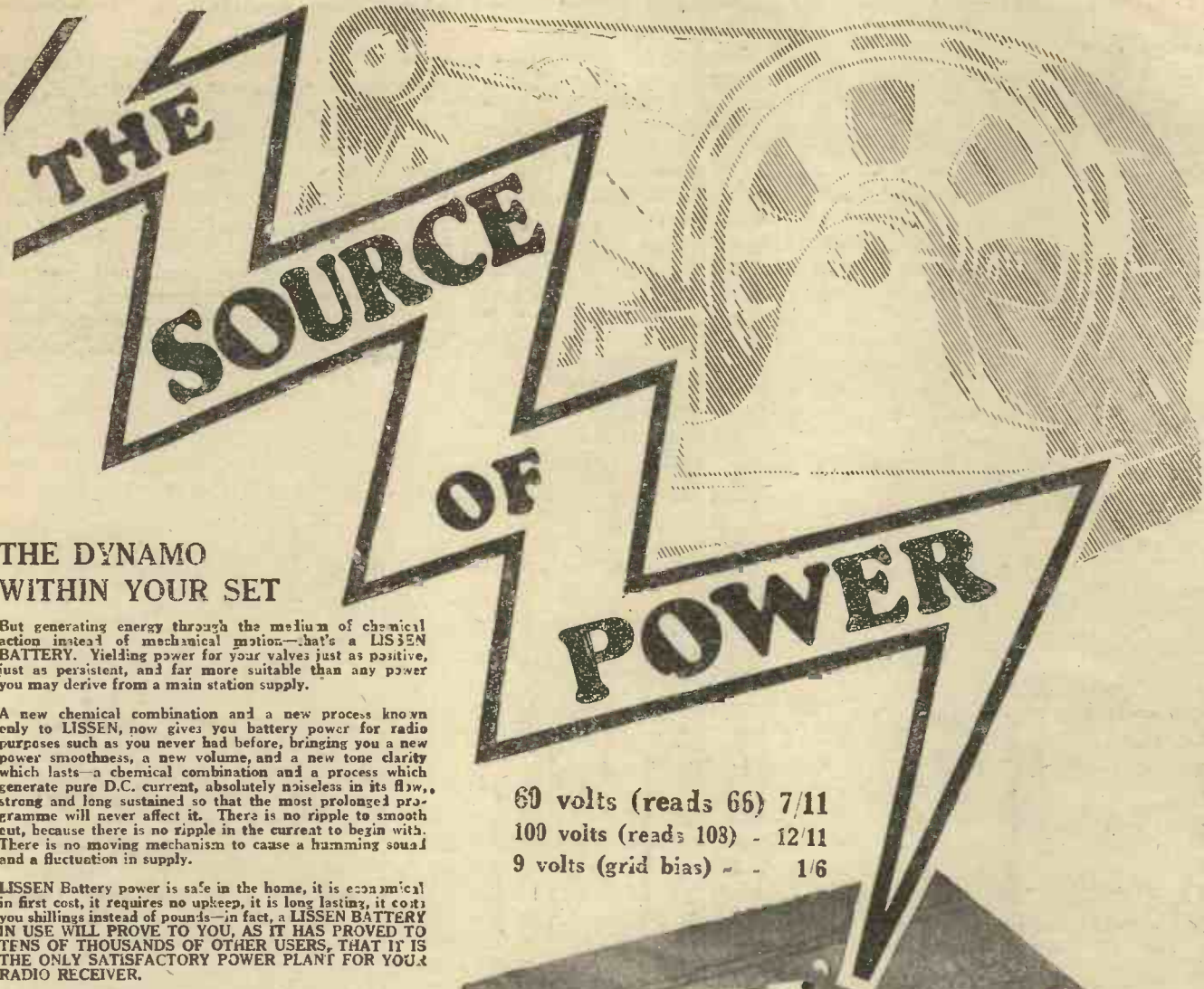
The Wiring Diagram of the Straight-line Three. (Blueprint available, price 1/-)



Details of Panel Drilling

There are no "snags" in the wiring which is absolutely straightforward. A flexible lead from the earth terminal is connected to a Clix spade terminal, and this is secured under the "X" terminal of the plug-in coil. Carefully check over the connections before making any reception tests. Then insert a No. 60 Lissen X coil in the single-coil mount and secure the flexible lead under the tapping terminal as already mentioned. In our tests a Marconi DEH210 was plugged into the detector valve-holder, a Marconi DEL210 in the first L.F. valve-holder, and a Marconi DEP240 in the last stage. This combination gave excellent results.

Selectivity on a 100-ft. aerial was above the average, and 5GB was heard at full blast on the loud-speaker without a suspicion of 2LO's transmission.



THE DYNAMO WITHIN YOUR SET

But generating energy through the medium of chemical action instead of mechanical motion—that's a LISSEN BATTERY. Yielding power for your valves just as positive, just as persistent, and far more suitable than any power you may derive from a main station supply.

A new chemical combination and a new process known only to LISSEN, now gives you battery power for radio purposes such as you never had before, bringing you a new power smoothness, a new volume, and a new tone clarity which lasts—a chemical combination and a process which generate pure D.C. current, absolutely noiseless in its flow, strong and long sustained so that the most prolonged programme will never affect it. There is no ripple to smooth out, because there is no ripple in the current to begin with. There is no moving mechanism to cause a humming sound and a fluctuation in supply.

LISSEN Battery power is safe in the home, it is economical in first cost, it requires no upkeep, it is long lasting, it costs you shillings instead of pounds—in fact, a LISSEN BATTERY IN USE WILL PROVE TO YOU, AS IT HAS PROVED TO TENS OF THOUSANDS OF OTHER USERS, THAT IT IS THE ONLY SATISFACTORY POWER PLANT FOR YOUR RADIO RECEIVER.

You can obtain a LISSEN Battery on your way home at the nearest one of 10,000 radio dealers

- 60 volts (reads 66) 7/11
- 100 volts (reads 103) - 12/11
- 9 volts (grid bias) - - 1/6



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Managing Director: Thos. N. Cole

LISSEN NEW PROCESS BATTERY

Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

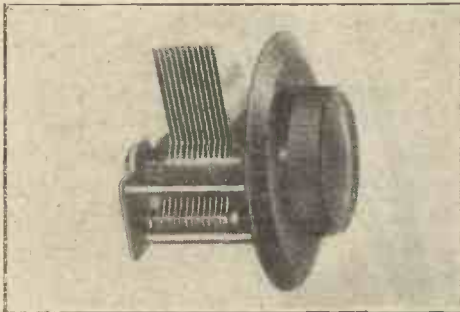
"A.W." TESTS OF APPARATUS

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

Trix Logarithmic Condenser

THE logarithmic condenser is becoming increasingly popular owing to its obvious advantages in sets employing more than one tuned circuit. It is practically impossible to match a number of inductances incorporated in a set in such a way that each one requires an identical capacity for tuning to various wavelengths; if however, logarithmic tuning condensers are employed, the irregularities may be corrected by altering the position of the various dials until they read alike when tuned to the same wavelength.

The Trix condenser which we have received from E. J. Lexer, of 33 Clerkenwell Green, E.C.1, is designed in accordance with a logarithmic law, whilst the mechanical strength is ample, without employing



Trix Logarithmic Condenser

excess of metal in the frame. One of the most noticeable features of the design is the smoothness of motion which is attained by the use of a special lubricated washer. Good electrical contact is assured by the provision of a copper pigtail while the moving plates are connected to the frame in order to lessen hand-capacity effects.

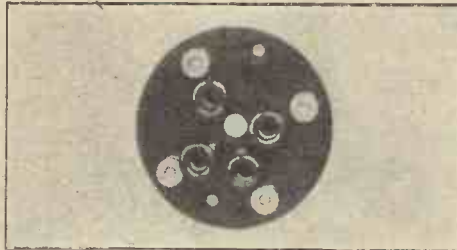
Measurements showed that the capacity range extended from .00022 to .000527 microfarad and that the logarithmic law was correct when due allowance was made for the usual stray capacities in circuit.

Lisenin Valve-holder

SPRING valve-holders are not always necessary for use with thermionic valves. There are, indeed, occasions when a rigid valve-holder is preferable, as in wavemeters and other precision instruments. Apart from this, the expense of vibratory holders is unnecessary from the antiphonic point of view in certain positions, such as H.F. amplifying or oscillating valves.

The Lisenin valve-holders sent in for test by the Lisenin Wireless Co., of Connaught House, 1A Edware Road, Marble Arch, W.2, are of the rigid variety, and

are suitable for use in a position such as that just outlined. Four metal valve sockets surrounded by a covering of insulating material are fixed to a circular base of 1 3/4 in. diameter. The insulation round the plate sockets is coloured red, so



Lisenin Valve-holder

that the action of inserting a valve in the holder is facilitated. Four neat nickel-plated terminals are mounted close beside each socket. Various types of valves were found to fit easily, yet securely, into the holder. The component is well finished.

