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Amateur Wireless

and Radiovision

Every Thursday

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Vol. XX. No. 507

Saturday, February 27, 1932

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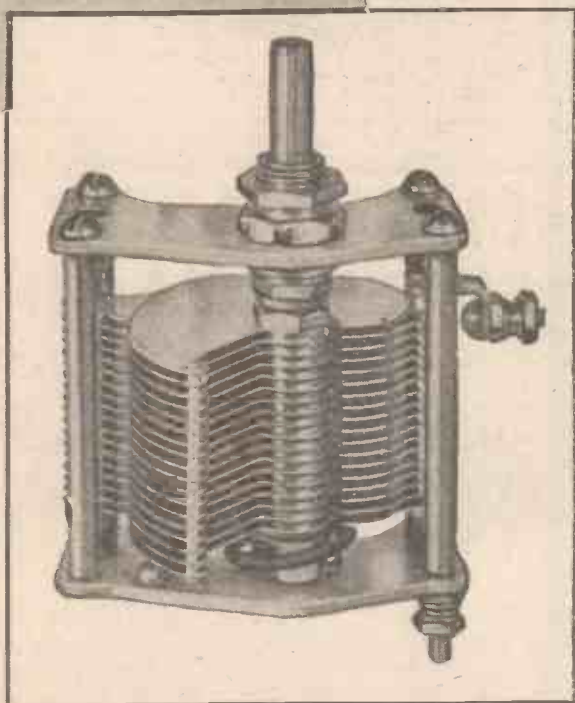
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1932 ETHER SEARCHER

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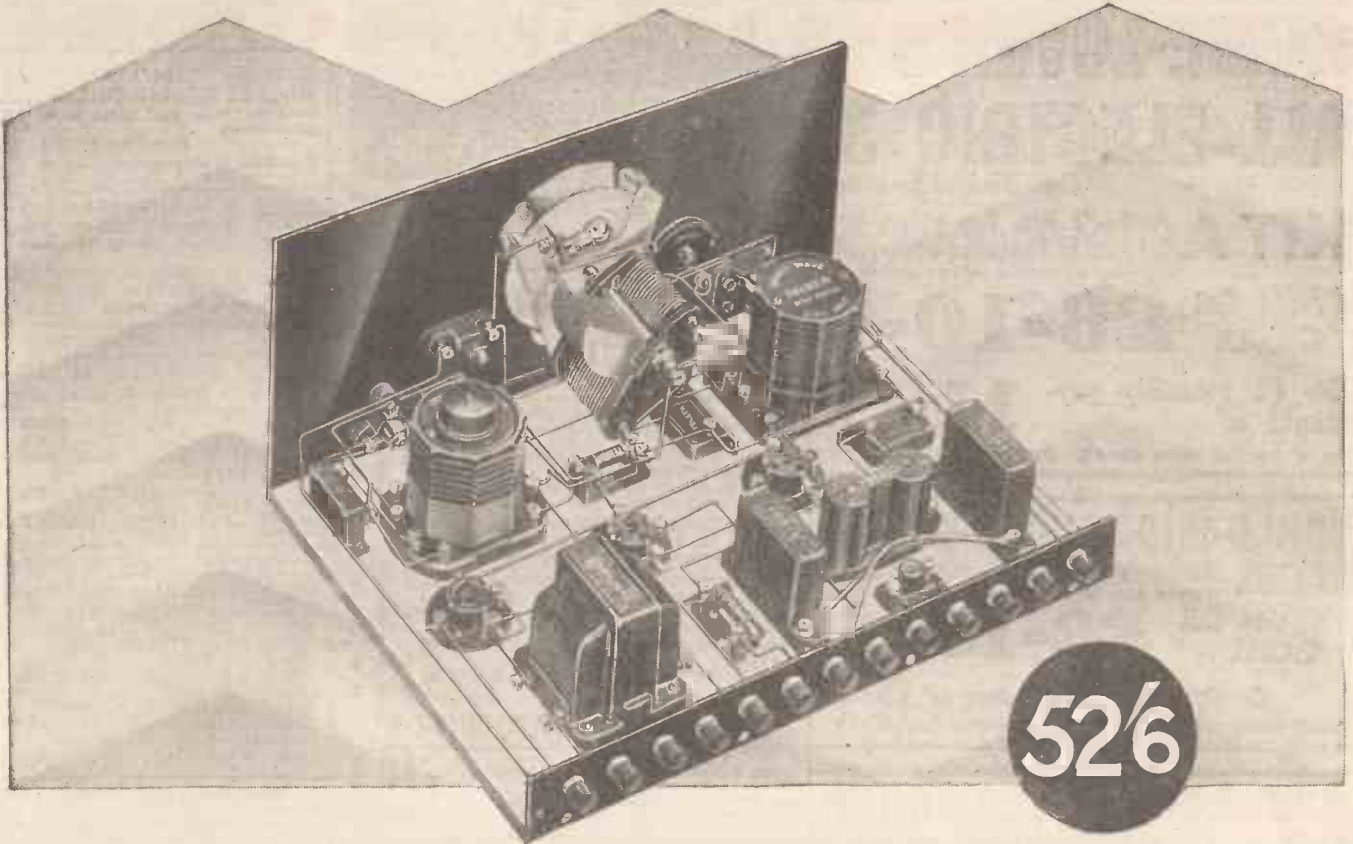
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LIST OF COMPONENTS

	q.	d.
3 Valve Holders	...	1 6
1 .0001 mfd. Mica Condenser	...	1 6
1 .0003 mfd. Mica Condenser	...	6
1 .001 mfd. Mica Condenser	...	6
1 Grid Leak, 2 meg.	...	9
1 Grid Leak, 1 meg.	...	9
2 Grid Leak Holders	...	1 0
1 Aerial Coil with 'Selectivity Adjustment'	...	7 6
1 Dual Range S.W. Coil Unit	...	4 6
1 .0005 mfd. Logarithmic Variable Condenser	...	4 6
1 .0003 mfd. Reaction Condenser	...	2 0
1 2-point Switch	...	1 0
1 3-point Switch	...	1 3
1 4-point Switch	...	1 6
1 Radiogram Transformer	...	8 6
1 50,000-ohm Spaghetti Resistance	...	1 6
1 25,000-ohm Spaghetti Resistance	...	1 0
1 .01 mfd. Manbridge Condenser	...	1 6
1 1-mfd. Manbridge Condenser	...	2 3
1 Binocular H.F. Choke	...	5 0
1 Fuse Holder	...	6
1 Illuminated Disc Drive	...	4 6
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The Telsen Short-wave Coil adds the Short Waves without coil changing



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

CVS-13



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FOR CONSTRUCTOR, LISTENER & EXPERIMENTER**

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NEWS & GOSSIP OF THE WEEK

HELPFUL HINTS

MR. PERCY W. HARRIS contributes an interesting feature to this week's issue in the form of a page of practical hints. As announced last week, he will contribute exclusively to "A.W." and "W.M." and he will have something good to tell you week by week.

OUR NEW SETS

THE Technical Staff is pressing forward with new set ideas. The all-electric three-valver described in the middle pages this week is the latest product—a complete mains-driven set with speaker and supply unit for £7 17s. 6d. Mr. Percy W. Harris has been seen conferring with the set constructors. Perhaps a "P.W.H." set is on the stocks!

JACK HYLTON'S BROADCAST

JACK HYLTON will be welcomed back to the studio by all dance fans when he broadcasts on March 1 and 2. The "wharf" studio, No. 10, has been set aside for the Hylton broadcasts, and a large audience will be present so that he will have his usual stage atmosphere. An interview with Jack Hylton on the topic of broadcasting, exclusive to "A.W.," is in this issue.

THE U.S.A. RELAY

UNSATISFACTORY other conditions prevented the recent Atlantic telephone relay from America from repeating the previous technical success. According to B.B.C. engineers, the noise level was really too high to enable a satisfactory relay to be made. We understand that the transatlantic telephone is specially modified for these music relays. When the frequency band is increased, so, unfortunately, is the noise level. For intelligible speech the frequency band of the transatlantic phone is between 300 and 2,800

cycles, but for music it is extended down to 100 cycles and up to about 4,500 cycles.

JACK PAYNE'S BROADCASTS

IN spite of several stories, there is no truth in the suggestion that Jack Payne has secured a contract with the B.B.C. for regular "outside broadcasts" when Henry Hall takes over. We are informed that Jack Payne will be heard about once a month, but that there is to be no definite series.

A NEW "MIKE"

WE have more than once been intrigued with the nature of one of the microphones fitted up in a Savoy Hill studio, and we now learn that this is an Edison microphone, being used with great success owing to the fact that it is entirely non-directional. A baffle board is used to give this effect.

SCOTTISH NATIONAL ORCHESTRA

JUDGING from the names we have seen associated with the forthcoming discussion on the formation of a Scottish National Orchestra we should say the B.B.C. is favourably disposed towards the project. While we have every sympathy with the aims of those who have Scotland's musical interests at heart, we cannot help feeling that there would be a good deal of discontent, to put it mildly, if Scottish Regional got a National Orchestra, while North, Midland, and West regions have to put up with mere studio nonettes!

REGIONAL NEWS

SO the roof is now on at the Falkirk building housing the Scottish Regional stations! Well, now we must wait patiently until March or April for first tests. The foundations have been well and truly laid for West Regional at Washford Cross, so the end of the regional scheme is well in sight—should we say completion, rather than end? Subtle!

AT NUMBER TEN

WE learn that when Sir Thomas Beecham conducts the Delius "Romeo and Juliet" programme on May 20, he will do so in No. 10 studio. This looks as though the B.B.C. is not particularly sanguine about the prospects of getting into the big studio at Broadcasting House—until the summer, at least.

STILL WANTED

ALTHOUGH many would-be broadcasters are bemoaning the fact that musical auditions have been cancelled for at least six months at Savoy Hill, and for three months even in the provinces, the B.B.C. issues a gentle reminder that the National Chorus can still do with some really good "warblers." And the Vaudeville Producer still welcomes comic turns, if not with open arms, at least with an optimism that will not be denied.



An amateur television transmitter. Miss Ann Miller, a popular American television "subject," at the controls of a commercial amateur television outfit which is designed for linking-up with a short-wave telephony transmitter

NEXT WEEK: A WIDE-TUNING TWO—EASY TO BUILD

NEWS & GOSSIP OF THE WEEK — Continued

THE REPERTORY STUDIO

THE new B.B.C. studio at Sir Barry Jackson's Repertory Theatre, Birmingham, is being used more often now. It is fitted up with permanent microphone amplifiers and signal lights so that radio play rehearsals can be given there. Mr. Henry Ainley is broadcasting from this studio on Sunday, March 6.

BROADCAST DANCE BAND CONTESTS

DID you tune in to the Dance Band "marathon" broadcast by all the German stations of the Berlin chain last week? This contest of Berlin's leading dance bands was held in a West End Theatre, the Admirals Palast and was broadcast continuously by all stations.

DELIUS LISTENED

WHEN the great Delius choral work "A Mass of Life" was broadcast from a Hallé concert, Delius, who is now blind and living in France, tuned in on his seven-valver to the North Regional programme and heard the performance. When he wrote the Mass he never expected to hear it performed, as he is a confirmed invalid.

RUSSIAN OPERA

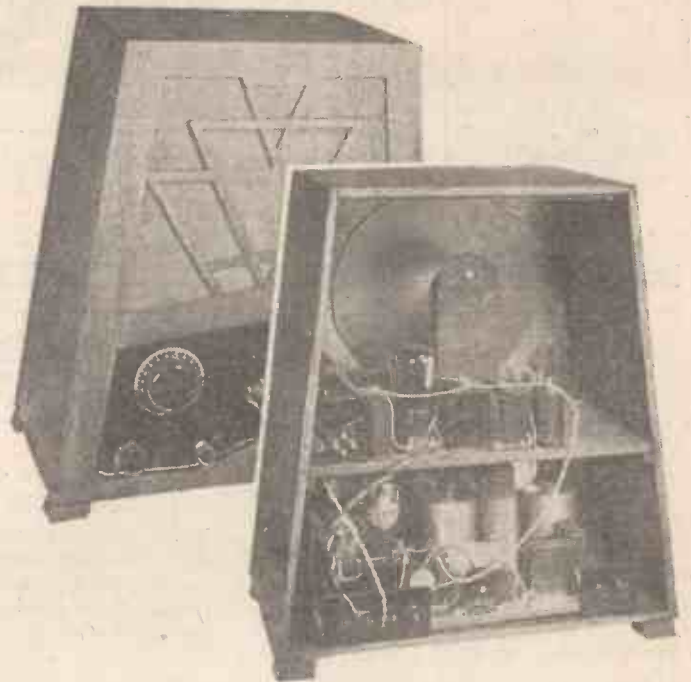
OPERA lovers will be pleased to hear that the Leningrad State Theatre is to broadcast opera. Others may not be so pleased! The Soviet officials have arranged for a number of stations on the

Reichs Rundfunk chain to rebroadcast, via Leningrad. The Wagnerian opera *Gotterdammerung* was recently heard in this way, emanating from Russia.

SUNDAY PROGRAMMES

THE B.B.C. flatly denies that there is any truth in the story recently put out by a London evening newspaper

The new "Home-Lovers' All-electric 3," first details of which are given in the centre pages this week. The modern technical features of the new set include selective tuning, all-mains operation, console layout, integral speaker and remarkable simplicity of construction. The total cost, less valves, is £7-17-6



"BRIGADE EXCHANGE" AUTHOR
THE author of the popular play *Brigade Exchange*, which was given in the last series by the B.B.C., is Ernst Johannsen,

who is now broadcasting through all German stations a spoken version of a new futurist play, *Station Three*. It is understood that the B.B.C. is considering this with a view to broadcasting. It deals with troubles in a huge electric-power station.

to the effect that Sunday programmes would be drastically altered. Here is the categorical denial: "There is no new programme appointment. The musical programmes on Sundays will continue as at present. The Sunday talks policy remains unchanged. There will continue to be two religious broadcast services in the evening. The 6-7 p.m. period on Sunday evening will not be filled in. As already promised, *Othello* will be broadcast on March 13, but there will be no regular Sunday play schedule."

MOVING IN TO BROADCASTING HOUSE

IT has now been officially decided that the general exodus from Savoy Hill to Broadcasting House will start during the last week in March and will continue throughout April. The last Savoy Hill programme should therefore be broadcast by the end of April.

FAREWELL TO SAVOY HILL

IN preparation for his "Last Programme," to be broadcast when the studios of Savoy Hill are finally closed down, Lance Sieveking is having records made of "voices of the past" such as Rex Palmer, the one-time London announcer, A. J. Alan, who is, of course, still very much a voice of the present, and Archie Haddon, who was the first dramatic critic the B.B.C. engaged.

Israel in Egypt will be given on March 3 from a studio, Stanford Robinson conducting.



"I made it myself and I call it the 'Gate-Crasher Four'!"
"Why 'Gate-Crasher'?"
"Because its reception's rotten!"

RETURNING THE COMPLIMENT

THE B.B.C. is preparing some special programmes to be relayed by the Columbia system to American listeners, by way of returning recent relays. The first of these programmes will be taken by America over the transatlantic 'phone at the end of March or the beginning of April. The heavier type of chamber music and symphony concert will be excluded from these programmes—by special request.



PERCY W. HARRIS OFFERS A FEW TIPS

HAVE you ever thought how easy it is to accept a statement and, if it seems plausible, how hard it is to question it? As a matter of fact, many important inventions have been made because someone has said to himself, "Yes, that sounds all right, but is it really so?"

I had a lot of trouble once with a piece of apparatus designed for a special purpose and containing a compass needle. Super-heterodynes were just emerging from the experimental stage and frame aeri-als were the rule for such receivers. I wanted to set the frame accurately for north and south, but the compass needle persisted in pointing almost due west.

Taking It for Granted

Now you can deflect a compass needle by means of a field from a coil, so I had taken precautions to see that no current was flowing nearby. It can also be deflected with a second magnet or any piece of iron or steel. Iron and steel had been carefully barred and yet that wretched needle was being deflected by *something*! And the something was a metal plug which I had turned out of brass rod.

Now brass, you will say, is non-magnetic. You learnt that at school. You probably never questioned it. The statement is true enough when brass is made from copper and zinc, with no impurities, but it often happens nowadays that the makers of this metal include a certain amount of iron, which, I am told, facilitates working.