Orphean Gem Loud-speaker

THE Orphean Gem loud-speaker is the small brother of the Orphean Senior loud-speaker which has already been reviewed in these columns.

The magnet unit is of the standard two-pole type, and is housed in a neat brown moulded casing standing on four supports; thick rubber pads fixed to the end of the



Orphean Gem Loud-speaker

supports serve to insulate the speaker from external vibrations, and also prevent damage in the form of scratches to articles of furniture on which the speaker may be placed. Although the magnet unit is fairly small, a horn of relatively large dimensions is fitted, and in consequence the speaker will respond to a fairly extensive range of

audible frequencies. The total height of the speaker is 20 in., whilst the flare of the horn has a diameter of 10 in.

When tested in our laboratories, good reproduction of speech and music was obtained, whilst a large volume could be handled without overloading. Selling at a popular price, this instrument is capable of giving a good performance, and should find favour. The London Radio Manufacturing Co., Ltd., of Station Road, Merton Abbey, S.W.19, are the makers.

Faradex H.T. Charger

THE H.T. charger, which we have received for test from Rooke Bros., Ltd. of 55 Cardington Street, Euston, N.W.1, employs a non-corrosive and non-poisonous electrolyte; the electrodes do not corrode,

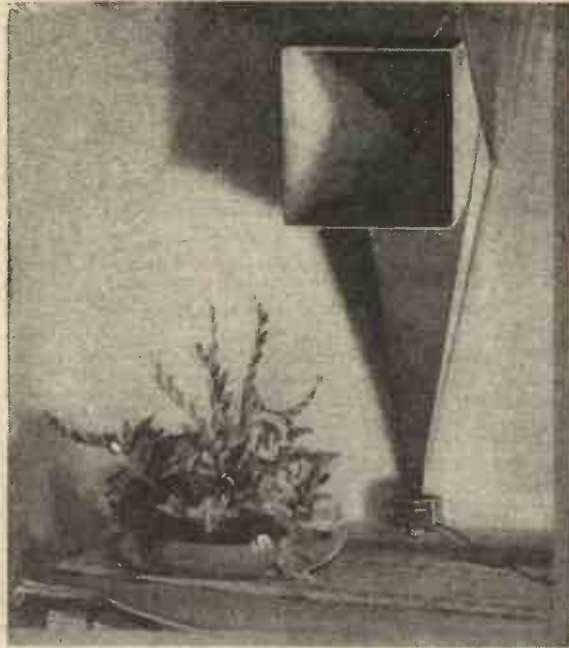


Faradex H.T. Charger

and in consequence the reliability of the charger is considerably increased, while should the instrument become inadvertently upset, no damage will result.

The charger consists of four glass cells filled with a special electrolyte into which four pairs of metal electrodes dip. An ebonite disc fits over the mouth of the cells and a perforated metal cylinder forms an outside casing. Two leads from the instrument terminate in a plug for connecting to A.C. mains and a socket into which a regulating lamp is placed. A pair of red and black leads are provided for connecting to the H.T. battery. H.T. batteries up to 120 volts can be charged at a rate which varies according to the power consumption of the lamp and the voltage of the A.C. mains. For example, the charging rate on a 60-volt H.T. accumulator, working off 220-volt A.C. mains, varies from 40 to 130 milliamps, with a lamp having a power consumption of 20 to 60 watts. Tests made on this charger in our laboratories confirmed the figures given above and showed that the overall rectifying efficiency exceeded 60 per cent.; thus the charger is particularly economical in use and should give long service.

The illustration shows a simple but really effective loud-speaker horn—that can be covered with fancy paper or painted so as to resemble a factory article—made for a few pence by following the easy directions supplied with every 'Lissenola' Loud Speaking Unit, a Lissen product yielding results equal to the most expensive instrument on the market and sold at the record low price of ... **13/6**



A powerful loud-speaker that costs less than headphones



The complete Unit with 'Lissenola' Reed attached ready to receive a cone—or any other diaphragm working on the reed principle.

Hardly credible—but true. For less than the price of a pair of 'phones you can buy the 'Lissenola' Loud Speaking Unit that only needs the addition of a horn to make it a powerful, full-sized instrument, equal in volume, purity, and tone to the most costly on the market.

really efficient horn for a few pence. Or, by using the 'Lissenola' Reed (price 1s. extra), a cone or any other diaphragm working on the reed principle can be quickly made and fitted, yielding results equal to an expensive speaker. By removing the sound-box and substituting the 'Lissenola' Unit, any gramophone can instantly be converted into a loud-speaker.

Any good horn will do. If you have a spare one in the house from a gramophone or a loud-speaker it will serve admirably. If not, there are directions with every 'Lissenola' Loud Speaking Unit and full-sized patterns, telling you how to make a simple but attractive and

Make this test. Go to your nearest dealer and ask him to put on the most expensive loud-speaker in his stock. Then put the same horn on the 'Lissenola' Unit—keep the input voltage the same, no matter how high—and see if you can notice any difference.



The 'Lissenola' Reed attachment (patent pending). Price 1/-.

Take no imitations. If an imitation is offered to you come firmly away and send direct to factory—no postage charged, but please mention dealer's name and address.



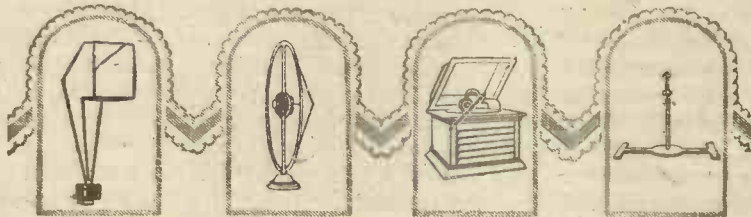
Showing method of attaching Reed to the 'Lissenola' Loud Speaking Unit.

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

A cone diaphragm loud-speaker can easily be constructed. The illustration shows one method of mounting.

The 'Lissenola' instantly converts any gramophone into a loud-speaker.

The 'Lissenola' Reed Attachment (pat. pending) for use with cone diaphragm loud-speaker. Price 1/-.



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RULES.—Please write distinctly and keep to the point. We reply promptly by post. Please give all necessary details. Ask one question at a time to ensure a prompt reply, and please put sketches, layouts, diagrams, etc., on separate sheets containing your name and address. See announcement below

Capacity Aerial.

Q.—*What is meant by receiving on a "capacity aerial"?*—G. L. (Eltham).

A.—This really means receiving without any aerial at all. It is a term sometimes used when signals are being picked up on the tuning coils of the set with the ordinary aerial disconnected.—G. N.

Loud-speaker Extension.

Q.—*I understand that it is possible to work a loud-speaker at a distance from a wireless set and yet use only one lead between the set and the loud-speaker. Can you tell me how this may be done?*—E. C. (Elstree).

A.—This is done by using an "earth return." An L.F. choke coil is connected across the L.S. terminals of the set and one end of the single extension lead is connected, through a large-capacity fixed condenser to that loud-speaker terminal on the set which is internally connected to the plate of the last valve. The other end of the extension lead goes to one of the terminals on the loud-speaker and the

remaining loud-speaker terminal is earthed.—G. N.

When Asking Technical Queries

PLEASE write briefly
and to the point

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

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

Finding Earthed Main.

Q.—*My house electric light supply is D.C. and I want to know whether the positive or the negative side is earthed. How can I find this out?*—D. N. (Manchester).

A.—First you must determine the polarity of the mains. That is, you must find out which is the positive main and which the negative. You can do this either by using a "polarity indicator" or by applying the well-known test with dilute acid. This latter consists in immersing the bared end of the two mains in slightly acidulated water. Bubbles will then be seen to rise from the negative main. You should then try the effect of connecting a lamp rated at the mains voltage between each of the leads in turn and your wireless earth (the latter, of course, should be a really good earth). If the lamp lights when connected between the positive main and earth then the negative main is earthed. Similarly if the lamp lights when connected between the negative main and earth it indicates that the positive main is earthed.—N. F.

Transformer, Resistance or Choke?

(Continued from page 938)

all we have to do to obtain efficient note magnification is to use transformers containing a large amount of wire on their primaries and a much greater amount upon their secondaries. Unfortunately, however, certain practical considerations step in. The size of the secondary of any transformer is definitely limited. If we give it more than a certain number of turns, two things happen; the self-capacity becomes so great that the efficiency of the transformer is much reduced, and, further, the instrument becomes so bulky that there is no room for it in the ordinary receiving set. We can therefore obtain a big step-up ratio only at the expense of turns upon the primary coil. Hence when a transformer with a 10-to-1 ratio is made, its primary impedance must be small, and it will give poor results with any preceding valve but one of low impedance.