**PERCY W. HARRIS
CONTRIBUTES EACH WEEK
TO "A.W."**

Whatever the reason may be, there was certainly enough iron in this particular piece of brass to deflect the needle, so I began a systematic test of all the brass around my laboratory.

The answer, briefly, was—not far! If you take a magnet and try it in a box of small brass screws you are quite likely to find a number attracted. Of course, I am not referring to the so-called "brass" rod, which is merely iron with a thin layer of brass covering it, for this, of course, will show magnetic effects normally. If I had not been a questioning kind of person, I should have assumed at once that brass could not possibly affect the needle and

should have hunted elsewhere in vain.

Ebonite and Insulation

Next, consider the question of ebonite. It is a very fine electrical insulator, as numerous careful laboratory tests have shown, but it may not always *remain* a good insulator, as I found to my cost upon returning from America recently. Looking round the "lab" to see how the apparatus had fared in my absence, I found a large and fairly high-voltage high-tension dry battery completely ruined, obviously by a "short." The only leads from it were taken to plug sockets mounted in a sheet of ebonite, which formed the front of a piece of testing apparatus. These plug sockets could be considered merely as extensions of the sockets in the insulating material of the battery itself. Tests showed that the surface of the ebonite was highly conducting, the cause of the trouble (I was really, myself, to blame) being that the apparatus had been exposed to sunlight for a long period; the light had caused a surface deterioration of the ebonite, with the production of sulphuric acid and other substances which in themselves are highly conducting. This conducting surface shorted all the plugs.

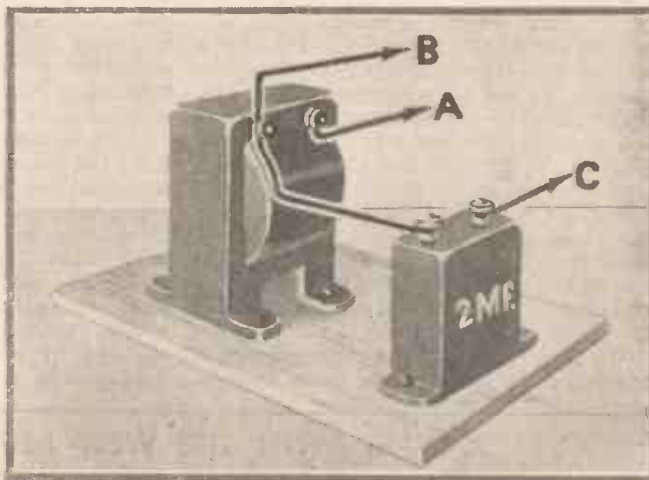
If you have any wireless apparatus in which the ebonite panel is more than a mere support and happens to connect two parts of the apparatus at different potentials, take my tip and keep it out of the sunlight, for, sure enough, it will deteriorate and may let you down badly, either by causing a high-tension leakage or by shunting away a lot of energy which ought to go elsewhere. If you have a set in which the ebonite is badly discoloured it is quite a good plan to fit a new panel. Good high-grade ebonite is inexpensive in these days.

A Set That Went Off

I dropped in, the other night, to see a friend whose wireless set was—well—not quite up to the scratch, shall we say! He

apologised for the quality, which entirely lacked brilliance and blurred speech badly, by saying that he was going to get a new speaker. I asked him whether he was sure it was the speaker, and he replied he was certain, as he had changed the valves and everything else and no improvement resulted.

"I know it is the speaker," he said. "It used to work splendidly, but it has been going off steadily for some time now. When I tried my cousin's speaker the other day on this set the quality was fine, so that



A simple choke-condenser output was fitted to the set

proves it is not the set."

"Is it really so?"

Just then there came into my head that phrase that has helped me so often in the past, as I hope it will help you: "That sounds all right, but is it really so?" The set was of good sound design, of which many thousands have been made; the layout and parts were good and the circuit a simple detector, with two low-frequency stages (one resistance and one transformer coupled), the output valve being connected direct to the speaker. I had my suspicions of what was happening, so I asked permission to rummage in his "wireless cupboard."

His wife was horror-struck at the idea of any visitor seeing his "disgusting collection of rubbish," as she called it, but with a little tact we overcame her qualms and
(Continued at foot of next page)

HOW IT IS DONE

Switching On the B.B.C. Gramophones

GRAMOPHONE music is taking a greater part in the B.B.C. programmes, and very shortly more gramophone music will be used during programme intervals in place of the electric clock ticking.

Many people imagine that there is only one gramophone at Savoy Hill. That is quite wrong. There are several



One of the gramophone playing desks in the studio.

gramophones, and at least three can be used at a time.

At Broadcasting House a new gramophone room is being fitted up and it will be possible to have twelve gramophones running simultaneously! Probably it never will be necessary to have them all going at once, but when the gramophones are used for creating "effects" in radio plays two or three must be going at the same time so that the noises on each of the records can be "mixed."

When you hear the noises of a "fun fair" during a radio play, for example, the three gramophones will be working together. A record of band music will be running on one, crowd noises will be playing on another and special effects, such as steam whistles and loud shouts will be on the third record.

One of these "effects" gramophones is in the No. 2E studio in the basement

of Savoy Hill, the room specially reserved for the manufacture of radio play noises.

A control desk on another floor has a number of wire-wound potentiometers on it, connected up in a similar manner to the volume control of a radiogram.

By turning the knobs of these wire-wound "pots" the noise of any record can be brought up to full strength. The crowd noises can be subdued to a dull murmur, the band music faded in and out to convey the impression of movement through the fun fair, and the staccato noises of the steam whistles brought in at intervals—all at the twist of a knob.

In a metal file in the 2E room there are over six hundred gramophone records of practically every kind of noise, from the firing of shots during a revolution, to the cooing of pigeons!

"PERCY W. HARRIS OFFERS A FEW TIPS"

(Continued from preceding page)

before long I had ferreted out a disused low-frequency choke and a 2-microfarad condenser. While the soldering bit was getting hot on the gas stove ("Fancy you letting Mr. Harris see our kitchen like this!"), we cut off a piece of wood, 4 in. square, from an old baseboard and screwed the choke and condenser to it. I then cut a piece of electric light flex about 6 in. long, untwisted it so as to make two leads, bared the ends, and screwed one end of each lead under the choke terminals. A short length of wire was then soldered to one of the condenser terminals, the other end of this wire being screwed under one of the choke terminals.

We then went into the other room, disconnected the loud-speaker leads, brought

them into the kitchen, and soldered one of them (one only) to the free condenser terminal, leaving the other wire disconnected for the moment. Of course, if the condenser had not been of an old-fashioned type, with soldering lugs and no screw terminals, we could have avoided soldering altogether, for most modern 2-microfarad condensers have good stout terminals to save soldering.

Back in the dining-room again I lifted the lid of the set to see which loud-speaker terminal was connected to high tension and which to the plate of the output valve. We then connected the short lead A to the loud-speaker terminal which went to H.T.+ and the lead B to the L.S. terminal connected to the plate of the valve. Lead C, which, you will remember, is the one we soldered to the condenser, formed one loud-speaker lead, while the free loud-

speaker lead was joined to the earth terminal of the set. We then switched on.

An All-round Improvement

To say that my friend was pleased would be to put the case mildly, and the tone of reproduction was so much improved that his wife almost forgave him for being a wireless enthusiast. Of course, the more experienced reader will recognise at once that all I had done was to provide the set with a standard choke-condenser output, without in any way altering the interior connections of the set. This little filter-output was tucked away behind the receiver out of sight and no other alterations were necessary. There is, of course, nothing new in the scheme, but I have found that so many sets can be improved in this way that new readers may think it well worth trying.

Naturally, if your set has already a choke or transformer output, this scheme will be valueless, but I can say that with a direct-coupled set which shows any tendency to instability (and this often happens when a high-tension battery eliminator is fitted), this kind of output device will invariably bring about a marked improvement.

When a set becomes so unstable that it "motor-boats," the user recognises at once that something is wrong, but when the instability is slight it may still spoil the quality without the cause being recognised. When my friend's high-tension battery was new and, therefore, had a low internal resistance, the set was quite stable and the quality good, but as the high-tension battery gets older its internal resistance goes up and the tendency to instability increases. Sometimes you will find a set stable with one loud-speaker and unstable with another, which accounts for the fact that my friend's test with his cousin's loud-speaker gave such good results.

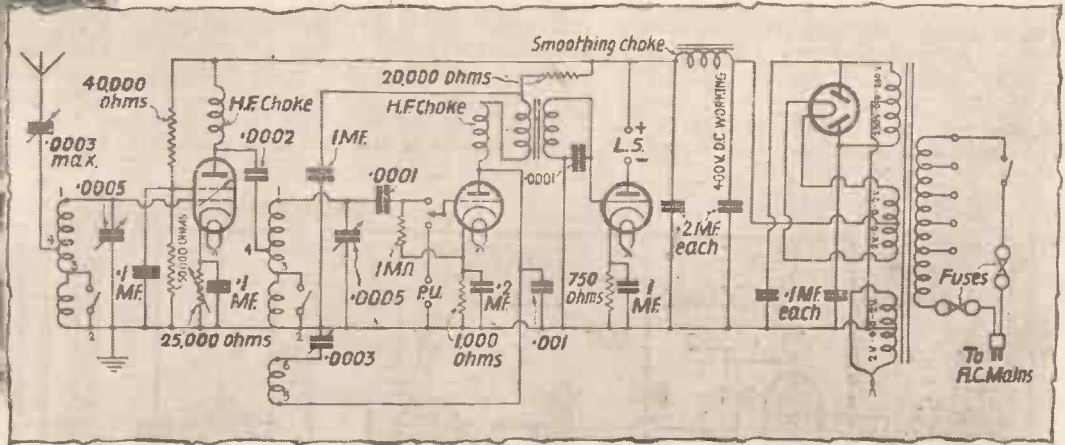
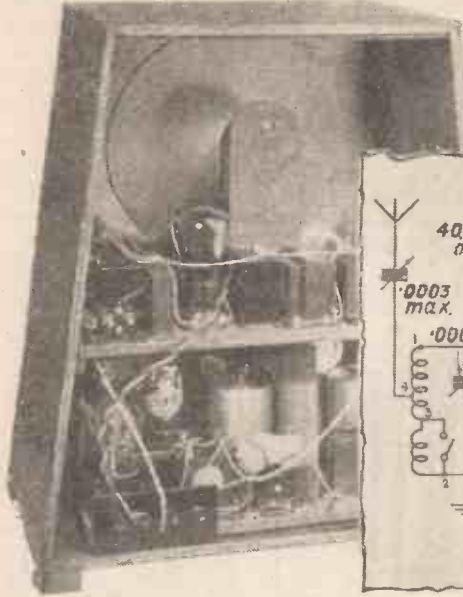
But I see my space is all used up. Next week I will try and tell you some of the interesting things I found out about loud speakers a few months ago in one of the finest sound laboratories in America.

A START WITH THE WEST REGIONAL



Rapid progress is being made at Washford Cross, where work is in hand for the new West Regional transmitter. The excavations are here being made for the foundations to carry the building and the heavy machinery

HOW THE "HOME-LOVER'S ALL-ELECTRIC 3" WORKS



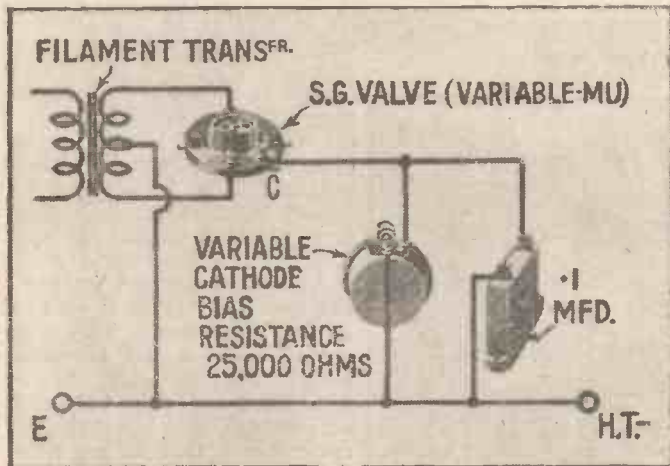
A simple explanation by Alan Hunter of the circuit principles employed in the all-electric console fully described this week in our centre pages. Even if you are not an intending constructor of the set you will find this article of great interest

I AM particularly glad to be able to give readers an explanation of the circuit used in the "Music-lover's All-electric 3," since this set forms such a fitting sequel to my recent "A.B.C. of All-electric Radio" series. In the new set, the construction of which is very fully described elsewhere in this issue, a very modern three-valve A.C. mains circuit has been

Before doing so let us be quite clear that the valves are arranged as one high-frequency amplifier, followed by a detector, which is transformer-coupled to a power output valve. These valves are all of the indirectly-heated type. That is to say, the electron emitter is indirectly heated by means of a heater filament fed with "raw" A.C. from the mains, which are stepped down from whatever the supply voltage may be to four volts. In addition to these three valves there is a fourth valve, and this is the mains rectifier, whereby the A.C. is converted at high voltage into D.C. supply for the anode feeds of the three receiving valves. So much for the bare outline of the circuit arrangement.

is used mainly to vary the degree of selectivity. Thus, when receiving foreign stations on wavelengths well away from the local stations there is no need for the utmost selectivity and greater signal strength can therefore be obtained by increasing the capacity of the pre-set condenser. By this means more of the signal energy is transferred to the aerial-tuning circuit, and consequently a larger signal is applied to the input of the screen-grid valve.

VOLUME CONTROL



This pictorial diagram shows the main essentials for obtaining volume control with a variable-mu screen-grid valve. The circuit arrangement shown here is exactly as used in the "Home-lover's All-electric 3" set. It will be seen that a 25,000-ohm variable resistance is connected between the cathode of the screen-grid valve and the earth line. This resistance is shunted with a .1-microfarad fixed condenser

employed. It has many notable technical features, but I think the simplest way to explain the circuit is to deal with each valve stage in turn.

The aerial is connected to a tapping on this coil through a .0003-microfarad variable type condenser. In passing, I should mention that the series condenser is a panel control and

The Variable-mu Valve

Now we come to one of the important circuit features of the "Home-lover's All-electric 3." I mean the variable-mu screen-grid valve, which, owing to its special form of construction, enables the sensitivity to be varied over wide limits without introducing distortion.

You probably know that with the ordinary type of screen-grid valve a small signal input tends to be distorted under normal operating conditions and a large signal is equally difficult to handle owing to partial rectification. With the variable-mu valve sensitivity is readily controlled by varying the grid bias. As this valve is indirectly heated, the negative bias is applied to the control grid by making the cathode so many volts positive with respect to the grid, at the expense of anode volts.

The volume control is therefore extremely simple with this type of valve, for all that is needed is a 25,000-ohm variable resistance in the cathode lead as shown. This resistance is shunted by a .1-microfarad fixed condenser.

Because the volume is controlled by varying the grid bias, we can provide a fixed voltage for the screening grid of the

The cost of the set is £7-17-6—and there are no maintenance expenses

"HOW THE 'HOME-LOVER'S ALL-ELECTRIC 3' WORKS" *(Continued from preceding page)*

screen-grid valve instead of varying the voltage by means of a potentiometer, a method much used with the ordinary type of valve.

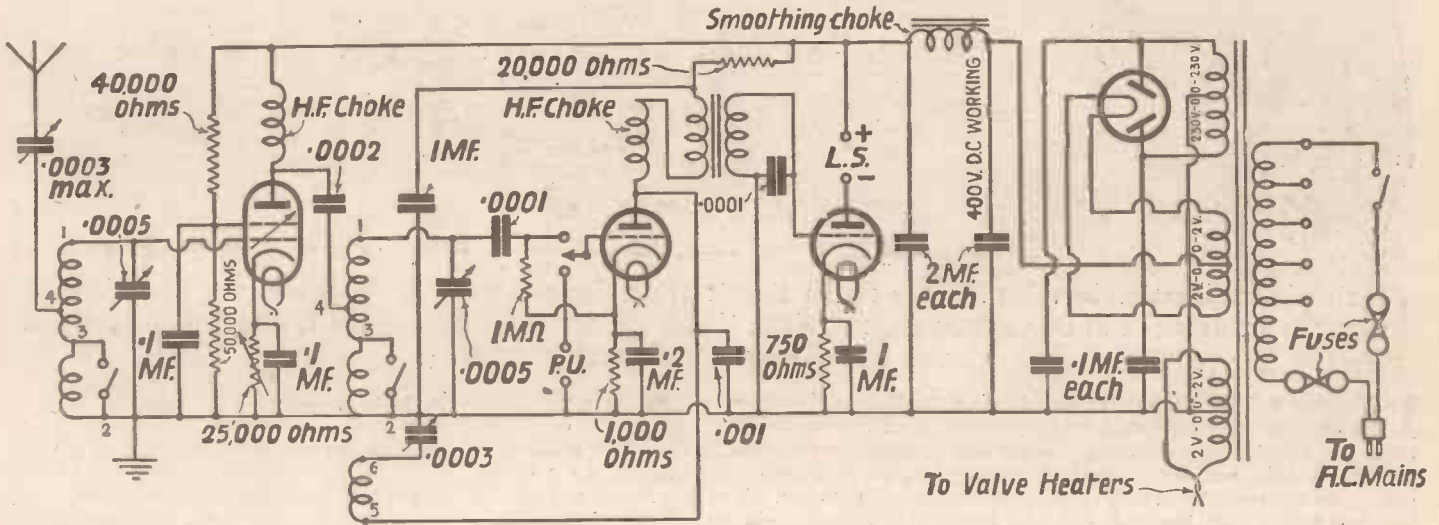
As there is a maximum voltage of nearly 200 volts available, a fixed potentiometer with almost a centre-tap will give the right voltage for the screen. Thus, we connect a 40,000-ohm resistance in series with a 50,000-ohm resistance across the high-tension supply, taking the screening grid to the junction point. This means that about 70 volts is applied

type and are totally screened. Separate tuning condensers are provided for these circuits, but as the coils are so similar, the dial readings for any given station are approximately the same.

Let us pass along to the detector itself. Here we find conditions for power-grid detection. The grid condenser is of .0001-microfarad capacity and, in conjunction with the 1-megohm grid leak, this effectively prevents frequency distortion. The lower end of the grid leak is connected to the cathode of the valve, so that zero

all-electric set for gramophone-record reproduction, provision has been made at the detector stage for this extra facility. A simple gramophone changeover switch has been inserted, so that when the grid is connected to the gramophone position it is negatively biased, since the pick-up then brings into effect a 1,000-ohm bias resistance in the cathode lead. Note that this resistance is shunted by a .2-microfarad fixed condenser.

For power-grid detection it is now enough merely to provide suitable grid



Here is the theoretical circuit diagram of the "Home-lover's All-electric 3," which consists of a screen-grid high-frequency stage, a power grid detector and a transformer-coupled power output stage. The valve on the extreme right is the mains rectifier

to the screen, which is de-coupled by means of another .1-microfarad fixed condenser.

We come now to the method of coupling the screen-grid valve. This is achieved by the very popular tuned-grid system, whereby a high-frequency choke is inserted in the anode circuit of the screen-grid valve, so that the voltage developed across it can be handed on to the grid-tuning circuit of the detector valve through a small coupling condenser. This condenser is, of course, essential to prevent the high-tension supply from being short circuited, as it would be if the anode of the screen grid valve were connected directly to the grid tuning circuit of the detector. A capacity of .0002-microfarad has been chosen for this coupling and it is very important to note that it is connected to a tapping on the grid-tuning coil and not to the grid end of this coil.

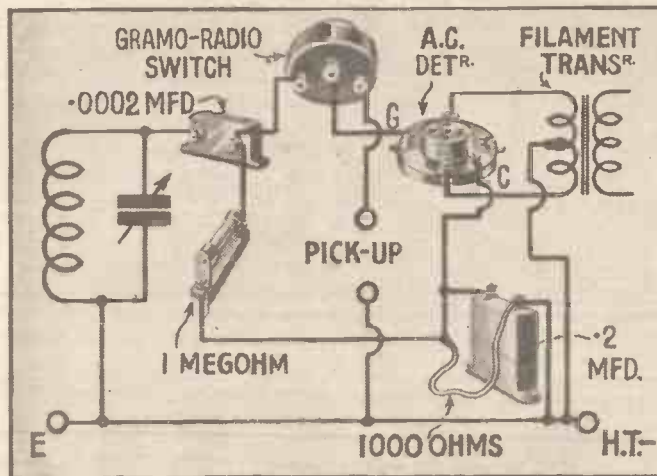
This tapped tuned-grid system provides really remarkable selectivity, and so great is the over-all amplification available that the slight loss of signal strength is certainly not appreciable.

The grid-tuning coil is very similar in construction to the aerial-tuning coil. Both coils are of the simple dual-range

bias is applied. This is the normal condition for grid detection with an A.C.-mains valve.

As many readers will want to use this

GRAMO-RADIO SWITCHING



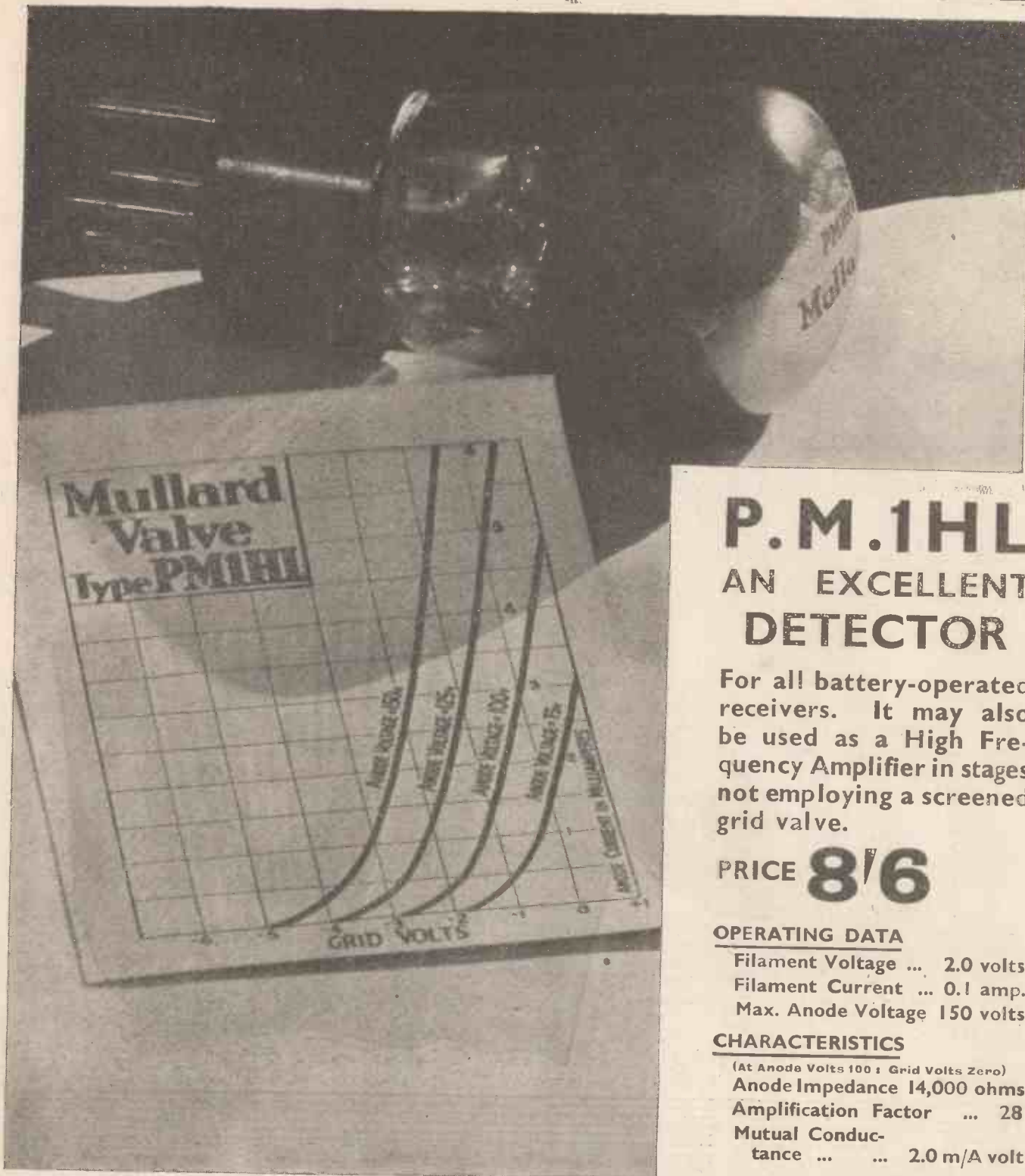
This pictorial diagram shows the method of gramophone-radio switching in the "Home-lover's All-electric" set. It will be seen that a three-point change-over switch is used with the grid of the detector valve connected to the centre point. One of the other points goes to one side of the pick-up, the other side of the pick-up being earthed. The remaining connection of the gramophone switch goes to the grid-leak-and-condenser connection. It should be noted that the lower end of the grid leak is connected to the cathode of the detector valve and that this cathode goes to earth through a 1,000-ohm bias resistance shunted by a .2-microfarad fixed condenser. When the gramophone switch is moved to the gramophone position the cathode is positive with respect to the grid, so negative grid bias is actually applied. When the gramophone switch is moved to the radio position the bias resistance is inoperative and the grid is then at zero potential with respect to the cathode.

leak and condenser values—the valve must work as an efficient power amplifier as well. For this reason as much voltage as possible is applied to the anode by decreasing the value of the de-coupling resistance in the anode circuit to 20,000 ohms. There is thus about 100 volts H.T. actually on the anode of the valve—considerably more than is usually obtained in a battery set with lower maximum high-tension supply and a higher decoupling resistance.

Another important feature of the detector circuit is an anode by-pass condenser. This is connected between the anode and earth. Its capacity of .001 microfarad may seem to be rather on the high side, but it should be remembered that we are dealing with a power-grid detector, of which the considerable damping necessitates a large by-pass condenser to give maximum detection efficiency. There is no appreciable loss of the higher audible frequencies with this by-pass condenser capacity.

The last point to note about the detector is the provision of reaction, by the usual arrangement of a reaction condenser in series with a small winding coupled to the grid-tuning coil.

(Continued on page 462)



P.M.1HL

AN EXCELLENT DETECTOR

For all battery-operated receivers. It may also be used as a High Frequency Amplifier in stages not employing a screened grid valve.

PRICE **8/6**

OPERATING DATA

Filament Voltage ... 2.0 volts
 Filament Current ... 0.1 amp.
 Max. Anode Voltage 150 volts

CHARACTERISTICS

(At Anode Volts 100 ; Grid Volts Zero)
 Anode Impedance 14,000 ohms
 Amplification Factor ... 28
 Mutual Conductance ... 2.0 m/A volt

MADE IN ENGLAND

Mullard

THE · MASTER · VALVE

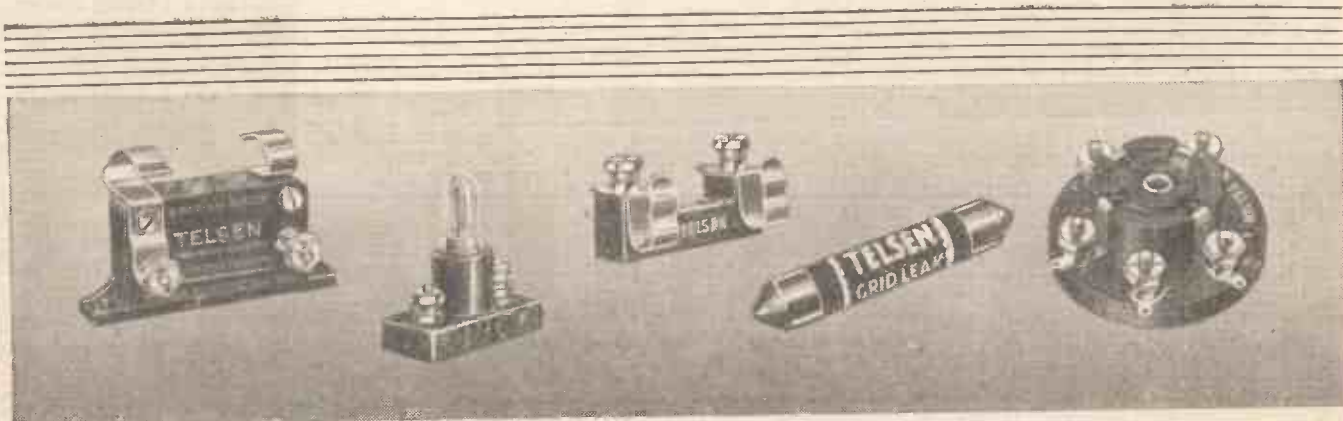
Advt. The Mullard Wireless Service Co., Ltd., Mullard House, Charing Cross Road, London, W.C.2

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

ARKS

NEARER CLEARER

MORE LIVELY THAN BEFORE



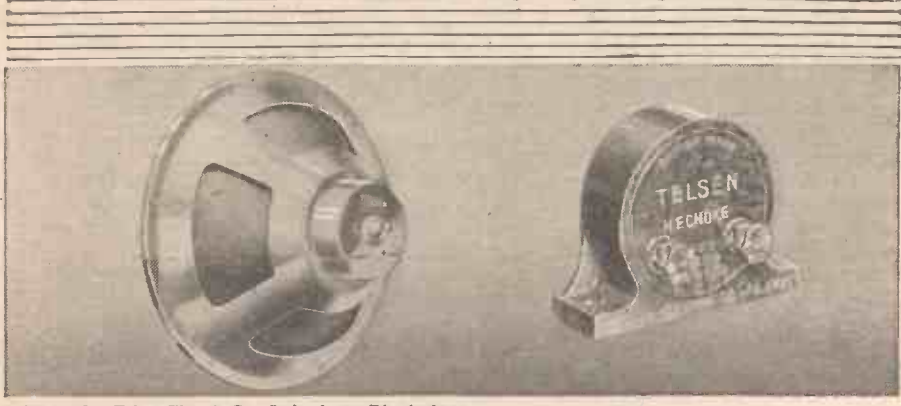
To Ensure Speedy Delivery, Mention "A.W." to Advertisers

“CHANGING over to Telsen is like taking the wool out of your ears”—that is the verdict of an enthusiastic Telsen constructor which inspired the illustration on the opposite page. Telsen Components in your set give you a realism which is astonishing—they enable you to sit back and HEAR, without straining forward to listen—they bring every item on the programme “nearer, clearer, more lively than before.”

L.F. Transformers	from	5/6
Output Transformers .. .. .	.. .. .	12/6
L.F. Chokes	from	5/-
Output Chokes	from	8/-
Binocular H.F. Chokes .. .. .	.. .. .	5/-
Standard H.F. Chokes .. .. .	.. .. .	2/-
(18l) Loud-speaker .. .. .	.. .. .	10/6
Fixed Condensers .. .. .	.. .. .	6d.
Mansbridge Type Condensers	from	1/6
Valve Holders	4-pin, 6d., 5-pin, 8d.	
Grid Leaks .. .. .	.. .. .	9d.
Grid Leak Holder .. .. .	.. .. .	6d.
Fuse Holder .. .. .	.. .. .	6d.
Telsen Screens	2/- and 2/6	

TELSEN

100% BRITISH
RADIO COMPONENTS



Advt. of The Telsen Electric Co., Ltd., Aston, Birmingham

CVS—123

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

EVERY BATTERY-SET SHOULD NOW HAVE "PENTODE OUTPUT"



THE Lissen Power Pentode Valve takes no more current than any ordinary power valve. It consumes actually only 7 m/A of H.T. current and can be run economically off ordinary batteries. **THERE IS, THEREFORE, NO REASON WHATEVER WHY EVERY BATTERY-DRIVEN SET SHOULD NOT EMPLOY THIS POWERFUL LISSEN VALVE.**

If you want extra volume, try this valve. If you want all the foreign stations at full loud-speaker strength, try it. Particularly in conjunction with a cone loud-speaker try this Lissen Power Pentode Valve—it produces a new brilliance of tone which pleases every ear and automatically corrects the tone balance of the music.