And there are other very serious objections to accomplishing note magnification entirely by means of transformers. It has so far not been found possible to make a transformer that will respond equally well to all the frequencies corresponding to the piano scale; only the most careful design can make it anything but hopelessly inefficient as regards the frequencies corresponding to notes below the middle C. The use of transformer coupling is therefore liable to lead to a suppression of the lower notes.

And there is worse to follow. Transformers have very large fields which cause interaction to take place between them even if they are screened. This leads to certain low-frequency reaction effects which are apt to produce a very unpleasant form of instability. My own view is that if real quality is desired, one transformer-coupled note-magnifying stage is all that should be employed.

Choke Capacity

Yet another objection to the use of transformers is that owing to their step-up effect; two of them, when a strong signal is coming in, give rise to such big voltage changes that the valve in the last holder is almost sure to be overloaded even if it is of the small-power type.

Choke-capacity coupling has only one serious disadvantage: it is not so efficient, stage for stage, as that provided by transformers. Against this we must set several very important advantages: chokes are not so liable to produce low-frequency reaction effects as are transformers; the average well-designed choke can deal faithfully with a bigger range of frequencies than the transformer; since there is no secondary to be considered the impedance of a choke can be made very big; and last, but by no means least, a first-rate choke costs considerably less than a transformer.

Provided that you use a choke of suitable impedance, a grid condenser of suit-

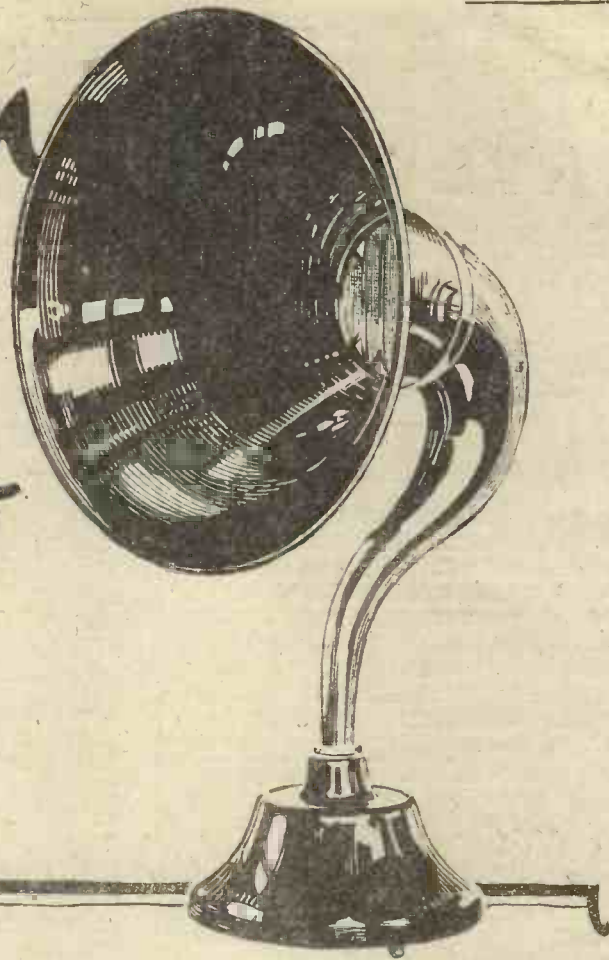
able capacity, and a leak of suitable resistance choke capacity coupling will give practically distortionless reproduction over the whole range of audible frequencies.

There remains resistance-capacity coupling. The biggest advantage of this method is that it does give an almost equal response to all audio frequencies.

Now supposing that we use a 100,000-ohm resistance in the plate circuit of a power valve whose own plate-filament resistance is but 5,000 ohms, we are faced with a serious high-tension problem. The total resistance in the circuit is 105,000 ohms. If, therefore, we apply 105 volts from a high-tension battery, there will be a potential drop of 100 volts across the resistance, and of 5 volts only between the plate and filament of the valve. To obtain a steady plate potential in the neighbourhood of 100 volts we should require to use a high-tension battery of enormous size. Luckily there are on the market quite a number of high-impedance valves with a large magnification factor with which resistance-capacity coupling can be used satisfactorily.

To sum up, I would recommend for two stages of note amplification that the second should be transformer coupled, the very best obtainable transformer being used. The first should be either resistance-capacity or choke-capacity according to whether the rectifying valve is of the high or low-impedance type.

Reduction
in price



We have pleasure in announcing that the price of the B.T.H. Type C2 Loud Speaker has been reduced from £3 0. 0. to

£2-10-0

Speaker itself will remain unchanged and will still be, as it has been in the past, the finest instrument in its class. Give a B.T.H. Loud Speaker this Christmas and you give a present that is sure to please.

The price is applicable in Great Britain and Northern Ireland only.

LOUD SPEAKER
TYPE C 2

Bosch-Houston Co., Ltd.

2881

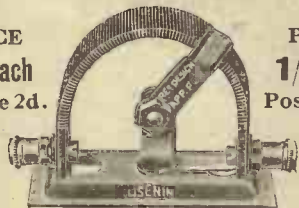
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The ends of the leads are so gripped that they cannot possibly come adrift. Pressure is so distributed that a break is practically impossible. (See illustration.) Further, the ragged ends of the flex covering are covered up, and one's leads look and behave as they ought to behave when fitted with Lisenin Positive Grip Terminals, as used in

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"Amateur Wireless" and "Wireless World" Sets. Follow the lead of experts.

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To the right is a list of twelve popular sets or circuits. We invite you to tell us which among them are your favourites. To encourage you to take the little trouble necessary we are offering some splendid money prizes.

All you have to do is to select what you consider to be the six best sets or circuits and insert them in the special coupon given on this page in what you think to be their order of merit or popularity. With our readers' votes in hand, we shall be able to determine which set has the honour of first place and in what order of popularity the rest should come; then, in due course, we shall be able to give readers the advantage of our information.

Readers whose lists agree, or most nearly agree, with the majority result will win the prizes.

- A** 2-valver.—Detector with reaction, followed by one transformer-coupled L.F. valve.
- B** 2-valver.—One reflexed valve, crystal detector, and one L.F. valve.
- C** 3-valver.—Detector, using anode-bend rectification, followed by two stages of resistance-capacity-coupled L.F.
- D** 3-valver.—High-frequency valve, neutralised; plug-in coils, by a detector valve and transformer-coupled L.F. valve.
- E** 3-valver.—Detector valve with reaction, followed by two transformer-coupled valves with switch to cut out last L.F. valve.
- F** 3-valver.—Detector with Reinartz reaction, followed by one resistance-coupled L.F. stage and one transformer-coupled L.F. stage.
- G** 4-valver.—High-frequency valve neutralised, plug-in coils, detector followed by two transformer-coupled L.F. valves.
- H** 4-valver.—High-frequency valve, neutralised, detector with reaction, followed by one resistance-coupled stage and one transformer stage of L.F.
- I** 4-valver.—Two high-frequency valves, neutralised, detector followed by transformer-coupled L.F.
- J** 4-valver.—Three high-frequency valves and detector.
- K** 5-valver.—Two high-frequency valves, neutralised, detector followed by two stages of L.F.
- L** 5-valver.—Two high-frequency valves and detector, neutralised and screened with single control; followed by one resistance-coupled L.F. and one transformer-coupled L.F.

RULES

TO BE MOST CAREFULLY OBSERVED

Every competitor agrees to accept the Editor's decision as final and as legally binding.

All entries to be written IN INK on the special coupon printed on this page.

Competitors may submit more than one coupon, but will not be awarded more than one prize.

In the event of two or more competitors tying for place, the Editor will decide as to the next step.

We bind ourselves to present prizes to a minimum total value of £35

We shall not be responsible for entries lost or mislaid.

No employee of Bernard Jones' Publications, Limited (the proprietors of AMATEUR WIRELESS), may compete.

The names and addresses of prize-winners will be announced in AMATEUR WIRELESS early in the New Year.

The closing date for entries is December 31, 1927.

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O 627		4	40	16	0	
O 632	2 Cells	2	20	1	2	6
O 633	4-volt	3	30	1	7	0
O 639	3 Cells 6-volt	2	20	1	13	6
O 640		3	30	2	0	6

The "GEEKO" Low Tension Accumulator, like all G.E.C. products, is thoroughly reliable and *guaranteed* to give long and perfect service. Each 2-volt cell is easily removed for inspection or renewal. The container is of thick transparent celluloid fitted with non-spilling vents. Ample space is provided below the plates for the collection of sediment. Non-corrosive terminals are fitted.

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The driving unit of this fine cone speaker is the Ideal Four Pole Balanced Armature Driving Unit. This unit finally eliminates distortion and false resonances and gives full, harmonious and loud reproduction of music, song and speech and can cope with the highest energies. Very attractive in appearance. Can be used as a wall or table speaker.