You do not have to alter the wiring of your set at all. You do not have to increase the battery power. This one valve gives you much more volume, much clearer, louder, finer radio altogether. Ask for the Lissen Economy Power Pentode **12/6** P.T.225. **PRICE**

The **LISSEN**

THE LIVELY LISSEN DETECTOR

If you want to liven up your tuning—if you want extra range, greater sensitivity—get a Lissen Detector Valve for your set. You will find its lively responsiveness bringing in the foreigners like magic.

Match it up to a well-built set and work it in harness with other suitable Lissen valves, and you will be amazed at the results you get, the distance-searching you can do. Ask for Lissen H.L.210.

5/6 **PRICE**

**ECONOMY
POWER
PENTODE**

LISSEN LIMITED . WORPLE ROAD . ISLEWORTH . MIDDLESEX

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

On Your Wavelength!

HAM-HANDED HENRY FOR IT

THE lay papers have made quite a feature of the fact that in certain instances the G.P.O. has cancelled the licences of confirmed oscillators. I am very glad that it has done so and the publicity may serve as a further deterrent. The howler to-day cannot plead ignorance. If his squeals and yells are not the product of malice aforethought, they are certainly due to a total lack of consideration for his neighbours. Unfortunately, though, the penalty of having your licence cancelled is not nearly so severe as at first sight it might seem. So far as I know, there is nothing to prevent the fellow to whom this happens from walking round to the nearest Post Office and buying another. In effect, then, the procedure is to inflict upon him a fine whose maximum amount is ten shillings, but it may run to only a few pence if his licence has but a short time to go.

THE BIG RELAY

THE wonderful relay of Monday, February 15, was, without a doubt, the biggest thing of its kind that has ever been attempted. The newspapers were probably not far out in estimating the size of the audience at a hundred millions. All wireless-set owners in Canada, the States, South America, and in most European countries had the programme on tap from their local stations. But it was also sent out by short-wave transmitters of world-wide range, and there is no doubt that it was picked up at places all over this globe of ours. It is a pity that the concert was considerably interfered with by atmospherics, which at times were bad enough to make reception quite poor. Atmospheric interference is an event whose occurrence no one can foretell, and it remains one of the greatest of all problems in wireless transmissions on short, medium, and long wavelengths. From time to time comes the news that somebody has invented a device for eliminating atmospherics, but one never seems to hear any more of these contrivances after the preliminary announcements. Some day, I suppose, we shall master the atmospheric, just as we shall find a means of dealing successfully with the problem of fading.

MAGIC WORK.

THE relay was an astonishing achievement, when you come to think of the terrific difficulties involved. Thousands of miles of carefully balanced land-line were required for over-land transmission; cables were used for the relaying from this country to Europe, and the wireless link served to connect New York with London. We may pride ourselves on the fact that, though the broadcast was made from America, London formed the most important link in the broadcast chain.

Thanks to our development of the wireless telephone services, London is now the world's telephone exchange. Any call put through from the New World to the Old, or from the Antipodes to this side of the earth, must go through London.

RUNNING COMMENTARIES

WHAT a splendid diversion for wet Saturday afternoons, when one is confined to the house, those running commentaries of sporting events provide! Or perhaps I ought to re-write that sentence to read: How often those splendid commentaries of sporting events confine us to the house on fine Saturday

WHAT PERCY W. HARRIS SAYS OF THE "HOME-LOVER'S ALL-ELECTRIC 3"

THE performance of this receiver is remarkably good. When the Editor invited me to try it out in my home, I had seen neither the specification nor the circuit diagram. Without examining either I plugged straight into the lamp socket, switched on and found it tuned to Radio Paris. The volume and quality at once called for praise from my family, while the long-wave selectivity was quite satisfactory. On changing to the medium wave band, just as good a performance was obtained, and by adjusting the series aerial condenser, a wide range of selectivity was obtainable, quite sufficient for all ordinary purposes. On comparing it on an indoor aerial with a commercial set costing many times as much, we all agreed there was little to choose—and the set with which it was compared is well known for its excellence. Tone, freedom from hum, selectivity and ease of handling are all good. The two tuning dials "track" quite well, which is also a help. I can recommend this set as one in wide demand.
P. W. H.

afternoons. They are appreciated by countless thousands, who find them almost as exciting as the actual watching of matches—and far less expensive! Did you, by the way, see that delightful picture in *Punch* some time ago of the enthusiast who wanted to follow both a big soccer match and a big rugger match on the same day? He is shown watching the soccer match and listening to the rugger commentary with the help of headphones and a portable.

IMPROVING DETECTION

MANY of us run our grid-leak detector valves with a plate voltage that is really far too low for the best results from the quality point of view.

The reason why we keep the volts down is mainly that this often makes the reaction control smoother. With a battery set you can hardly use genuine power-grid detection, for this entails a voltage of a couple of hundred and a heavy plate current. You can, all the same, use something between ordinary leaky-grid condenser detection and the genuine power article—at any rate, when you are listening to your local station. Just try the effect of reducing the capacity of your grid condenser to about .0001 microfarad and the resistance of the grid leak to quarter of a megohm. Then put up the plate volts (or reduce the value of any resistance that may be in the plate circuit) until you get a current of 5 or 6 milliamperes passing through the detector valve. You will find that if you now use good meaty signals the quality will be very distinctly better than it was. It is not difficult to arrange the condenser and the grid-leak in such a way that a change-over is easily and quickly made. Make the permanent grid condenser .0001-microfarad and in parallel with it arrange a .0002-microfarad glass-tube condenser held in a clip holder. It doesn't take a second to insert or remove this condenser. If you have both a ¼-megohm and a 2-megohm leak, it is usually but a matter of a moment to exchange one for the other.

MORE ROYALTIES

ISEE that another patent "problem" is looming up in connection with sets which are fitted with a pick-up for playing gramophone records. One would have thought it the simplest thing in the world to utilise the L.F. stages of one's receiver as a gramophone amplifier, but, like many other apparently obvious things, the idea seems to have been patented by the inventor. Of course, there are any amount of other patents relating to this subject, and the long and the short of it is that the various owners have now combined into a pool, and propose to charge a royalty of ten shillings on each valve used in a radiogramophone.

CALLING THE WORLD

THE new big wireless station of the League of Nations is to receive the appropriate name Radio-Nations. It is not, of course, a broadcasting station; its purpose is to keep the League in direct touch with far-away corners or with special missions sent out to investigate particular matters. It is to be a short-wave beam station and the output rating is 20 kilowatts. Two transmitters are being erected; the first is a Marconi 20-kilowatt short-wave installation, the second a crystal-controlled apparatus manufactured by the French T.S.F. people. In this country we should be well outside the skip area of the station, and if the beam

On Your Wavelength! (continued)

is directed our way we should have terrific reception of signals. The wavelengths used will be mainly between 15 and 40 metres, though the Marconi transmitter can be tuned a good deal higher if necessary.

"TURNING UP THE WICK"

FOR the normal home use, our radio receivers give us adequate volume with good quality, particularly if the newest types of valves are used. The modern power valve gives a "hefty" output, due to its extremely low impedance with a high mutual conductance, and it is this latter characteristic that should be borne in mind when choosing one. But it is very nice to have a little bit of spare "horse-power," the factor of safety that thoroughly takes care of the quality, even when the carpet is turned back for dancing and the volume inevitably turned up. It is surprising how low the normal volume of one's set becomes when a few couples are dancing to its music and chatting betimes. Frequently the mere "turning up of the wick" brings with it the most colossal distortion, or at least that peculiar sensation of the extra sound being forced out of the loud-speaker, with accompanying rattles. Which is a state of affairs no true ham would have happen in front of his friends, radio or otherwise.

OVERLOADING

I HAVE always been in favour of a large margin of safety from distortion in L.F. circuits, for it is in this section of the set that overloading of any sort plays the most havoc with reproduction quality. And it is usually the last valve and preceding transformer where such overloading takes place. The input voltage to the valve is probably too great, causing rectification and/or a flow of grid current. The latter is particularly dangerous, because it goes through the secondary of the transformer on its return journey from grid to filament, and the transformer is certainly not designed to carry such a current in such a place. Consequently, there are complicated saturation effects; momentarily, true, but enough to give the loud-speaker that sinking feeling. This, I think, is where push-pull amplification comes in.

PUSH-PULL

MOST of my readers will, I expect, be familiar with the theory of working two valves in "push-pull," as distinct from merely putting the same two valves in parallel. Briefly, the principle makes use of an L.F. transformer with a centre-tapped secondary, each end of this secondary winding being connected to the grid of an output valve. So that when one valve has an additional negative voltage applied, a correspondingly less negative voltage is applied to the grid of the other valve—"pushing" one valve while it's pulling the other, and vice versa,

thousands of times a second. The plates of these valves are fed through a centre-tapped choke or output transformer. The advantages of this somewhat complicated system are many. The distortion due to the slight curve which is present to a small degree in the anode current/grid volts characteristic curve (which should be straight on the part we want to use) is balanced out; the total feed current is perfectly steady, preventing reaction effects and motor-boating; and the heavy current going through the output choke or transformer has no saturation effect, the feed from centre-tap to one valve plate neutralising the effects of the feed to the other valve. Altogether, these various advantages give push-pull a distortionless efficiency of about 40 per cent. more power than the same two valves simply hooked up in parallel.

COMMERCIAL RECEIVERS

OF course, push-pull amplification is a luxury. That is why it is probably found so infrequently in the L.F. circuits of ready-made wireless sets. There is also the fact that there is quite a respectable royalty charged for the use of the patent. Still, I think it is a worth-while luxury that should certainly be included in all the higher-priced receiving sets.

THAT "MELLOW" TONE

TALKING of commercial radio receivers, I notice that there are now quite a few that include variable tone controls. This is leading to the ruin of the reputation of many a fine manufacturer. Returning to London in the early hours of the morning recently, I stopped by the way at one of the large petrol station-cum-café's that are

SCREEN-GRID CONSUMPTION

As triode H.F. valves consume very little anode current, one is apt to forget that modern screen-grid valves are sometimes more greedy in their



current requirements. An average M/A figure is 2½ to 3 milliamperes, but some valves take considerably more. Negative bias can be applied, just as with an L.F. valve, to cut down the waste of steady D.C. current.

springing up on the arterial roads. As I was about to commence absorbing my bacon and eggs, the hostelry's radio-gramophone was started up. You have already guessed that I am about to remark that the "tone" was terrible, and you are right. Records were being reproduced with absolutely no "highs" at all, and the words of songs, etc., were quite unintelligible. The receiver I recognised as being first-class, but further investigation disclosed that it was fitted with a tone control that was adjusted, as the waiter said, to give a "lovely mellow tone." A turn of the knob brought the tone back to normal. But how many people had gone away with the impression that it was the receiving set, and not the operator, that was at fault?

MAINS HUM AND TRANSFORMER DESIGN

MY attention was directed the other day to a type of fault which is not common nowadays, but which may, nevertheless, give trouble in certain circumstances. The case in point was a small A.C. set using a single-wave metal rectifier for supplying the H.T. and, of course, using indirectly-heated valves. The set worked quite satisfactorily except for an unpleasant hum, which nothing seemed to dispel. Direct induction did not seem to be responsible for the trouble, and careful tests seemed to show that the smoothing was adequate. The addition of extra condensers, or the use of larger smoothing chokes, or both, made no difference whatever. It was ultimately found that by using a different transformer to supply the current to the heaters the trouble disappeared, and further investigation showed that the real trouble was too small an iron circuit in the original transformer. It is often not realised with a single-wave rectifier that the mains transformer is liable to be saturated by the direct current which has to flow through the secondary of the transformer. The iron circuit is therefore working under conditions which are far from symmetrical, and the net result is that the secondary wave form, instead of being a pure sine wave, is very distorted, one-half of the wave being much larger than the other and having a pronounced peak instead of a smooth top.

POSSIBLE CAUSES

EVEN with a wave like this, smoothing on the high-tension side was apparently not abnormally difficult, but it seems that the cathodes of the A.C. valves were not at all happy under such conditions. Whether it was that the cathode had not sufficient reservoir action to smooth out the peaks in the heating effect (which would be very large, because the heating depends on the square of the current) or whether the trouble was due to electrostatic induction again aggravated by the peaky waveform, I do not know.

THERMION.

JACK HYLTON Talks About BROADCASTING



KENNETH ULLYETT interviews this popular dance orchestra leader while preparing for his B.B.C. broadcasts on March 1 and 2

WHEN I met Jack Hylton he had just returned from a Continental tour covering Belgium, Holland, Italy, Switzerland, and France, and he was busy arranging matters for his new B.B.C. broadcasts on March 1 (Regional) and March 2 (National).

"The last time I was in a B.B.C. studio," said Jack, "was when we broadcast to America. The B.B.C. did not give out that one-hour programme as at that time existing contracts did not favour studio broadcasts of any dance orchestra other than that of the B.B.C. Dance Orchestra.

"The American programme was relayed by the transatlantic short-wave telephone link, and some of your readers may have been keen enough to tune in on their short-wavers in the early hours of the morning.

used to microphone conditions. Probably it was because our programme was being relayed over 75 per cent. of the United States.

Continental Broadcasts

"I have had over 10,000 letters as a result of this broadcast, and although most of these were, of course, from America and Canada, about 10 per cent. were from British and Continental enthusiasts, which shows that some people were busy with their short-wavers!"

"What about your Continental broadcasts?" I asked.

"During my recent ten-day flit from France to Holland and back, I have done more broadcasting than usual," Jack continued. "I broadcast from Radio Paris,

where, in the ordinary way they use a large number of my gramophone records (which saves me going over to the rue Francois

studio), and from Hilversum, which is, I think, my favourite Continental station.

"They have a fine main studio there and a surprising number of people in this country seem to hear my Hilversum broadcasts on the long waves."

Knowing that no studio audience is allowed during broadcasts of the B.B.C. Dance Orchestra, I asked Jack how he managed with regard to rehearsals and studio sightseers.

"We had only one rehearsal for our American broadcast," he replied, "but the B.B.C. can give us more than that for our forthcoming broadcast. John Watt, of the B.B.C. Productions Department, is devising a special feature for my band, so that it will not be a straight dance music feature, but the various tunes will be linked together with some continuity.

"We do not worry about studio audiences. There were thirty people crammed into No. 7 studio during the American broadcast, and as there were twenty-four in my orchestra, you can imagine what a crush it meant."

"Do you have the same size band for broadcasting as for gramophone recording and public performance?"

"The number of performers is generally the same," said Jack.

"Many of the boys are well known: William Terner, who is, in addition, one of my arrangers; Pat O'Malley, the vocalist; Johnny Raily, Johnny Rosen, Jack Raine, Chappie D'Amatoe, and many others. There were twenty-four performers when we were in No. 7 studio and, as you probably know, owing to an objection by the American Musicians' Society, an orchestra of the same size as mine had to sit silent in a New York studio and be paid full time. That was to prevent professional jealousy."

I asked Jack if there was any possibility of him doing a large amount of B.B.C. work in co-operation with the new dance orchestra now being formed.

(Continued in 3rd column of next page)



A "close-up" at the microphone in a studio (above) and (right) a scene in the Paris Opera House during a recording rehearsal. Jack Hylton, extreme right, is with Ernest Ansermet, the well-known conductor, and Stravinsky

"We used No. 7 studio at Savoy Hill, B.B.C. engineers presided at the control panels, and a B.B.C. announcer announced for us. So far as we were concerned, it might have been an ordinary B.B.C. broadcast.

"The only difference was a feeling of tension which most of my boys noticed, in spite of the fact that we spend most mornings in the gramophone studio and are quite



THE HOW AND WHY OF TUNING—XXIV

TUNED TRANSFORMER COUPLING

"Hotspot" continues his comprehensive series of articles on tuning by explaining in simple language how a high-frequency valve can be coupled to the detector by means of a high-frequency transformer

IN addition to tuned-anode, and its variant, tuned-grid, there is another good system of coupling a high-frequency valve to the detector, and this is known as transformer coupling.

In order to keep these articles fairly non-technical, I have to skip over a good deal that ought to be written to complete the story. But here, in dealing with transformer coupling, I really think a little theory will be appropriate, so I crave my readers' indulgence.

A high-frequency transformer consists of two windings, a primary and a secondary, insulated entirely from each other in an

flowing through the first coil—what happens?

Just what you might reasonably expect to happen: some of the field lines of the first coil will link with the turns of the second coil, and if the current is changing in value an E.M.F. will be induced into the second coil. From this it will be seen that an alternating current flowing through one coil, call it the primary, will set up an alternating voltage in the other coil, call it the secondary.

The two coils are said to be coupled together by their mutual induction. Although there is no electrical connection

that ensures adequate sensitivity with selectivity. There is an optimum ratio of secondary turns needed to give the greatest amplification from the transformer-coupled stage, but as this can be calculated for only one wavelength, usually a wavelength at the middle of the scale is chosen, and this gives a good working condition.

Its Place in the Circuit

It will be of interest now to see how a high-frequency transformer is actually connected up between two valves, and so I refer you to the pictorial diagram.

As you will see, it is a very simple arrangement. The primary winding forms the anode circuit of the high-frequency valve, one end going to the anode and the other to the high-tension supply.

As there is no electrical connection between the primary and secondary, the connections to the grid of the detector or next high-frequency valve are simplified, since there is no need to worry about high tension from the first valve anode getting to the grid of the next.

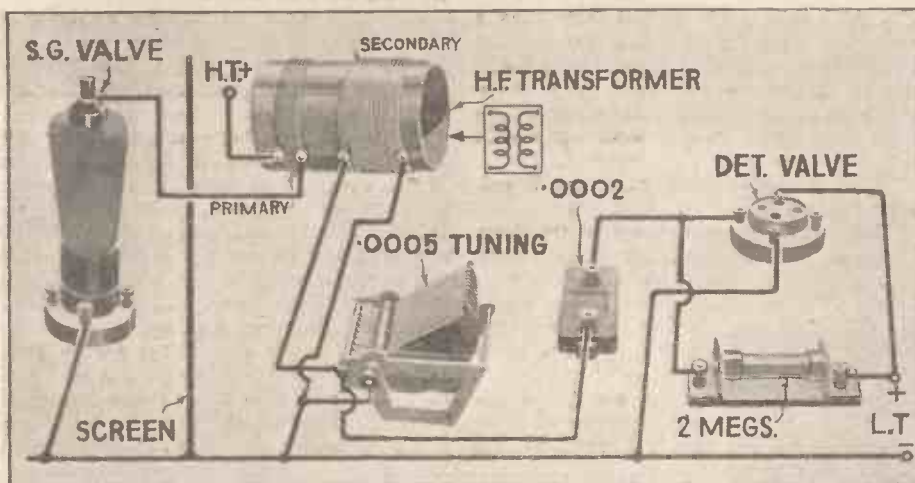
We connect a .0005-microfarad tuning condenser across the secondary winding, which forms the tuned-grid circuit of the detector. One side of the secondary winding goes to the grid, through the usual .0002-microfarad grid condenser, and the other side can go straight to earth.

As with tuned-grid coupling, the connection of the moving plates of the tuning condenser to earth simplifies the construction of a set chassis, and also tends to stabilise the actual tuning operation, since the hand, which is more or less at earth potential, is then at the same potential as the spindle of the condenser.

It is quite easy to apply reaction to the secondary of a high-frequency transformer, as shown for tuned grid last week.

Owing to the need for careful and somewhat exacting calculations to achieve optimum results, I do not recommend amateurs to make their own high-frequency transformers, although some instructive experiments can readily be made with two plug-in coils used as primary and secondary windings.

HOTSPOT.



Pictorial diagram showing how a high-frequency transformer is connected between two valves

electrical sense, yet intimately connected with each other in a magnetic sense.

Many readers will already know something about what happens when an alternating current is sent through a coil of wire—I have mentioned this matter in a previous article in the series. What happens is that a magnetic field is set up, and the lines of force comprising this field link or cut the turns of the coil through which the alternating current is flowing.

Should this field be varied, as by varying the current flowing through the coil, an electro-motive force will be set up or, as we say, induced in the coil. This is the E.M.F. of self induction, a name that explains itself, namely, that the electro-motive force caused by the changing current through a coil is induced in the turns of the coil through which the current is flowing.

The great point to remember is that the induced E.M.F. is generated only when the current is changing. In fact, it is only the rate of change that determines the value of the induced voltage. An unvarying current, no matter how great, would not induce any E.M.F. in the turns of the coil.

So much for one coil. But now suppose we bring near to such a coil another, so that the turns of this second coil are within the magnetic field set up by the current

between the two coils, they are, indeed, intimately connected by this mutual induction.

In a high-frequency transformer, as used to couple a high-frequency amplifying valve to the detector (or, of course, to another high-frequency valve) it is usual to tune the secondary winding and to couple this closely to an untuned primary.

Making a Suitable Choice

There are always two considerations involved in choosing a suitable high-frequency transformer. Firstly, the secondary must, with a suitable tuning condenser, cover the desired band of wavelengths and, secondly, the primary winding must be wound so that its impedance, by which is meant its effective impedance, matches the impedance of the preceding valve.

With modern high-frequency valves of the screen-grid type, where the impedance may easily be more than 200,000 ohms, this primary impedance rule is not entirely practicable, since the number of turns needed for correct impedance matching would so greatly increase the mutual inductance that unselective tuning would result.

It is, therefore, usual to cut down the number of primary turns to a compromise

"JACK HYLTON TALKS ABOUT BROADCASTING"

(Continued from preceding page)

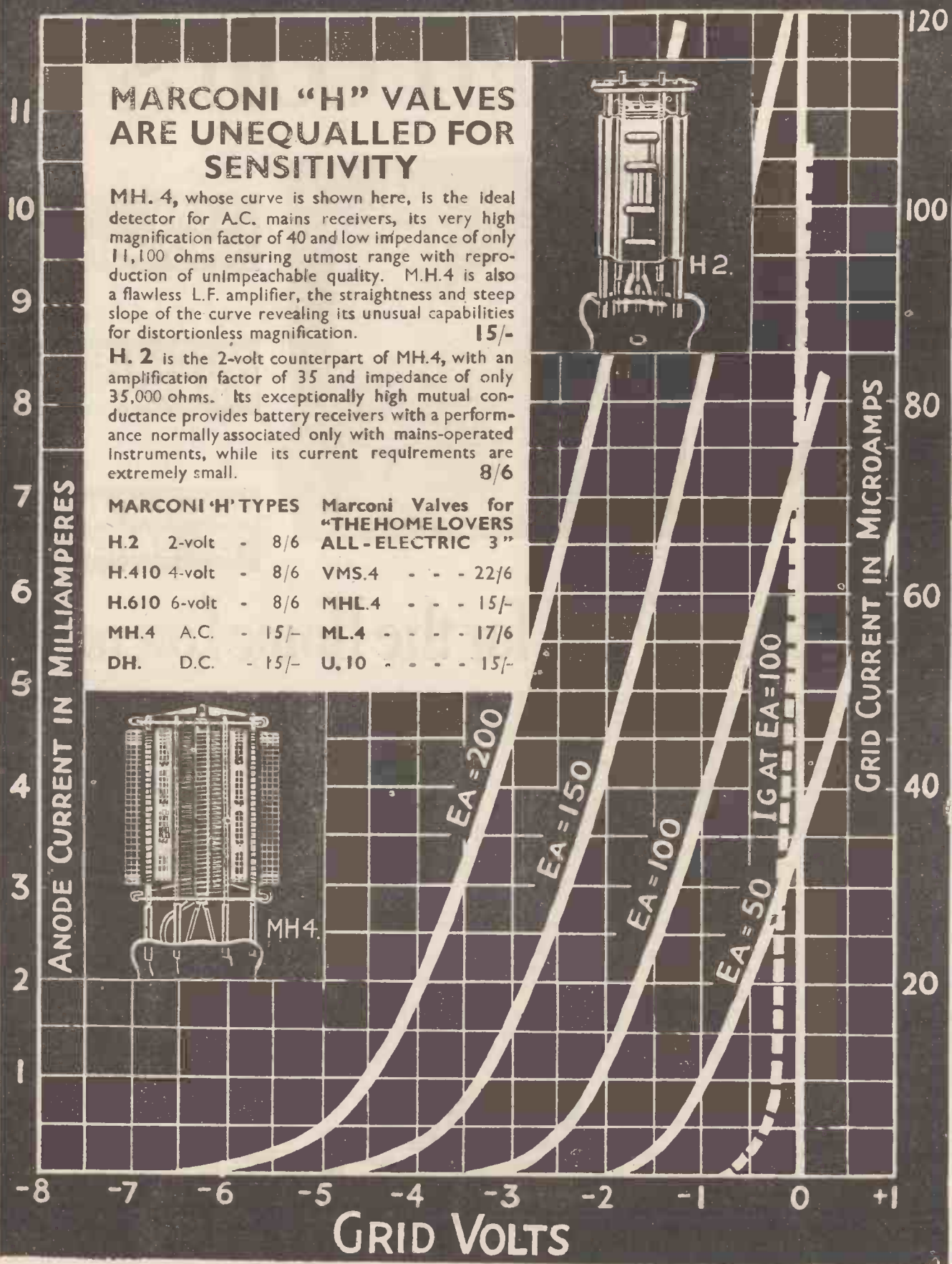
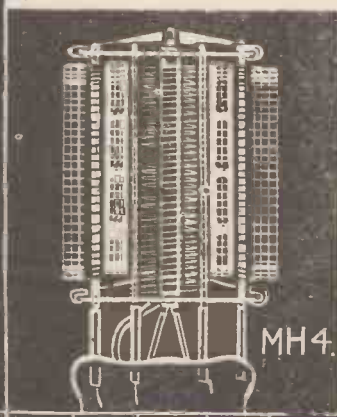
"I am afraid I can't talk too much about politics," said Jack, smiling, "but I am afraid while I am kept busy with British and Continental engagements, I cannot think of settling down to regular weekly microphone work. There is a possibility that I shall do another Continental tour, and the Soviet Union have asked me to introduce British dance music into Russia, which I may do in the late spring. That will mean that I shall be broadcasting from Moscow and several other high-power Russian stations.

MARCONI "H" VALVES ARE UNEQUALLED FOR SENSITIVITY

MH. 4, whose curve is shown here, is the ideal detector for A.C. mains receivers, its very high magnification factor of 40 and low impedance of only 11,100 ohms ensuring utmost range with reproduction of unimpeachable quality. M.H.4 is also a flawless L.F. amplifier, the straightness and steep slope of the curve revealing its unusual capabilities for distortionless magnification. **15/-**

H. 2 is the 2-volt counterpart of MH.4, with an amplification factor of 35 and impedance of only 35,000 ohms. Its exceptionally high mutual conductance provides battery receivers with a performance normally associated only with mains-operated instruments, while its current requirements are extremely small. **8/6**

MARCONI 'H' TYPES		Marconi Valves for "THE HOME LOVERS ALL-ELECTRIC 3"	
H.2	2-volt - 8/6	VMS.4	- - - 22/6
H.410	4-volt - 8/6	MHL.4	- - - 15/-
H.610	6-volt - 8/6	ML.4	- - - 17/6
MH.4	A.C. - 15/-	U.10	- - - 15/-
DH.	D.C. - 15/-		



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

The newest thing in SHIELDED COILS

**COMPLETELY
SHIELDED**

**NO LONG-WAVE
BREAK-THROUGH**



**LOW
DAMPING**

**ABSOLUTELY
INTERCHANGEABLE**

**LABORATORY MATCHED
FOR GANGING**

-and used by "A.W." for the Home Lovers 3

LISSEN have always had the reputation of making highly efficient Tuning Coils; even in the days of the Plug-in Coil, Lissenagon Coils had (and still have) the reputation of being the very best of their type. During the last few years Lissen have directed a considerable amount of research to the production of Tuning Coils for highly efficient single-dial commercial receivers. Such coils need to be made to much closer specification than ordinary constructors' coils—high efficiency—low screen losses—even reaction over the whole of both ranges—exact matching—no inductance variations due to temperature, humidity or time—all these points and many others too must be incorporated in a coil of the smallest possible dimensions. Lissen have embodied all the specialised experience of the Lissen laboratories in the new Lissen Shielded Coil—they will set new efficiency standards in coils for constructors' receivers.

These coils are EXCLUSIVELY used in the Amateur Wireless "Home Lover's 3," described in this issue. You MUST use them to build this set—its extreme selectivity is based upon the exceptional efficiency of Lissen 1932 Dual-range Shielded Coils.

NO longer is it necessary to buy new coils for every new set you build. Here are coils which you can use as aerial tuning coils, as tuned anode coils, as tuned grid coils—they are all laboratory matched if you want to use them for band-pass tuning. Equally suitable for a one-valve set or a five-valve set. The selectivity is of the very highest order and "break through" on the long-wave band has been almost entirely eliminated. Shielding is particularly complete with shielding cover and shielding disc supplied. Full diagrams are enclosed with every coil, together with instructions for the use of the new coil in many different ways.

PRICE COMPLETE WITH SHIELD **6/6** each

OTHER LISSEN PARTS USED IN THE "HOME LOVER'S 3" include:—

THREE LISSEN Mansbridge Type Condensers.
LISSEN "Torex" Transformer.
LISSEN Horizontal Valve Holder.
LISSEN Disc Type H.F. Choke.
LISSEN Balanced Armature Loud-speaker Unit.

6/6 DUAL LISSEN RANGE 6/6
SHIELDED COILS
LISSEN LIMITED, WORPLE ROAD, ISLEWORTH, MIDDLESEX

Please Mention "A.W." When Corresponding with Advertisers

AT THE B.B.C.

BROADCASTING AN S.O.S.



Our Special Commissioner, continuing his account of interesting facts about broadcasting activities; describes how urgent bulletins are prepared for the microphone

THE new head of the new section, is a journalist, and he is pressing various changes in B.B.C. policy with regard to broadcast news. It is understood that he favours the view that these bulletins should be given more in magazine style, of general interest, and not quite as in the present unemotional budgets.

One very interesting section of the news work comes under his charge—receiving and preparing S.O.S. messages for broadcasting.

S.O.S. messages come in in every possible way. Often the phones are set ringing only a quarter of an hour or so before the late night bulletin, and either a private listener or a police official makes a request for a special broadcast.

Police messages sometimes come in on a special form which saves the B.B.C. newsman a great deal of work in checking. In the case of private requests, the head of the department personally considers each, and makes sure that it does not overstep any of the new regulations covering S.O.S. broadcasts.

A Valuable Service

Doctors, police authorities and other responsible officials have to be communicated with and urgent phone calls put through to check the authenticity of the S.O.S. So far no case has yet arisen in which a practical joke has been played on the S.O.S. section. The public obviously appreciates the worth of this free service to aid in tracking down criminals, and in finding missing people.

Most S.O.S.'s arrive before the news bulletin is prepared and given to the announcer, and then the urgent message goes through in the routine fashion. It is typed on a special coloured sheet, indicating its priority, and this is tacked to the front of the big foolscap sheets which carry the weather and news bulletins.

If the message comes through and is checked before the final news is given, then it is sent down on a slip to the announcer while he is still before the

microphone in No. 5 studio and a typed copy of this is made afterwards for reference.

The S.O.S. messages are kept in a special file for three weeks after they have been broadcast, and this file is often of great help to the police in making investigations.

Many recent murder cases have been the subject of an S.O.S. broadcast on the night before the tragedy was made known in the papers.

"Before the news bulletin, here is an S.O.S. message" is a familiar phrase and yet it will probably come as a surprise to listeners to know that in six months of last year (figures for the last month are not yet available) 299 S.O.S. messages were given. That makes an average of 500-600 for the whole year.



In the Northern Regional Talks Studio at Manchester, from which news bulletins and urgent S.O.S. messages are broadcast.

These messages are given in case of illness, for missing people, and for witnesses wanted by the police. Of these three classes, most S.O.S.'s are required in case of illness. Of the 299 S.O.S.'s broadcast, 188 were for people wanted in cases of illness and over 59 per cent. of these were successful.

Taking S.O.S.'s of every kind into consideration, the last series has shown that over half of them, 50.84 per cent. to be exact, were successful, and of 3.01 per cent, it is not known whether they achieved their object or not.

Checking Results

After an S.O.S. has been given, the B.B.C. issues a free card which should be returned in order to show whether or not the message has been successful. It is a great help to the B.B.C., as well as to the doctors or police concerned, to know whether the broadcast message has been successful. If ever you have to make use of the S.O.S. service, then please don't forget this little courtesy to the B.B.C.