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F. A. HUGHES & CO. LTD.

"THE 'SUPER' CRYSTAL RECEIVER"

(Continued from page 928)

wire anchored. Ten turns are then wound on and a tapping made by looping the wire. At the end of a further ten turns a second loop is made, and at the thirtieth turn the third loop. No further tappings are made and the remaining thirty turns are continued until the total sixty turns are wound on.

The coil is secured to the baseboard by screwing a strip of wood inside one end of the coil former and then screwing the strip to the baseboard with a screw passed through the centre of the strip.

Wiring and Testing

Wire up with Glazite or Junit wire as indicated in the diagrams and photographs, and carefully check over the connections. When testing on actual reception, carefully adjust the crystal detector until loudest results are obtained, and then leave well alone, as far as the detector is concerned.

We were fully satisfied with the volume and clarity of the reception of 2LO at a distance of some eight miles.

An Ideal Christmas Gift

A receiver such as this is inexpensive to build and would make an admirable Christmas gift to someone who lives near a B.B.C. station and has facilities for the erection of a reasonably efficient aerial-earth system.

CHIEF EVENTS OF THE WEEK

LONDON AND DAVENTRY (5XX)

- Dec. 18 Symphony concert conducted by John Barbirolli Poushnoff (pianoforte).
- " 19 *The Ship*, a play in three acts by St. John Ervine.
- " 20 Nativity play relayed from St. Hilary's Church, Marazion.
- " 21 *Rigoletto*, an opera in three acts by Verdi.
- " 22 Carillon of carols. Bizet programme.
- " 23 *Hansel and Gretel*.
- " 24 Mrs. Buggins, alias Mabel Constanduros, gives a Christmas party.

DAVENTRY (5GB)

- Dec. 18 Chamber music.
- " 19 Haydn and Mozart music.
- " 20 *Rigoletto*, an opera in three acts by Verdi.
- " 21 Carol concert by the Gloucester Cathedral Chorists.
- " 22 Military band concert.
- " 23 A Dickens dream fantasy by Stanley West.

BOURNMOUTH

- Dec. 19 *On the Wings of Song*.

CARDIFF

- Dec. 19 *Moonshine*, a play in one act by Laurence Housman.
- " 20 *The Super Six in Christmas Crackers*.
- " 22 *Cynwisa Ganu*. Carol singing of the Silent Fellowship.
- " 24 *Heigh-Ho the Holly*, an orchestral and vocal programme.

MANCHESTER

- " 21 *Rigoletto*, an opera in three acts by Verdi.

NEWCASTLE

- Dec. 22 A concert performance of *La Fille de Madame Angot* (Lecocq).

GLASGOW

- Dec. 24 A Dickens Christmas programme.

ABERDEEN

- Dec. 18 Orchestral concert in aid of Lord Provost Lewis's Fund for the Aberdeen Joint Hospitals Scheme.
- " 22 Humorous Scottish programme.

BELFAST

- Dec. 19 Orchestral concert relayed from the Grosvenor Hall.

C.D.M. COMPONENTS

IN the list of components of the "All-wave Two," which was described in the December 3 issue, among the makers of the .0003 fixed condenser used C.D.N was printed. This, of course, should have been C.D.M. the well-known manufacturers.

BLUEPRINTS

Full-size Blueprints, each one being a photographic contact print, from the draughtsman's original design, and produced on stout paper, are now available of the following sets:

No.	Price.	Post free.
ONE-VALVE SETS		
One-valve for Frame Aerial ...	W.M. 4	1 0
One-valve All-wave Reinartz ...	A.W. 2	1 0
All-in-all One-valve ...	A.W. 13	1 0
Hartley DX One-valve ...	A.W. 27	1 0
Alpha One* ...	W.M. 26	1 3
Reinartz Plug-in One-valve ...	A.W. 46	1 0
TWO-VALVE SETS		
All Broadcast Two* ...	W.M. 5	2 3
Safeguard Two ...	A.W. 3	1 0
Two-valve, embodying K.L. 1 Valves ...	A.W. 5	1 0
One-control Two ...	A.W. 6	1 0
Wide-world Short-wave Two ...	A.W. 11	1 0
All-wave Two-valve ...	A.W. 15	1 0
Loftin-White Two* ...	W.M. 20	2 3
Reinartz Two ...	A.W. 21	1 0
Remote-control Two ...	A.W. 23	1 0
One-dial Two ...	W.M. 23	1 0
Empire Short-wave Two ...	A.W. 28	1 0
Screened-trap Two ...	A.W. 31	1 0
"Next-step" Receiver ...	A.W. 31	1 0
Gizdle Two* ...	W.M. 30	1 3
Centre-tap Two ...	A.W. 42	1 0
Mains-fed Two ...	W.M. 37	1 0
Three-option Two ...	A.W. 51	1 0
The Rover Two ...	A.W. 53	1 0
British Broadcast Two ...	W.M. 44	1 0
General Purpose Two ...	A.W. 55	1 0
All-wave Two ...	A.W. 57	1 0
The "Yule" Two ...	A.W. 59	1 0
THREE-VALVE SETS		
One-knob Three ...	W.M. 3	1 0
Continental Three ...	W.M. 7	1 0
Shielded Searcher ...	W.M. 8	1 0
Victory Three ...	A.W. 9	1 0
Regulator Three ...	A.W. 12	1 0
Hi-mu R.C. Three* ...	W.M. 9	2 3
M.C.3 Star ...	A.W. 16	1 0
Wave-catcher Three ...	W.M. 19	1 0
Excelsior Three ...	A.W. 20	1 0
Split-primary Three ...	A.W. 21	1 0
Lighthouse Three ...	A.W. 27	1 0
Purity Three-valve ...	A.W. 33	1 0
A Modern Tuned-anode Three ...	A.W. 35	1 0
Tetrode Three for Shielded Valves ...	A.W. 36	1 0
Alternative-programme Three ...	A.W. 38	1 0
A "Mains" Three-valve ...	W.M. 31	1 0
Screened-grid Three ...	W.M. 21	1 0
"Simpler Wireless" All-from-the-Mains Receiver ...	A.W. 41	1 0
"Simpler Wireless" Special Three-valve "Home Station" Three ...	A.W. 41	1 0
"Home Station" Three ...	A.W. 45	1 0
The "Economy" Three ...	A.W. 48	1 0
Five-guinea Three ...	W.M. 29	1 0
Dominions Short-wave Three ...	W.M. 39	1 0
Short-wave Three ...	A.W. 50	1 0
The Ether Searcher Three ...	A.W. 51	1 0
Three Continent Three ...	A.W. 54	1 0
Tuned-anode Three for the Mains (D.C.) ...	W.M. 43	1 0
The Standard Three ...	A.W. 56	1 0
Straight-line Three ...	A.W. 60	1 0
THREE-FOUR-VALVE SETS		
A Tuned-anode Three-four ...	A.W. 40	1 6
Concord Three-four ...	W.M. 45	1 6
FOUR-VALVE SETS		
Paradyne Four ...	W.M. 2	1 6
M.C. Four ...	A.W. 8	1 6
Household Four ...	A.W. 17	1 6
DX Four ...	A.W. 13	1 6
Revelation Four ...	W.M. 21	1 6
Auto-selector Four ...	W.M. 35	1 6
"A.W." Grammo Radio ...	A.W. 40	1 6
All-purpose Four ...	A.W. 43	1 6
All-wave Roberts Four and copy of "A.W." ...	A.W. 47	0 4
C.T. Four ...	A.W. 58	1 6
FIVE-VALVE SETS		
1927 Five ...	W.M. 6	1 6
Two-volter's Five ...	W.M. 11	1 6
Individual Five ...	A.W. 25	1 6
Exhibition Five ...	W.M. 33	1 6
Phoenix Five ...	W.M. 42	1 6
SIX-VALVE SETS		
Nomad Six ...	W.M. 31	1 6
SEVEN-VALVE SETS		
Simpladyne Seven (Super-het.) ...	W.M. 22	1 6
AMPLIFIERS		
All-broadcast Amplifier ...	W.M. 10	1 0
Two-valve D.C. Mains Amplifier ...	W.M. 16	1 0
Gramophone Amplifier ...	W.M. 32	1 0
Range Extender (H.F. Amplifying Unit) ...	W.M. 38	1 0
PORTABLE SETS		
Springtime Portable (Two-valver) ...	W.M. 12	1 0
Countryside Four ...	W.M. 17	1 6
Motorists' Portable Four-valver ...	A.W. 14	1 6
M.C. Three Portable ...	A.W. 22	1 0
Handy Three ...	W.M. 27	1 0
Holiday Portable (three-valver) ...	A.W. 32	1 0
Club Portable (three-valver) ...	A.W. 39	1 0
CRYSTAL SETS		
Crystal Set for the R.C. Enthusiast ...	W.M. 13	0 6
Fonotrol Crystal Set ...	W.M. 11	0 6
Hi-lo Crystal Set ...	W.M. 18	0 6
Two-programme Crystal Set ...	W.M. 25	0 6
Alternative-programme Crystal Set ...	A.W. 39	0 6
Half-Hour Crystal Set ...	W.M. 28	0 6
MISCELLANEOUS		
Loud-speaker Tone Control & Filter Unit* ...	W.M. 1	2 3
Heterodyne Wavemeter ...	A.W. 7	1 0
Made-to-measure Wave-trap ...	A.W. 19	0 6
New Current Supply Idea ...	A.W. 26	1 0
DX One-valve Unit ...	A.W. 37	1 0
Volume Control Unit ...	W.M. 40	0 6
Battery Eliminator for A.C. Mains ...	W.M. 41	1 0