The police are making increasing use of the service as it is so successful. The average of successes for people wanted in case of illness has never fallen below 50 per cent., which only goes to show what great use is made of radio reception when the news bulletins are broadcast.

There is no special announcer for news and for S.O.S. broadcasts

Mr. Hibbard, Mr. Grisewood, or one of the other London announcers who happens to be dealing with the main programme at the time, goes down to the news room and takes charge of the bulletins and any S.O.S. messages.

The London News Department takes charge of the S.O.S. messages for most stations on the S.B. system, but at other centres, Belfast, for example, there is a special news and S.O.S. service, under the control of the Station Director.

The Czecho-Slovak Ministry of Posts and Telegraphs has started on the erection of a short-wave transmitter at Prague with a view to a regular direct exchange of broadcast entertainments with the United States. The new transmitter, when completed, will also be used for the daily relay of the Prague programmes.



OUR BROADCAST CRITIC

TALKS ABOUT—

NOISES

A PLAY that depended on the assumption that, on a certain day in February, 1932, mankind would suffer extinction, appealed to me as soon as I read the notice of it in the programmes. The only comment I made was that *Catastrophe* was not a very appropriate title. I listened with interest, the more so because I think extravaganzas of an occult type, provided they are not unpleasant or morbid, make good entertainment.

My criticism of this play is that there was too little dialogue of a connected nature and far too much noise. Also, I never managed to come to grips with the characters in the play. As soon as I became interested in the Astronomer, or the Mathematician, or the Daughter, or the Poet (who amused me considerably), he or she ran away from the microphone and I lost sound of them, so to speak.

The noises were the chief characteristic of the production. The idea of them was risky in the listening sense; thinking it over, I realise now what was intended. The Astronomer prophesies the end of the world; the noises served as atmosphere for various scenes of normal life, while such dialogue as came through the noise served to inform us how various sections of the community were taking the news.

I think nine or ten *sound-scenes*—I cannot think of anything else to call them—were rather too much for one play. No one can *guarantee* that the sounds will convey the right mental impressions.

Personally, I did not dislike the play at all; I do think, however, that a little more guidance is necessary. I found myself guessing hard in several of the scenes. On the other hand, it is only fair to say that some of the "noises" were very realistic.

I liked Marie Wilson's tone in the Strauss suite on the Sunday evening. The only grumble I have to record is that the solo horn was off pitch in the "Entry and Dance of the Tailor." The effect made me think the horn player owed the tailor a bill!

A very delightful broadcast, in my judgment, was that called "Irish Bulbuls." I thoroughly enjoyed the lilt of the Irish melodies. Also, I thought the Wireless Chorus sang splendidly.

If I have any criticism to pass, it must be on the dialogue. I thought it poor stuff in places; where it was *not* poor—and there were many places where it was *good*—it appealed to me as being

the sort of dialogue that looks better written than it sounds spoken. Otherwise, no complaints. I hope "Irish Bulbuls" is to be one of a series of light fare with Provincial flavour.

Mr. Mais, on Cornwall, was delightful. This series must be very fascinating to prepare and deliver; it is certainly so to hear. Quite one of the successes of the spoken programmes.

The Street Pavement Artistes' little affair was rather too much for me. It was another case of "noises" chiefly. Banjo - saxophone - accordion - guitar - harmonium music is quite interesting, but a little of it goes a very long way. I did my best with it, but it won in the end and I had to switch off. Still, there was some originality about it.

I missed most of the first part of the symphony concert this week, but arrived home in time to catch the last movement of the Brahms violin concerto. I was very taken with some of Adolph Busch's playing; he well deserved the reception given him.

I wonder if many of you heard the second half? I think a good many listeners might have liked Ireland's "Mai Dun," but whether they could appreciate the "Winter Legends," by Bax, is another matter. "Winter Legends" left me rather *cold*, but perhaps they were intended to?

I thoroughly enjoyed the recital by Angus Morrison and Elena Gerhardt. Morrison's playing of the simple Beethoven sonata pleased me immensely. Elena Gerhardt is a great singer. The announcer spoke of her first concert twenty-five

years ago. I remember her in the early days of her career, and was delighted to find her voice so beautifully fresh after a quarter of a century. It is a long time to sing and *keep up one's standard*. I hope Madame Gerhardt will sing again soon. If so, *Schubert, please!*

The Operatic Concert was a decided success. Miriam Licette and Frank Titterton were splendid—not only separately, but together. I want to see these concerts regularly in the programmes; I think they will eventually become almost as popular as the vaudevilles.

Christopher Stone is a good hand at gauging the taste of the average Saturday public; the programme of his recital this week was well chosen. Added to which, he was cheery as usual.

I see that the "Conversations in the Train" have reached No. 6. It has so happened that I have not been able to hear any of them until this last one. If they have all been as entertaining and clearly written as the sixth, I think they can be regarded as a distinct success.

On the other hand, I do think that the noises of the train might, here and there, be very much modified. The representation of the engine starting out of each of the stations was so realistic that the general atmosphere was thereby enhanced. The continuous noise, however, rather distracted my attention; I found myself thinking something was wrong with the set! I make the suggestion that the noises during the heat of the various arguments should be allowed to fade out.

I thought some of the vaudeville good. I had to turn the set down to a minimum during the piano-accordion solos because I could not endure the instrument. By so doing, I missed the announcer for the succeeding item, but I suppose it was Dora Gregory? At all events, those monologues were really good; I hope she will broadcast again soon. As for Leonard Henry, he is more and more brilliant as time goes on.

I enjoyed listening to the critic (Herbert Farjeon). I thought he made some good points; but, of course, he did not really criticise the vaudevilles.

The item from the Palladium was quite *near enough*, I think. Steady, B.B.C., or you will have thousands of letters from shocked Puritans!

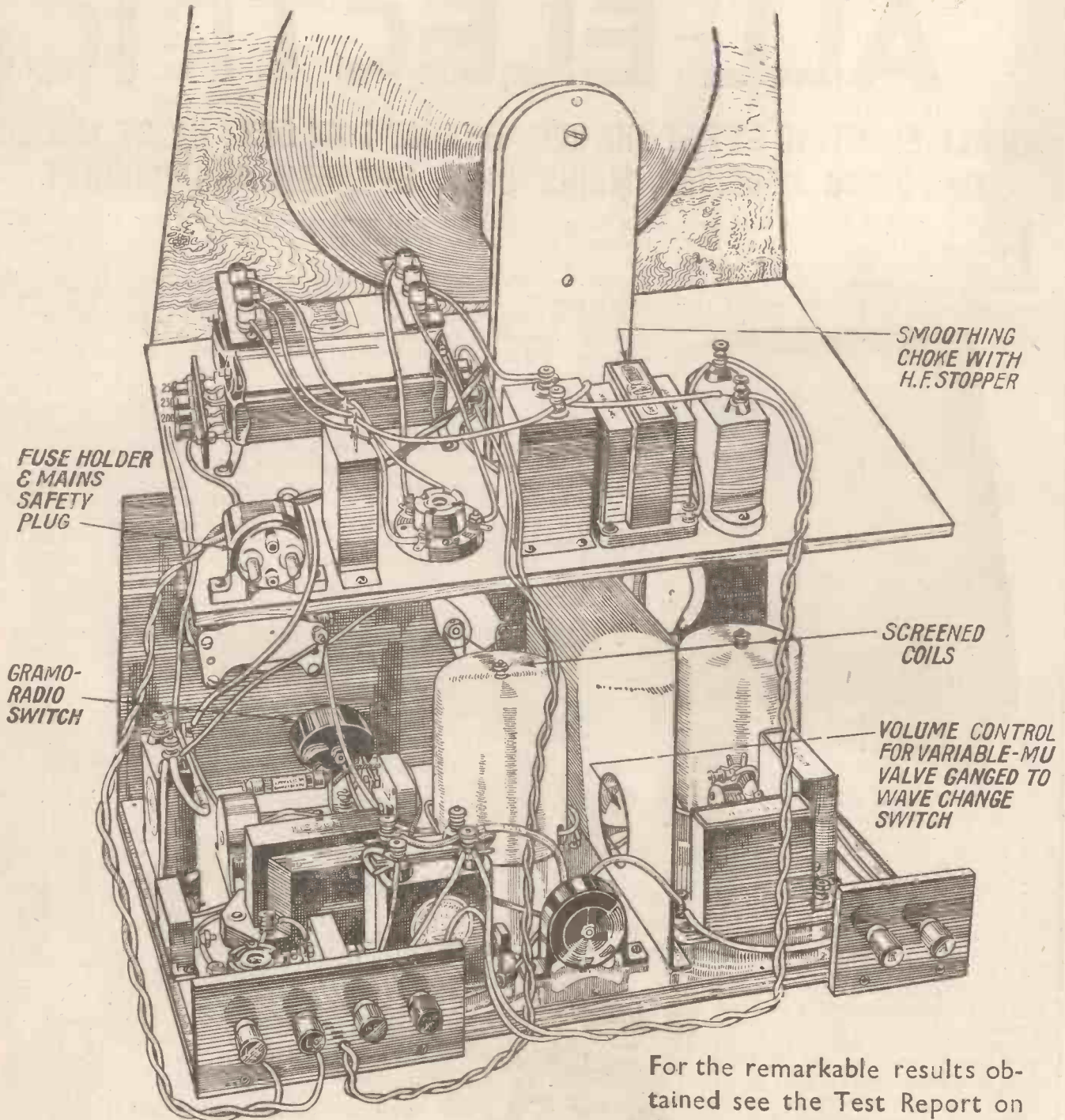
WHITAKER-WILSON.



Alexander and Mose in cartoon

Let the Power-station Run Your Radio

THE SCHEME OF THE "HOME-LOVER'S ALL-ELECTRIC 3"



For the remarkable results obtained see the Test Report on page 456

Building the HOME-LOVER'S ALL-ELECTRIC

**AN ALL-ELECTRIC SET AT THE REMARKABLY LOW COST OF £7 17s. 6d.
INCLUDING RECEIVER, MAINS UNIT, SPEAKER AND CABINET**

FIRST of all, I should like to make it perfectly clear to all intending constructors of this set that the assembly is no more difficult than for an ordinary three-valve battery set.

The set, comprising the usual panel and baseboard structure, is mounted at the bottom of the cabinet. Above this is a platform or shelf carrying the power supply components and the loud-speaker.

As regards the construction of the set itself, the absence of ganging has greatly simplified the layout. In spite of the fact that very sensitive mains valves are used, the screening arrangement is very simple. Adequate screening is obtained by covering the baseboard with aluminium foil and by erecting a vertical metal screen to separate the aerial-tuning circuit components from the remainder of the set.

There is a hole in the vertical screen to take the screen-grid valve, the valve holder being mounted in the aerial tuning compartment.

Looking from the front of the set, the panel layout consists of two main controls, the aerial tuning condenser on the left and the tuning condenser of the tuned-grid coupling on the right. In addition to these tuned controls there are five subsidiary controls.

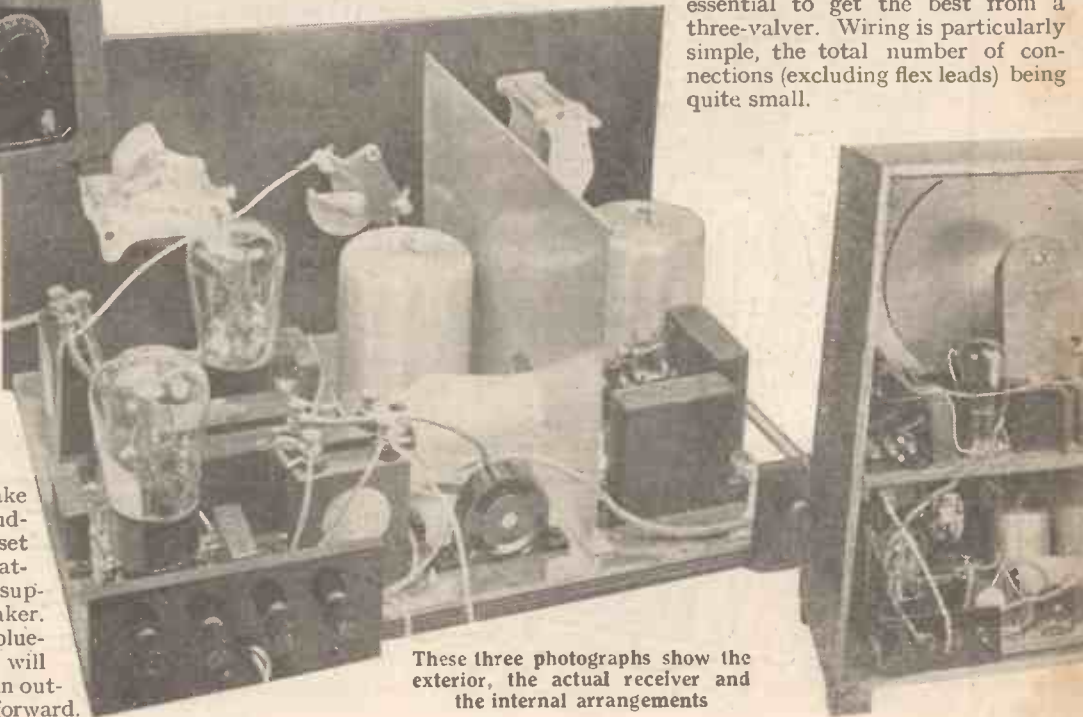
Of these, the reaction condenser comes between the two tuning condensers. On the extreme left is the aerial pre-set condenser, giving a variable degree of selectivity; and balancing this on the right is the mains on-off switch. Coming between these two controls is the combined volume control and wave-change switch to the left, and the grammo-radio switch to the right.

No attempt has been made to cut down the number of controls to an inconvenient minimum. All these controls are really essential to get the best from a three-valver. Wiring is particularly simple, the total number of connections (excluding flex leads) being quite small.

There is, of course, a little more work involved, because the "Home Lover's All-electric 3" is a console. This means that the cabinet contains everything for reception with the exception of the aerial and earth.

A console divides itself naturally enough into three sections. Firstly, there is the cabinet, which must be large enough to take the set, power supply and loud-speaker. Secondly, there is the set chassis. Thirdly, there is the platform upon which rests the power supply components and the loud-speaker.

A careful examination of the blueprint and the various illustrations will save tedious explanations. The main outline of the layout is quite straightforward.



These three photographs show the exterior, the actual receiver and the internal arrangements



Designed by
S. RUTHERFORD WILKINS

A full-size blueprint is invaluable. Copies of this can be obtained, price 1s., post free, from the Blueprint Department, AMATEUR WIRELESS, 58-61 Fetter Lane, London, E.C.4. A small reproduction of this is given herewith.

Constructors are advised to carry out the assembly in the following sequence:—

First, drill the panel with the aid of the blueprint and mount the panel components. This is quite easy as all the com-

HERE ARE THE COMPONENTS REQUIRED FOR BUILDING THE "HOME-LOVER'S ALL-ELECTRIC 3"

Three-ply panel, 14 in. by 7 in. (Peto-Scott, Camco, Clarion).
Baseboard, 14 in. by 10 in. (Peto-Scott, Camco, Clarion).

Sheet of aluminium foil, 14 in. by 10 in. (Peto-Scott, Readi-Rad).

Two .0005-mfd. variable condensers (Polar "No. 4," Lissen, Lotus, Telsen, Dubilier, Utility).
Two 3-in. dials (Polar).

.0003-mfd. reaction condenser (Polar "Compax," Lissen, Lotus, Readi-Rad, Telsen, Ormond).

.0003-mfd. variable series aerial condenser (Telsen, Polar, Lotus, Lissen, Readi-Rad, Formo, Ormond).

Two screened dual-range tuning coils (Lissen).

Combined three-point shorting switch and 25,000-ohm variable resistance (Wearite).

Gramo-radio change-over switch (Readi-Rad, Lissen, Bulgin).

Single-pole toggle switch (Bulgin, Igranic, Claude Lyons).

Four-pin valve holder (Telsen, Lissen, Lotus, Benjamin, Wearite, Clix, Bulgin, Junit).

Two five-pin valve holders (Telsen, Lissen, Lotus, Benjamin, Wearite, Clix, Bulgin, Junit).