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Send a Postal Order to-day to BLUEPRINT SERVICE AMATEUR WIRELESS 38-51 Fetter Lane London, E.C.4

“Circuits for You to Try”

(Continued from page 937)

high, a value of 70,000 ohms being satisfactory in which case the capacity C7 should be at least .01 and preferably rather higher; while a grid leak of about 2 megohms will suffice. Resistance coupling is employed because the use of anode-bend rectification tends to increase the impedance of the detector valve considerably, and if the first L.F. is made a transformer-coupled stage, there is likely to be difficulty with the quality.

The circuit shown by Fig. 3 is novel. The first tuned circuit is connected, not across the grid and filament of the first valve as is usual, but across the grid and anode. The top end of the coil is not connected directly to the anode, but through a condenser C2 in series with the coil L5. The purpose of the condenser C2 is to control the oscillation in the circuit by restricting the feed from the anode back to the grid and, by setting this at a suitable value, the circuit can be maintained under control. High tension is supplied through the high-frequency choke coil L4.

The amplified currents in the anode circuit are handed on to the detector stage through the coupling between L5 and L6 while a capacity-controlled reaction is applied from the anode of the rectifier. The choke coil L8 is inserted to keep the H.F. out of the L.F. stages, if any, and to give smooth reaction. It can be omitted if the impedance of the telephones or transformer used is sufficiently high. The coil L3 is a high-frequency choke coil intended to bias the grid of the first valve and to prevent it from acquiring a large negative potential which it would do if it were left free.

The values of the circuit are more or less straightforward. L2 and L6 are 60 or 75 coils, L1 and L5, 30, and L7 50 coils. L3, L4 and L8 are H.F. chokes. C1 and C3 are .0005; C2, .0001; C4, .0003, with the usual 2-megohm leak and C5 is again .0001 to .0003. The high-tension on the H.F. valve should be adjusted so that in conjunction with the condenser C2, suitable control is obtained over the oscillation. H.T. 2 may be 60 or 70 volts in order to obtain smooth reaction. As before one or two L.F. stages may be added to the circuit if desired.

“Amateur Wireless and Electrics.” Price Threepence. Published on Thursdays and bearing the date of Saturday immediately following. Post free to any part of the world: 3 months, 4s. 6d.; 6 months, 8s. 9d.; 12 months, 17s. 6d. Postal Orders, Post Office Orders, or Cheques should be made payable to “Bernard Jones Publications, Ltd.”

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

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

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

Communications should be addressed, according to their nature, to The Editor, The Advertisement Manager, or The Publisher, “Amateur Wireless,” 58/61, Fetter Lane, London, E.C.4.



“BREAK STEP!”
- else the bridge might be wrecked



These five features are exclusive to BENJAMIN Valve Holders:

- 1 Valve sockets and springs are made in one piece with no joints or rivets to work loose and cause faulty connections.
- 2 Valves are free to float in every direction.
- 3 Valves can be inserted and removed easily and safely.
- 4 Valve legs cannot possibly foul the baseboard.
- 5 Both terminals and soldering tags are provided.

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Price 1/-

IT JUST shows you how serious vibration can be. Soldiers marching across a bridge are given the order to break step. If they kept in step their marching would create a regular vibration that might wreck the bridge!

Yet there are still thousands of radio men who mount their valves in old-fashioned or inefficiently sprung valve-holders, so that the rhythmic street vibration reaches the delicate filaments. And then they wonder that their valves have short lives!

Only BENJAMIN anti-microphonic Valve-holders will effectively prevent every quiver of vibration, every shock from reaching the vital filament. Bring your set up-to-date, make your reception purer and treble the life of your valves by fitting BENJAMIN anti-microphonic Valve-holders in every stage.

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Anti-Microphonic

VALVE HOLDERS

2/-
each

THE BENJAMIN ELECTRIC LTD.
Brantwood Works, Tariff Road, Tottenham, N.17.



HUMPERDINCK'S opera *Hänsel and Gretel* has found favour with listeners and a repeat performance is promised for December 23. May Blyth, Doris Lemon, Elsie Suddaby, Constance Willis, Mavis Bennett and Herbert Simmonds are in the cast.

5GB will relay a carol concert by the Gloucester Cathedral Singers, conducted by Sir Herbert Brewer, from the Chapter House, Gloucester Cathedral, on Dec. 21.

Pimpus and Casca, a play to be broadcast on December 22, should be interesting. Max Mohr, the well-known German dramatist, is the author.

For a Punch and Judy entertainment, to be broadcast from the London studio on December 16, the oldest showman alive, W. H. Kesson, will appear before the microphone. The true history of Mr. Punch and his family has been rewritten by W. S. Meadmore and L. de G. Sieveking. The cast will include Mabel Constanduros as Judy and Mr. Sieveking as Puccio d'Ariello, the original Punch.

The Christmas broadcast festivities open this year on December 20 with a Nativity play to be relayed to London and Daventry from St. Hilary's Church, Marazion.

A carillon of carols will be heard on December 22 from 2LO.

St. John Ervine's play *The Ship*, will be broadcast from 2LO, on December 19.

Cardiff begins the Christmas fun on December 20, with the Super Six, in *Christmas Crackers*.

Glasgow, in an extravagant "Trip Abroad," on December 22, will present the Radio-optimists Concert Party in *Hawaii in the Home*, *Persia in Pollokshields*, *Montmartre in the Maisouette*, and other humorous glimpses of the big world. On the same evening Aberdeen will revel in a ghost programme, to be followed by a creepy play, bearing the title, *Out of the Shadows*.

A new experiment in radio drama will be carried out in the broadcasting of *Shadows*, a one-act play, on December 15. It consists of three characters—a newsboy, a man and a woman.

Dundee district listeners are complaining about B.B.C. cockney pronunciation from London and elsewhere. Reception is imperfect because of the rapidity of the speech, and also on account of the "r's" and "h's," while it is felt to be degrading to Scottish songs to have them sung by people who put English words in place of the Scottish ones!

An example of co-operation between the B.B.C. and other public departments is being given at the Glasgow station on

December 17. Lieut.-Col. F. N. Westbury, Postmaster-Surveyor of the city, is to deliver a talk about the Christmas mail service, with hints to the public as to posting, etc.

On Christmas Eve, you are cordially invited to a party, over which Mrs. Fuggins (*alias* Mabel Constanduros) will preside, and on that evening carols again will be relayed to 2LO, from Whitechapel. On Christmas Day (Sunday), Stanford Robinson will conduct the broadcast of an oratorio in the afternoon, and an augmented military band will provide the evening entertainment. Boxing Day brings us dance music from 3.45 to 5.15 p.m. and a series of entertainments of a light character. They will include star variety, a "sheer nonsense" feature and a pantomime boasting of six plots, entitled *Pantomimicry*.

For Saturday, New Year's Eve, the London studio has prepared a review of some of the best items of the year, as broadcast on previous occasions; it is entitled "Reminiscences of 1927." The programme will conclude with Clapham and Dwyer's concert party.

Another radio phantasy by John Overton, is the main feature of the Birmingham programme on Christmas Eve and *A Legend of Vandalia*, a comediette, will be a seasonable feature for Boxing Day as the action takes place at 10 o'clock on the night of December 26 in an old baronial hall.