Horizontal mounting valve holder (Lissen, W.B., Junit).

Two 1-mfd fixed condensers (Lissen, T.C.C., Dubilier, Formo).

2-mfd. fixed condenser (Lissen, Telsen, T.C.C., Dubilier).

Two .1-mfd. fixed condensers (Telsen, Lissen, T.C.C., Dubilier, Igranic).

Two .0001, one .0002, and one .001-mfd. fixed condensers (Telsen, Lissen, T.C.C., Dubilier, Graham-Farish, Sovereign, Ormond, Formo).

2-mfd. fixed condenser, 400-volt D.C. working (Formo, Ferranti, Dubilier, T.C.C.).

2-mfd. fixed condenser (Lissen, Telsen, T.C.C., Dubilier, Formo, Ferranti).

2-mfd. centre-tapped fixed condenser, 1,000 volt, A.C. test (Dubilier, type BE3L).

1-megohm grid leak (Telsen, Lissen, Dubilier, Sovereign, Graham-Farish).

Grid-leak holder (Readi-Rad, Lissen, Telsen, Bulgin).

High-frequency choke (Telsen, Lissen, Lotus, Lewcos, R.I., Climax, Varley, Readi-Rad, Wearite, Igranic, Atlas, Watmel).

High-frequency choke (Lissen, Telsen, Lotus, Lewcos, R.I., Climax, Varley, Readi-Rad, Wearite, Igranic, Atlas, Watmel).

Four spaghetti resistances, values 50,000, 40,000, 20,000, and 1,000 ohms (Lissen, Telsen, Lewcos, Varley, Sovereign, Graham-Farish, Tunewell, Igranic).

One 750-ohm spaghetti resistance (Lewcos, Telsen, Varley, Sovereign, Graham-Farish, Tunewell).

Partition screen, 10 in. by 6 in., with hole for S.G. valve (Peto-Scott, Readi-Rad, Parex).

Low-frequency transformer (Lissen "Torex," Telsen, Lotus, R.I., Ferranti, Lotus, Lewcos, Varley, Igranic).

Mains transformer, with the following secondary windings: 230-0-230 volts, 2-0-2 volts 1 amp., 2-0-2 volts 4 amps. (Heyberd, Atlas, Junit, R.I.).

Smoothing choke (R.I. "Dux Audirad," Lissen, Ferranti, Lotus, Atlas, Lewcos, Varley, Igranic).

Six terminals, marked Aerial, Earth, Pick-up (2), L.S.—, L.S.—, (Belling-Lee, Clix, Ealex).

Combined mains plug and fuse (Bulgin).

Terminal strip, 7 in. by 2 in. (Becol, Peto-Scott).

Two yards thin flex (Lewcoflex).

One foot single shielded flex (Lewcos).

Connecting wire and sleeving (Lewcos).

Cabinet, with chassis for loud-speaker and mains unit (Peto-Scott).

Loud-speaker unit (Lissen four-pole balanced armature, Telsen, Blue Spot, Ormond, Brown).

Piece of one paper (thin Bristol board from any art shop).

ton upon which to build the body perfectly normal, and after fixing the two screened coils, taking care that their terminal numbers come in the way shown by the blueprint, the remaining components can be screwed down. When screwing down the decoupling condenser in the screen circuit of the screen-grid valve,

The first baseboard component to be fitted is the volume control bracket of the combined wavechange switch and volume control. If this component fixing is left until later it will be rather inacces-

perfectly normal, and after fixing the two screened coils, taking care that their terminal numbers come in the way shown by the blueprint, the remaining components can be screwed down. When screwing down the decoupling condenser in the screen circuit of the screen-grid valve,

ponents have one-hole fixing nuts. Next tack down the aluminium foil to the baseboard. This can be done with any small tacks or gimp pins.

At this stage the panel can be fitted to the baseboard by means of the three fixing screws along the bottom of the panel. You now have the skele-

sible. Take care that the coupler between the wavechange switch and the volume control is securely fitted and that the bracket of the volume control is insulated from the metal foil on the baseboard.

Then mount the screen partition, with the hole for the screen-grid valve remote from the panel. If the hole for the screen-grid valve is not already cut out, take care that sufficient clearance is provided.

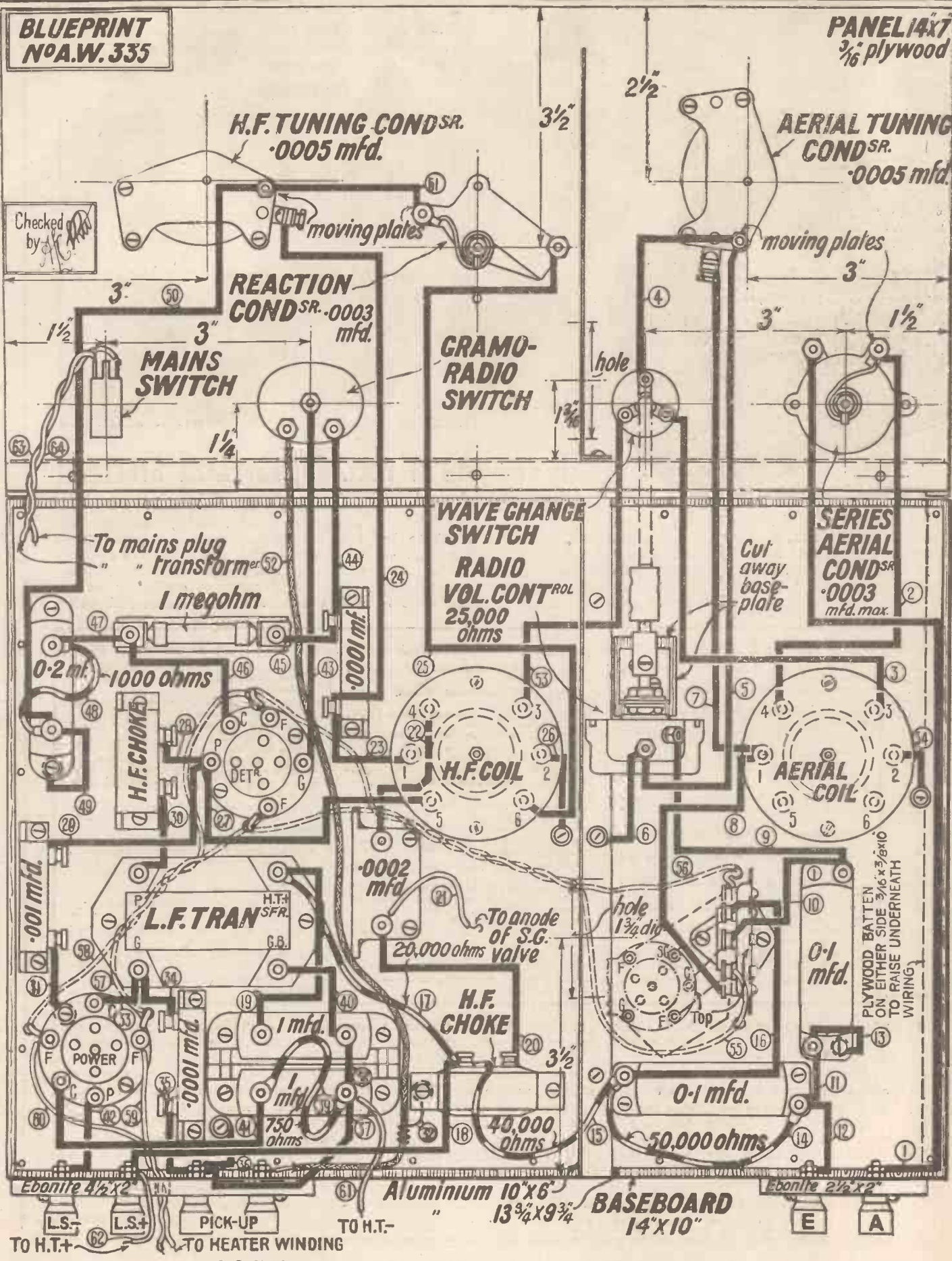
The rest of the component fixing is

connect a short length of wire between the terminal and the fixing screw, as this terminal provides the earthing point for the foil, because subsequently a wire is taken from this terminal to the earth terminal on a near by strip.

Wiring is greatly simplified if you follow the blueprint. The wire to use is No. 20 gauge tinned-copper, covered with one millimetre insulating sleeving.

Follow the blueprint sequence in making the connections and note that the spaghetti

THE LAYOUT AND WIRING DIAGRAM OF THE "HOME-LOVER'S ALL-ELECTRIC 3"



A full-size blueprint of this diagram is available, price 1/-

"BUILDING THE HOME-LOVER'S ALL-ELECTRIC 3" (Continued from page 453)

resistances are counted as connections in the numbering.

Note also that a flexible wire is taken from the coupling condenser between

one wire going to one side of the input transformer and the other wire going to one side of the mains plug. Two more flexible wires comprise the high-tension connections.

High-tension positive is a lead coming from the L.S. positive terminal and high-tension negative is a lead coming from the junction of the two 1-microfarad fixed condensers mounted near the terminal strip. These leads go to the two terminals of the output smoothing condenser.

The mains-unit assembly is extremely simple, as can be seen by the blueprint. First of all mount the strip of wood used to support the loud-speaker unit and then lay out the mains components as shown. Wire according to the numbers on the blueprint.

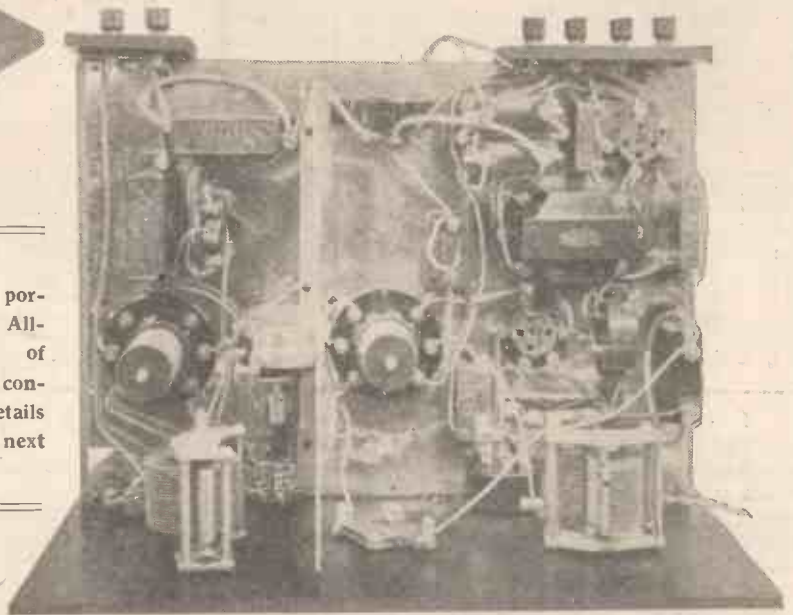
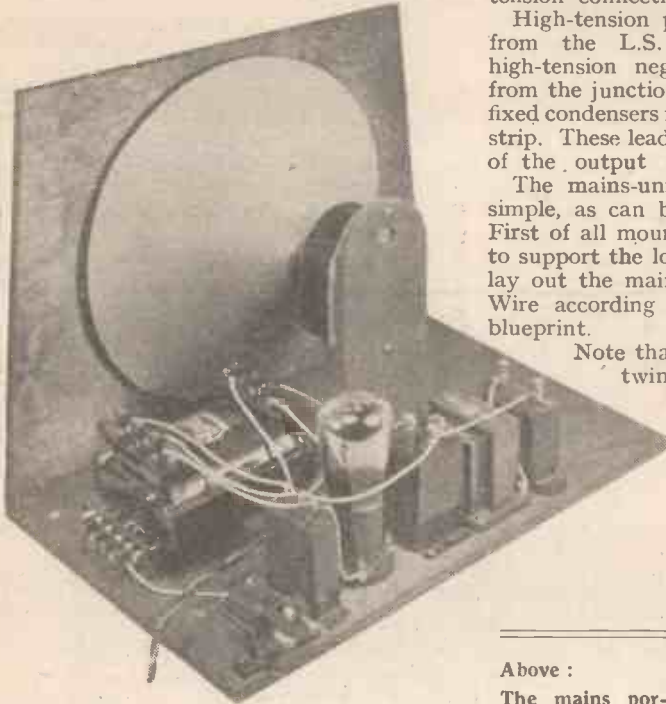
Note that the mains plug contains twin fuses and that the back

cone paper specified, with a 70-degree segment cut away, leaving a 3-inch overlap for sticking down the cone with seccotine. These dimensions provide a cone diaphragm nearly 10 inches in diameter.

When dry, the cone should be fitted with cone washers on each side to take the reed of the loud-speaker unit. The cone should be mounted about 1/4 inch behind the front of the cabinet, so that it is "free edge" or "floating."

The final constructional point is the connection of the loud-speaker unit to the loud-speaker terminals of the set, and the joining up of the high- and low-tension flexible wires from the set, through the platform to the terminals marked by the blueprint.

In next week's issue, final details and operating instructions will be given together with a layout and wiring diagram of



Above :
The mains portion of the "All-electric 3" of which the constructional details will be given next week

Compare this plan view of the receiver with the layout diagram on the opposite page

the screen-grid valve and detector valve to the anode terminal on the bulb of the screen-grid valve. The wire going from the outer pick-up terminal of the large terminal strip to the gramophone switch consists of a length of shielded wire, and this shielding is earthed by means of a short length of tinned-copper wire twisted round it and secured to the foil by one of the fixing screws of the high-frequency choke.

The filament terminals of all three valve holders are wired in parallel by means of flexible wire taken underneath the baseboard through small holes drilled in any convenient positions near the holders. Finally, the twisted flexible leads come from the power valve filament terminals through the hole drilled near the bottom of the centre of the large terminal strip. These are subsequently connected to appropriate power-supply terminals.

Two twisted flexible wires also run from the mains switch to the power supply,

of the cabinet cannot be taken off without breaking the mains connections, thus providing a very simple but effective safety device.

The Loud-speaker

The loud-speaker cone is home-made and consists of a 12-inch circle of the

mains unit. In the meantime, London readers who would like to see the actual set should see the special display in the Radio Department of Messrs. Selfridge and Co., Ltd., of Oxford Street, London, W. Readers living in the Manchester district will be able to see a model in the Radio Department of Messrs. Lewis.

WHY YOU SHOULD BUILD THE "HOME-LOVER'S ALL-ELECTRIC 3"

IT IS—

COMPLETE IN A CONSOLE CABINET WITH MAINS UNIT AND SPEAKER

SELF-CONTAINED AND WITH NO TRAILING BATTERY LEADS

INEXPENSIVE TO BUILD — £7 17s. 6d. COMPLETE LESS VALVES

EASY TO WORK and NO CIRCUITS TO GANG COMPLETELY SCREENED AND STABLE

CHEAP TO MAINTAIN

AMAZINGLY SELECTIVE

A GRAMO-RADIO SET

ULTRA MODERN!

MY TEST OF THE "HOME-LOVER'S ALL-ELECTRIC 3"

By J. GODCHAUX ABRAHAM'S

FOR the man whose house is fed by A.C. mains the "Home-lover's All-electric 3" should prove an ideal receiver. It can be constructed at low cost, it is highly selective and embodies an up-to-the-minute circuit which enables its owner to capture with ease the main European transmissions at full volume, and the tone of its reproduction, notwithstanding the low price of the loud-speaker unit adopted, is decidedly pleasing.

On test the receiver proved very satisfactory, inasmuch as it possesses a number of controls which are decidedly helpful in separating near-by stations. With careful

Notwithstanding this high selectivity, the receiver is easy to handle.

In the course of an hour's test, I was able to log the transmissions as per annexed log. In each case (except where otherwise stated) full loud-speaker strength was obtained and the broadcasts were of excellent quality. The evening chosen for this tour of the "Home-lover's All-electric 3" was an unfortunate one, inasmuch as during a portion of the period, most European stations were relaying an all-American programme and thus identification was rendered difficult. On a night when the ether is full of more varied

with judgment in connection with just the right amount of reaction and to bring up the strength of the reaction by means of the volume control as a final touch.

In addition to its many good qualities as a sound household no-trouble receiver, the "Home-lover's All-electric 3" provides you with a high-grade amplifier for the reproduction of gramophone records. In order, however, to prevent overloading the valves it will be necessary to add a volume control between the pick-up and the instrument. The pick-up may be connected permanently.