(Continued on page 956)



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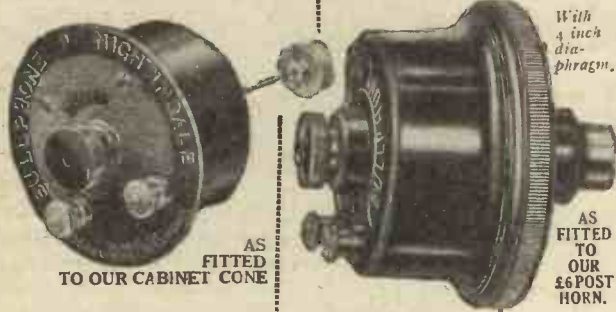
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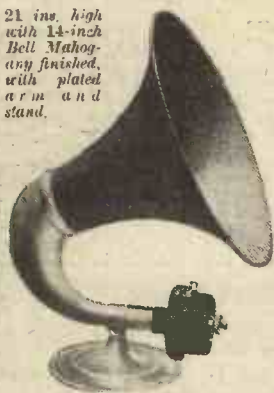


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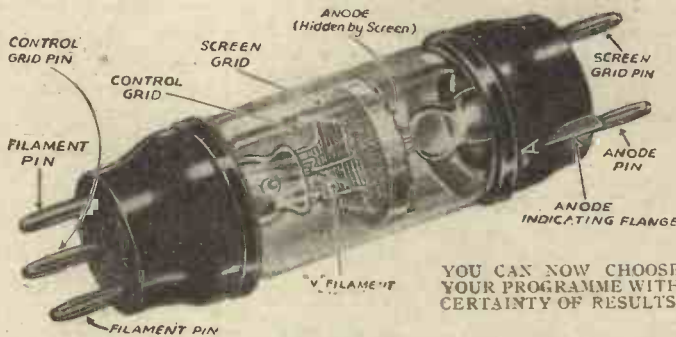
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M.B. 44

RADIOGRAMS (Continued)

LISTENERS to 5GB will be specially catered for on December 23, when a *Dream* by Stanley West will be relayed from the Birmingham studio. In the dream many of Dickens' characters will come to life to attend a present-day party given by Mr. Pickwick.

DO YOU KNOW?

1. In what part of the country police-station experimental transmissions may sometimes be heard?
2. In connection with what component is the term reluctance used?
3. Which station, to raise funds for its broadcast service, recently allowed visitors to "broadcast" to their friends for a small fee?
4. Which station, with the same wavelength as EAJ1, is a good test for the "DX" man and gives the call, "Allo Rabat"?

Puzzle your friends with these queries: the answers will be given in next week's issue of "A.W."

Answers to Last Week's Queries: (1) Huizen, Holland, 1840 and 1950 metres. (2) Hertzite. (3) Perikon. (4) PCLL, Holland, between 2 and 3 p.m. on most week-days.

Christmas Eve at Brown's is the title of the entertainment to be given by Manchester to its listeners on December 24.

Reorganisation of wireless in France is very gradually taking shape and it has just been announced that a new tax of 10 frs. (1s. 8d.) will be levied on all private owners of receiving sets. The proposal has yet to be adopted. There are no statistics available of the number of listeners in France, but it is estimated that there are 600,000. The P.T.T. should thus have an annual income of £48,000—a handsome new year's gift.

Radio-Paris, the long-wave station so well-known in England, will take on a new lease of life in a few days' time when the new studio in the Rue Francois will be opened. It is an exceptionally large studio and will accommodate an orchestra of 100 musicians comfortably. The broadcasts will still be relayed by land line to the transmitter at Clichy, in the suburbs.

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CHARGING DYNAMOS. L. & R. new 6- to 12-volt, 8 amps, shunt ball bearings, enclosed with pulley, 50/- New Mack, 0 to 12 volts, 40 amps, 25 10s. New Vaux, 22 volts, 12 amps., 25 10s. New enclosed type D.C. Dynamos, Crompton ball-bearing, shunt 30 volts, 15 amps., with pulley, 26. Slate panel for same, fitted 4-in. dial ammeter and voltmeter, 22.

50/75 volt 25 amp., L. & W. shunt dynamo, ball bearings, as new, 28. 100 volt, 10 amp., Crompton, as above, 27 10s. Ditto, 20 amp., 28.

MOTOR GENERATORS. D.C. to D.C. 220 volts to 8 volts, 1 amp., 23 10s. 240 volts to 23 volts 6 amps., 27 10s. 30 volts to 400 volts, 100 milliamps., 24 10s. 240 volts to 23 volts, 6 amps., 27 10s. Anode Converters, all sizes.

A.C. to D.C. 240 volts to 50 volts, 4 amps., 212 10s. 240 volts to 18 volts, 8 amps., 23 10s. 200 volts to 20 volts, 15 amps., 10.

ALTERNATORS. High frequency, Watford, 1 kw. 500 cycles, 23 10s. 2 kw., 500 cycles, 212 10s.

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2,000 volts, 500 milliamps.	240
2,000 volts, 1,000 milliamps.	252

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WORTH WRITING FOR

FROM A. H. Hunt Ltd., of H.A.H. Works, Tunstall Road,, Croydon we have received some leaflets concerning their electrical measuring instruments and Hellesen dry batteries.

A folder from the Benjamin Electric Ltd., of Brantwood Works, Tottenham, N.17, gives details of their improved earthing device, anti-microphonic valve-holder, H.T. battery eliminator, together with other units.

Particulars of Camden fixed condensers for transmitting and receiving sets are contained in a leaflet from the Camden Elec-

trical Co., of Stanley Chambers, Runcorn

A very attractive folder, well illustrated in colours which has been received from the General Electric Co., Ltd., of Magnet House, Kingsway, W.C.2, gives particulars of Gecophone loud-speakers.

A booklet issued by Philips Lamps Ltd., of Philips House, 145 Charing Cross Road, W.C.2, tells the story of "Mr. Milliamp" and conveys some information re the Philips H.T. unit.

EverReady flash-lamps are recommended as gifts in a booklet from the Portable Electric Light Co., Ltd., of 120 Shaftesbury Avenue, W.1.

ST. DUNSTAN'S

WE have just received the twelfth annual report of St. Dunstan's, the institute for war-blinded men.

The main pages, under the heading of "Masters of Their Fate," give striking and deeply interesting proof of the work done.

Anyone having before them the wonderful record of the work accomplished by St. Dunstan's in the past twelve years cannot fail to realise how deserving of support is this institution.

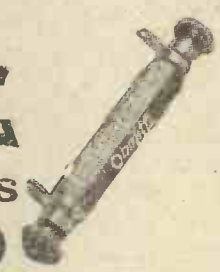
The report is most effectively illustrated by photographs of the men under training, at work, and at play.

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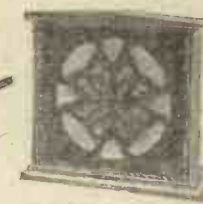
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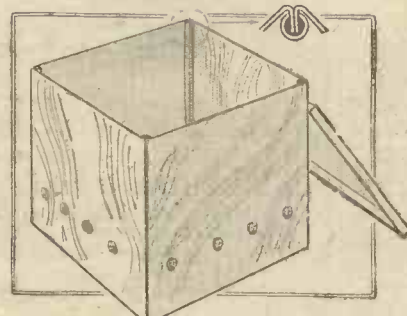
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Size 10 in. x 10 in. x 4 in. Suitable for portable self-contained sets, £2 : 10 : 0

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

R.C. Coupling

SIR,—In a recent issue of AMATEUR WIRELESS Mr. Paul D. Tyers gave a circuit employing resistance-capacity couplings. I agree that for quality the circuit is excellent, except for one important point. He showed an H.T. battery of 160 volts and gives only 120 volts to an LS5 valve. Both from the point of view of efficiency and economy of filament current, an LS5 with 120 volts is altogether wrong. The impedance is too high and the voltage given far too low. An infinitely better arrangement would be to use a DE5A with the whole 160 volts and about 20 to 25 volts grid bias.—F. G. S. (Birmingham).

The "Tetrode Three"

SIR,—Just a word of appreciation for that very fine receiver, the "Tetrode Three," described by Mr. Reyner in a recent issue of your paper.

Presently I hope to have an opportunity of giving an extended trial to the set and learning its full capabilities, but a preliminary run round the dials one evening gave me sixteen stations at or above good loud-speaker strength, some of them needing reduction of the filament temperature of the screened H.F. valve in order to permit of conversation in the same room. The tone is good, and the whole affair is a very interesting proposition.

—J. W. S. (Hitchin).

H.F. versus L.F. Amplification

SIR,—Some time ago it was stated in the "Information Bureau" page that "the addition of an H.F. stage will increase the range of your set . . . if you add a stage of L.F. amplification . . . signals from stations at present received will be considerably strengthened, but it is not probable that any other station will be brought within range of your reception."

The question of H.F. versus L.F. amplification is an old one, and I question if even now we have reached the final solution. Nearly four years ago, I built a crystal receiver, but as the nearest broadcasting station was then nearly 400 miles away, I received nothing but morse from the Australian commercial land stations. I then added two stages of transformer-coupled L.F., using dull-emitter valves, and immediately tuned in 3AR and 3LO Melbourne (400 miles), 2 FC and 2BL Sydney (800 miles), and 5AD Adelaide (100 miles). I received all these stations up to 800 miles clearly and regularly at good phone strength. On adding a third L.F. stage, I tuned in 6WF Perth (1,600 miles)

(Continued on page 960)

Polar Components
are guaranteed

The New R.C.C. Unit

The NEW "POLAR" Resistance Capacity Coupling Unit for quality of reproduction, compactness, low cost and economy of H.T. An ENTIRELY NEW



AIR-TIGHT METHOD of CONSTRUCTION ensures absolute reliability.

PRICES
Yellow Seal for High Impedance Valves, 12/6

For General Purposes:

Red Seal (1st stage) 7/6
Green Seal (2nd stage) 6/6

The Coil Unit

Twelve coils of uniform size available Wavelengths 170 to 4,720 metres. Fits valve socket. The smallest and most efficient COIL UNIT on the market.

PRICES

Carrier and 2 Coils .. 9/-
Coils .. 3/- each
Carriers 3/- each

Full wavelength table of all British and over 70 Foreign stations on application.



New Type Cam Vernier Condenser



A low-loss brass vane Condenser with brass end plates. Cam-reduction gear protected from external damage.

PRICE

.0005 .. 15/6
.0003 .. 15/-

Your dealer will show you these POLAR Guaranteed Components

Wingrove & Rogers, Ltd

Proprietors of the Broadcasting Business of RADIO COMMUNICATION Co., Ltd.

Arundel Chambers,

188/189, Strand, London, W.G.2.

Manchester—Liverpool—Glasgow—
Cardiff—Newcastle.

PLAYER'S

Plain or tipped
with cork of
pure natural
growth



10 for 6^D
20 for 11^D¹/₂
50 for 2⁵/₈ 100 for 4⁸/₈



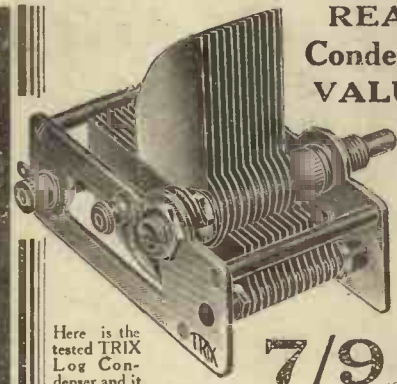
REGD NO 154011

"It's the Tobacco that Counts"

N.C.C. 325

The Government of Sweden has introduced a Bill which will give all authors of poems, short stories, etc., a royalty whenever their material is used either for broadcasting or public recital. The Bill was suggested by Ernst Diding, chairman of the Swedish Authors' Society, who stated there was more money in reciting poems or stories than there was in writing them.

The Broadcasting Association of Uruguay, composed of a number of importers and dealers in radio equipment, has been organised to finance, prepare, and broadcast a daily programme. Concerts and other numbers will be broadcast through station CWOS, operating on a 383-metre wavelength. The service is expected to start this month.



REAL Condenser VALUE

Here is the tested TRIX Log Condenser and it is ten points of perfection:

- (1) True logarithmic design of vanes.
- (2) Ball bearing.
- (3) Leather friction control.
- (4) Braided copper pistail.
- (5) Minimum ebonite insulation.
- (6) Low minimum capacity.
- (7) Terminals and tags.
- (8) One or two-hole fixing.
- (9) Copies of reports and curves by Faraday House Testing Laboratories and by J. H. Reynier, B.Sc., with every condenser.
- (10) Low price.

ERIC J. LEVER (TRIX) LTD.,
33 Clerkenwell Green, E.C.1.
Phone: Clerkenwell 3014/5.

7/9 each 0005 mfd.



The LORIOSTAT
1, 2, 3, 4, 5 or 6 valves perfectly and independently controlled by one unit.

A multiple unit superseding the fixed Resistor can be used in any circuit to control any number of valves. For downlight efficiency use a LORIOSTAT in your set.

1 way	2/-	4 way	7/3
2 "	2/3	5 "	9/-
3 "	5/6	6 "	10/3

A. W. STAPLETON, 10a, Lorrimore Buildings, Lorrimore St., Waltham, S.E.17.

GREATER EFFICIENCY & GREATER ECONOMY.

CROXSONIA PANELS

7 x 5	1/-	6 x 6	1/2
7 x 6	1/3	8 x 5	1/2
8 x 6	1/4	9 x 6	1/7
10 x 8	2/1	11 x 8	2/3
10 x 9	2/4	12 x 8	2/6
12 x 10	3/-	12 x 9	2/10
14 x 12	4/-	14 x 10	3/5
14 x 7	2/7	16 x 9	3/6
16 x 8	3/2		

have a higher electrical resistance than ebonite. Compare these prices! Why pay more for a less efficient article?

"AMATEUR WIRELESS" says: "It is not affected by heat or damp. Its electrical properties are good. The surface leakage and the insulation resistances were both found to be infinite and the material, therefore, can be used without hesitation as an insulating panel."

Panels cut to any size. Call, write, or phone Clerkenwell 7855, for quotations. Samples and prices post free to Trade.

CROXSONIA CO., 10 South St., Moorgate, E.C.2.
Agents—John Henry Smith, 139 Anlaby Rd., Hull.
L. H. Helyar, 82 Chamberlin Rd., Norwich.
A. Stredwick & Co., 27 The Market, Chatham.

MELODY MAKER 7/6, post 6d.

Insist on COILS Full Lists Made of the Best Materials obtainable, ensuring First Class Results—don't buy made by: 2d. Dud Coils.

RADIAX Ltd., Palmer Place, Holloway Road, London, N.6

CORRESPONDENCE

(Continued from page 958)

and got them all on the speaker, as well as all coastal morse stations as far as VID Darwin (over 2,000 miles). This, sir, on a bare crystal with three stages L.F.

On adding an H.F. stage, the only result was that 6WF Perth, came in louder, and the rest were easier to tune in. I might say the H.F. stage consisted of an aperiodic H.F. transformer.

There was no question of re-radiation at that time, as mine was the only receiver for a radius of at least fifty miles.

—J. P. (Baurmera, South Australia).

The "Ether Searcher Three"

SIR,—I have made up this set in accordance with the instructions contained in a recent issue of AMATEUR WIRELESS, and find it excellent in every way. The resistances recommended—viz., .25 and 3 megohms—were used, after trying other values, and were found to be the best combination. Purity of reception is most marked, and there is no lack of volume in the "E.S.T." even when compared with a set containing two really good transformers.

I congratulate you on under-stating rather than exaggerating the "getting" qualities of the set, and I do not hesitate in declaring that the "E.S.T." will bring in at least the same number of stations as any transformer-coupled three-valve L.F. set, but with greater purity.

—W. R. (Harrogate).

Another Big Ben

SIR,—"Thermion" refers to a clock striking at 11 o'clock on a recent Sunday. I, too, heard this clock, but I think I am correct in saying that it came from Kalundberg in Denmark and therefore I assume that Thermion heard Copenhagen. It was not, I think, Madrid, for I believe I am correct in saying that Spain has Greenwich time.

—F. G. S. (Birmingham).

Radio Vitus, the small broadcasting station erected at Montmartre, Paris, by a French manufacturer of wireless components, has added a short-wave transmitter to its studio, and experiments almost nightly on 37 metres.

According to the French PTT programme, a total of eighteen regional broadcasting stations are to be erected by the end of 1928. Work has already begun on a high-power transmitter at Montpellier (Herault).

REPAIRS—THREE MONTHS' GUARANTEE accompanies all our repairs. Any make of L.F. Transformer, Headphone, or Loud-speaker, repaired to maximum efficiency. 4/- Post Free. Terms to Trade.

SERVICE 24 HIGH ST., COLLIERIES WOOD, LONDON, S.W. 19. (New Address.)

TAYLEX WET H.T. BATTERIES

New Prices: Jars 1/3, Sacs 1/2, Zincs 11d. Sample doz. (18 volts) complete with bands and electrolyte 4/3., post 0d. Sample unit 6d. 16 page booklet free. Bargain list: see.

AMPLIFIERS: 1 VALVE 19/-, 2 VALVE 30/-, 2 VALVE ALL-STATION SET 24.

A. TAYLOR, 57 Studley Road, Stockwell, LONDON

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Advertisements under this head are charged **THREEPENCE PER WORD**, minimum charge **THREE SHILLINGS.**

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As the Publishers cannot accept responsibility for the bona fides of advertisers in this publication, they have introduced a system of deposit which it is recommended should be adopted by readers when dealing with persons with whom they are unacquainted. It is here explained.

Intending purchasers should forward to the Publishers the amount of the purchase money of the article advertised. This will be acknowledged to both the Depositor and the Vendor, whose names and addresses must necessarily be given. The Deposit is retained until advice is received of the completion of the purchase, or of the article having been returned to and accepted by the Vendor. In addition to the amount of the Deposit, a Fee of 6d. for sums of £1 and under, and 1s. for amounts in excess of £1, to cover postage, etc., must be remitted at the same time. In cases of persons not resident within the United Kingdom, double fees are charged.

The amount of the Deposit and Fee must be remitted by Postal Order or Registered Letter (Cheques cannot be accepted), addressed to

"AMATEUR WIRELESS,"
ADVERTISEMENT DEPARTMENT,
58/61, FETTER LANE, LONDON, E.C.4

PATENTS.—Trade Marks, Advice Handbook free.—B. T. King, Regd. Patent Agent, 146, Queen Victoria Street, London.

ACCUMULATORS.—British Manufactured, Celluloid Containers Ebonite Separators. In 2 volt units, 20 amp. 8/-, 40 amp. 7/6 60 amp. 9/-, 80 amp. 10/8, 100 amp. 12/4, 120 amp. 14/-, all post free to anywhere in the British Isles.—The Asgood Accumulator Co., Ltd., 181 Stockport Road, Manchester.

EASY PAYMENTS

We supply for 10% down (balance in 10 monthly payments), apparatus of the following brands:—

BRANDES LISEN OLDFAM DUBLIER
McMICHAEL EVERREDDY BENJAMIN LOTUS
HART S. G. BROWN FORMO EUREKA (VALVES
BELLING-LEE BURNEPT SILVERTOWN ALL BRITISH
AND NUMEROUS OTHER MAKEs.

Send list of requirements to—
LONDON RADIO SUPPLY CO.,
11, OAT LANE LONDON, E.C.2

The "RADIOLA BUREAU"

As Recommended by the Radio Press.
3 ft. high, Solid Oak or Mahogany, beautifully finished. In many sizes.

From **£5 5 0**

Sent on Approval Direct from Factory.

No need to rebuild! Will take every Set and handle batteries. Full Lists FREE

PICKETT'S CABINET (A.M.) WORKS, B.L.Y. HEATH.

The "MONOTUNE 3" is the master stroke of that genius in receiver design, C. P. Atkinson, A.M.I.R.E.

It has but one tuning dial, great electricity in volume, and has received over forty citations on the loud-speaker. The Set for the vast Majority.

Describe Circular Free. Our full catalogue, with particulars of various star sets and components for them, 2d. The "Monotune" Envelope with the fullest and most lucid description, illustrations, diagrams, template, etc., 2/8, including our catalogue post free.

RADIAX, Ltd., Palmer Place, Holloway, London, N.7

D-XELLENT!

DX-IN COILS

From 1/- **DX COILS, LTD., London, E.8**

THE LITTLE CELLS THAT SATISFY

Eton Primary H.T. Battery. P1 Porous Pot Cells, S1 and S2 Sac Cells. All complete for assembly

	1-cell.	6-cell.	12-cell.	30-cell.
P1	6d.	3/3	5/9	14/-
S1	6d.	3/-	5/3	12/-
S2	4d.	2/6	3/10	9/6

Send 11d. stamp for booklet giving full particulars to—
THE ETON GLASS BATTERY CO.
45 ST. MARY'S ROAD - LEYTON - E.10

"MELODY MAKER" COILS.

New Improved Model, complete with Stand and fixing screws, guaranteed wound to Messrs. Cossor's specification. Post 7/6 free.

KNIGHT & Co., 6 Chapel Street, London, E.C.2. Phone Clerkenwell 4715.

Amateur Wireless **COUPON**
Available until Saturday, Dec. 24th, 1927

WHY

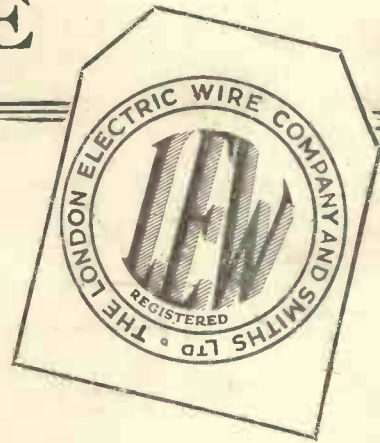
IS THE "PERTRIX PATENT LONG LIFE BATTERY" FAR SUPERIOR TO ALL OTHERS? IN THE FIRST PLACE IT IS CONSTRUCTED ON A NEW AND PATENTED PRINCIPLE. THERE IS NO SAL-AMMONIAC AND NO ACID TO ATTACK AND DESTROY THE ZINC CYLINDERS, AND SULTS OBTAINED. THE "PER-TRIX PATENT BATTERY" IS FOR ITS EX-CELLENT KEEPING PROPERTIES.

FULL PARTICULARS FROM A.F.A. ACCUMULATORS, LTD., 123 TOTENHAM COURT ROAD, LONDON, W.1. WRITE FOR THEM. "BE SURE IT'S

PERTRIX"



Be sure to see *this* mark on all **COLOURED CONNECTING WIRE**



This LEW trade mark on the label guarantees that it is the original GLAZITE Coloured Connecting Wire. Since its introduction hundreds of thousands of home constructors have proved the advantages of GLAZITE. It makes wiring simpler, quicker, more efficient, and cheaper. Always wire your sets with GLAZITE Coloured Connecting Wire. But be sure it is genuine—insist on the LEW trade mark.

Made in Red, Blue, Green, Yellow, Black and White.

Price 10d. per 10-ft. coil; 9d. per packet of four 2-ft. lengths (assorted colours).

The LONDON ELECTRIC WIRE CO. & SMITHS LTD. Playhouse Yard, Golden Lane, E.C.4

The CHEAPEST VALVE IN THE WORLD

Better results—lower filament current used—longer and more satisfactory service—Non-microphonic—all-British—greater clarity and better reproduction.

3 DAYS' FREE TRIAL

Money refunded in full if valves purchased are returned to us within 3 days.

TYPE H.F. L.F. and R.C. 2-, 4- and 6-volt. All 0.1 amps. Post Free **6/6**

TYPE POWER, 2-, 4- and 6-volt, 0.25, 0.15 and 0.1 respectively. Post free **9/-**



Beriton

Fill in the name of the Company on all Postal Orders and cross "Beriton" & Co' MERCHANTS MANUFACTURERS CO. LTD. 20 Bartlett's Buildings, Holborn Circus, London, E.C.1 Phone: City 14.9 TRADE ENQUIRIES INVITED Callers served at 23 Bartlett's Buildings (Basement)

GLAZITE BRITISH MADE REGD. THE ORIGINAL COLOURED CONNECTING WIRE

Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention



A great little condenser!

THE Dubilier fixed condenser with its di-electric of best India Ruby Mica, is hermetically sealed into its bakelite case to render it absolutely immune from the effects of damp or dust.

Before being sealed, however, the condenser element is subjected to enormous pressure, immersed in boiling wax, and kept so rigidly clamped when assembled that the excluded air can never regain entry. Finally the excellent bakelite moulding acts as an extremely high resistance and prevents losses through current "creeping" across between the terminals.

Years of experience and specialised craftsmanship go to the making of this great little condenser; see that it figures prominently in every set you build.



All Dubilier Products are fully described in the catalogue shown here. In addition there is a lot of information which you may find interesting. If your dealer has run out of copies we will forward you one free.



Dubilier Mica Condensers.
Types 610 and 6.0 (vertical):
0.0005 to 0.0009 mfd., 2/6
0.001 to 0.006 mfd., 3/-
0.007 to 0.009 mfd., 4/6
0.01 mfd., 4/-
0.015 mfd., 4/6

Advt. of The Dubilier Condenser Co. (1925) Ltd., Ducon Works, North Acton, London, W.3.

T.C.87.

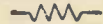
**DUBILIER
DICTA**



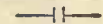
No. 4.

Truly we progress in cycles. What must have been the first wireless set to be used on active service had an aerial consisting of paraffin tin cans topped up on bottles.

The mighty spans of aerial covering acres of ground and supported on masts over eight hundred feet high denote the peak of the curve, and we are already descending again via the modern directional aerial of increasingly diminutive proportions.



If this sort of thing spreads to receiver practice we may soon expect to be building the "Cohere five" or the "Maggie Super eight."

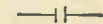


When the small accumulator was sold mostly for running trembler coils on cars, perhaps it was legitimate to rate it at double its actual capacity. Now, when we want an accumulator for valve lighting, we are careful to see that the capacity is rated in terms of continuous, not intermittent, discharge.



There is another little matter in which it will pay you to exercise a spot of circumspection.

It concerns the practice of referring to Mansbridge Condensers in terms of their "test" voltages.

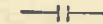


You may be perfectly safe in working a Paper Condenser at half its stated test voltage; on the other hand you may find that it deteriorates rapidly at considerably less than this figure. It all depends upon what is meant by the word "test."



But after all, "test" voltages are things that mainly concern the manufacturer.

What you are interested in is the maximum voltage at which your Mansbridge will work in safety to itself and to your set or battery eliminator.



Turn to the Mansbridge Condenser section of our catalogue (pp. 9 to 12) and you will find that for your convenience all condensers are referred to in terms of their safe working voltages.