The "Home-lover's All-electric 3" com-

"HOME-LOVER'S ALL-ELECTRIC 3" LOG (Tested on February 15, 1932)

MEDIUM WAVES				LONG WAVES				
Wavelength Metres.	Station.	Dial Readings	Wavelength Meters.	Stations	Dial Readings	Wavelength Metres.	Station.	Dial Readings
223	Radio Normandie (Fécamp)...	18 18	372	Hamburg (fair L.S.) ...	45 46	550	Budapest ...	87 87
239	Nürnberg ...	20 21	381	Lvov ...	46 42½	LONG WAVES		
247.7	Trieste ...	21 22	385	Radio Toulouse ...	47 47	1,000	Leningrad ...	19 14
261	London National ...	25 24	390	Frankfurt-am-Main ...	48 49	1,083*	Oslo ...	21 19
276.5	Heilsberg ...	28 26	398.9	Midland Reg. ...	49 50	1,153	Kalundborg ...	25 23
279	Bratislava ...	29 27	403	Söttens ...	49 51	1,284*	Moscow (T.U.) ...	29 33
298.2	Huizen ...	30 31	408	Katowice (faint L.S.) ...	50 52	1,348	Motala ...	32 36
301.5	North National ...	31 32	436	Stockholm ...	56 54	1,411	Warsaw ...	34 39
304	Bordeaux Lafayette ...	32 34	441	Rome ...	59 56	1,446	Eiffel Tower ...	39 42
322	Göteborg ...	34 34	453.2	San Sebastian EAJ8 (after 10.30 p.m.) ...	63 60	1,481	Moscow (Old Kom) (when Eiffel Tower closed down) ...	41 43
338.2	Brussels No. 2 ...	38 36	459	Beromuenster ...	64 63	1,554	Daventry National ...	42 45
342	Brno ...	40 37	473	Langenberg ...	65 66	1,635	Königswusterhausen ...	45 53
345	Radio Strasbourg ...	40 38	480	North Regional ...	68 69	1,744*	Radio Paris ...	60 65
349	Barcelona (EAJ 1) ...	41 39	509	Brussels (No. 1) (also heard midday) ...	75 75	1,875	Hilversum ...	70 75
356	London Regional ...	44 43	517	Vienna ...	77 76	J. GODCHAUX ABRAHAM'S.		
360.5	Mühlacker (fair L.S.) ...	44 44	533	Munich (faint L.S.) ...	82 80	*These stations were not working on their advertised wavelength.		
363.3	Algiers (fair L.S.) ...	44 45						

use of the aerial selectivity control, reaction condenser, and combined wave-change switch and volume regulator acting on the screen-grid valve, I found no difficulty in securing reception of Warsaw or Eiffel Tower at will with a perfectly silent background. In the same way with a minute adjustment I was able to listen to a concert broadcast by Mühlacker, a task which has proved difficult in my district with many more expensive and more complicated circuits.

entertainment, many additional broadcasts would be found.

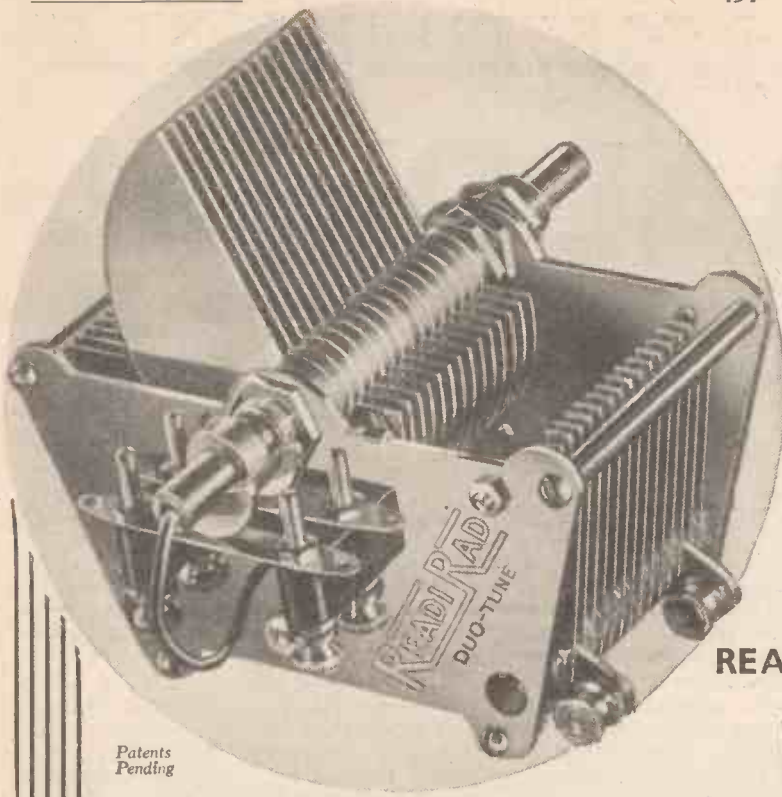
The discrepancy which would appear to exist in the aerial condenser readings is due to the fact that in instances where the frequency separation was relatively small the pre-set selectivity control was mainly relied upon for accurate tuning. As an extra "gadget" it is invaluable, as without its help several transmissions would have been hopelessly marred by neighbouring stations. It is therefore necessary to use it

pares very favourably, in regard to results obtained, with many more expensive multi-valve sets on the market and will be found to supply a long-felt want.

The aim of the AMATEUR WIRELESS Technical Staff, I am told, was to produce a highly efficient three-valve set entirely fed by A.C. mains at an economical price; in the "Home-lover's All-electric 3," without any doubt, they have achieved their object.

PERSONALITIES IN THE WEEK'S PROGRAMMES





Patents Pending

A new invention for ALL-WAVE TUNING

READIRAD

DUOTUNE CONDENSER

READIRAD DUOTUNE
(Extenser Model)
as illustrated above

15'6

Readirad 20-to-1 Slow-motion Extenser Drive .. **3/-**

When building your all-wave set use these Readirad Components:—

- Readirad Dual-Range Coil .. 6/6
- Readirad Short-wave Coil .. 4/6
- Readirad Slow-motion Anti-Capacity Extended Reaction Condenser 7/-

Send for full list of Ready Radio All-wave Equipment

Ready Radio, Ltd., Eastnor House, Blackheath, S.E.3.
Telephone : Lee Green 5678.
Telegrams : Readirad, Blackvil, London.
Showrooms : 159 Borough High St., London Bridge, S.E.1 (2 minutes from London Bridge Station).

The DUOTUNE possesses the unique feature of giving efficient tuning over all wavelengths—long, medium and ultra-short—in one condenser operated by a single knob. It is, in fact, two instruments in one and combines all the advantages of a .0005-mfd. and a .00025-mfd. condenser. When used for tuning the medium and long wavelengths it has a maximum capacity of .0005 mfd. and, in addition, automatically switches from medium to long wavelengths as the knob is turned.

For short-wave work it becomes a .00025-mfd. condenser at the touch of a switch, thus giving the wide station separation and the ease of tuning essential for short-wave reception. It is the complete solution to all problems of efficient tuning of all wavelengths with one receiver.

When used in combination with the Readirad 20 to 1 Slow-motion Extenser Drive the DUOTUNE forms an all-wave tuning control of the most modern and efficient design.

Be sure to use a DUOTUNE when building your all-wave receiver or when converting your present set for all-wave reception. It is the only condenser of its kind. Designed by G. P. Kendall, B.Sc.

POST COUPON NOW

To :—READY RADIO LTD., Eastnor House, Blackheath, S.E.3.

Please send me.....for which I enclose.....
Please send me full details of the DUOTUNE and other Ready Radio All-wave equipment.
(Cross out whichever does not apply)

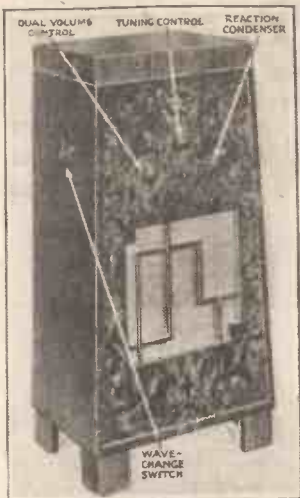
Name

Address

A.W. 27.2.32.

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

SETS OF DISTINCTION



R.I. MADRIGAL BAND-PASS 3

Makers: Radio Instruments, Ltd.

Price: £35

EVER since the first model was introduced in 1929, the R.I. Madrigal has been accepted as an outstanding example of a quality set.

The latest Madrigal, called the 1932 Band-Pass Three receiver, is beautiful to look upon and amazingly faithful in its reproduction of the broadcast programmes. These points need special emphasis, because the Madrigal is not a cheap mass-produced set. It is, as the makers rightly claim, an exclusive production "inspired and built by musicians, scientists, radio experts and craftsmen who know their work."

The beautiful figuring and decorative work of the walnut cabinet should be seen to be fully appreciated. It is a fairly large and yet not an inconveniently large console cabinet of the pedestal type, standing on feet that hide rubber castors, which facilitate moving the set about.

The Madrigal is entirely self-contained and will bring in the local programmes with a rare beauty of tone and more than ample volume, without any externals except an A.C.-mains plug and socket.

A Novel Aerial System

Aerial and earth can be entirely dispensed with because a patent system is utilised whereby a flexible wire of the loud-speaker connecting lead is used as the aerial, while the electric light mains conduit provides the equivalent of an earth system. The Madrigal has, therefore, a special application in flats.

For greater range of reception an external aerial is advisable, with or without an earth connection. It says much for the excellent smoothing equipment that even without an earth there is not the slightest trace of mains hum.

No attempt has been made to cut down the number of controls to an inconvenient minimum. Where simplicity of control is desirable it has been provided. You find a single knob for control of tuning, but there is no undue pruning down of the several subsidiary controls, all of which are needed to give complete satisfaction from a three-valve circuit.

As might be expected, the circuit comprises a screen-grid stage followed by a detector which is transformer coupled to a pentode output valve. An important

feature of the circuit is the use of band-pass aerial tuning. The tuning control works a three-gang condenser, and the three individual circuits are very accurately matched before the set leaves the factory.

This circuit is built into a well-designed metal chassis, with most of the smaller components mounted underneath. In fact only the three-gang condenser and the valves appear above the chassis. Screening is particularly complete.

To drive this set from the A.C. mains a separate power unit is fitted, and this utilises a valve rectifier. The chassis occupies the top portion of the cabinet and underneath is a moving-coil loud-speaker and behind this is the power unit.

This power unit is suitable for all mains voltages between 200 and 250 volts, while a special model can be obtained for supplying voltages between 100 and 120 volts.

Adequate protection against breakdown is provided by means of fuses inserted at appropriate points.

Easy Control

It is only when you come to try out the Madrigal under reception conditions that you appreciate the way the controls are arranged. Nothing could be more simple than the tuning, which, actuating the three-gang condenser, also works a well-calibrated tuning scale, marked in medium waves from 240 to 554 metres in steps of 20 metres and in long waves from 1,000 to 2,000 metres in steps of 100 metres.

To the right of this tuning knob is the knob for reaction. The oscillation point is approached very smoothly, which is an important advantage, as you need to work this reaction control in conjunction with the volume control in order to achieve maximum selectivity.

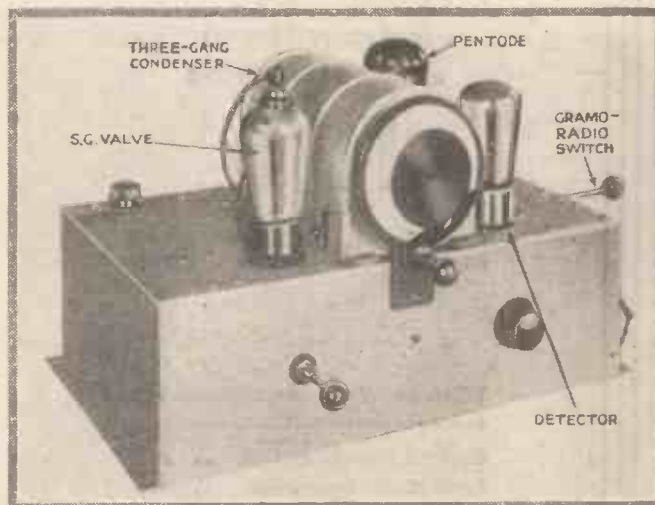
The volume control knob is on the left of the tuning knob and works on radio and gramophone reproduction. This control cuts down the volume

without loss of quality.

Other controls are mounted on the sides of the cabinet, the wavelength switch being on the left and the gramophone switch on the right.

At the back of the cabinet is the mains on-off switch, and near-by terminal plugs give connections for the aerial and earth, if used, and a gramophone pick-up. I was loaned this set for a long week-end, and during that time I was able to bring in most of the worth-while stations at good loud-speaker strength. This set is particularly good on the long waves.

The question of selectivity is, of course,



The chassis of the R.I. Madrigal 3

always an important one when testing a set, but the Madrigal quickly satisfied me. The band-pass tuning shows to excellent advantage, especially when separating adjacent high-power foreign stations.

Prague, North Regional and Langenberg were all tuned in at full loud-speaker strength clear of interference. Similarly, Rome and Stockholm were clear and loud. So were Söttens and Midland Regional. Strasbourg and Hamburg were both tuned in clear of London Regional, so there is no undue local station spread, at least not at twenty miles from Brookmans Park.

I heartily recommend the Madrigal set to critical listeners who want first-class reproduction above all things.

SET TESTER.



Put a Lissen Battery in your set and you will hear at least one instrument in the broadcast dance bands which many listeners have never heard. "Shush . . . shush," says the drum brush, giving a new character to the tune. So quiet, so indefinite, that you can only distinguish it if the high-tension current you use is quite pure. Yet so important that the drummer who puts this character into the music is probably one of the highest paid members of the orchestra.

Why should you be satisfied with "half a band?" Feed your valves with the pure power of a Lissen New Process Battery and hear each individual instrument quite plainly.



THE SECRET OF THE TEST TUBES

There is a Process used in the Lissen Battery which increases the actual life of the cells, offers resistance to volt-drop, deepens power capacity. So much so that A PRINTED LIFE GUARANTEE is given with every Lissen H.T. Battery sold.

60 VOLT
WAS ~~7/11~~
NOW **5/6**
100 VOLT
WAS ~~12/11~~
NOW **9/3**
120 VOLT
WAS ~~15/10~~
NOW **11/4**



LISSEN IMPROVED H.T. BATTERY

LISSEN LIMITED, WORPLE ROAD, ISLEWORTH, MIDDLESEX

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

The NEW "FAVOURITE" THREE

HOW TO OPERATE IT



Further information for those who are building this popular three-valver, constructional details of which were given on pages 384-386 of last week's issue

YOUR "New 'Favourite' Three" should be ready for working if you followed the constructional details given in last week's issue.

The connections are all quite straightforward and if you have the full-size blueprint, at the side of the set when checking the wiring, you simply cannot go wrong, as each lead on the print is numbered and shown in its correct position.

There are one or two little mechanical details which should be given attention after the wiring has been checked. See that the wave-change rod is long enough to allow the switch contacts to make and break properly. Several lengths of rod are available, and if the knob movement is restricted, the insulated piece on the wave-change shaft will not be moved to the extreme on and off positions.

The two-gang condenser shaft should pass easily through the 7/16th-in. diameter hole in the panel. The hole for the escutcheon is cut with its centre 3 1/2 in. above the baseboard. Although the escutcheon hole is of the usual rhomboid shape, the hole cut in the panel is circular, the ebonite boss of the escutcheon fitting in

this and aligning up properly if you have measured off the centres correctly from the print.

Attention to little details like these will make for easy operation.

Batteries and Valves

Now we come to the choice of batteries and valves.

Present owners of old type "Favourite Three's" should note that the existing valves and batteries are, in most cases, suitable, as the stage-by-stage arrangement of the set has not been altered in the new design.

Of course in many cases a great improvement in results can be effected by fitting new valves, especially if the old set has been in use for a year or so. The accompanying table should be your guide.

Suitable types for the detector, L.F. and power stages, are shown for a number of popular makes of valve. Medium-performance power valves are indicated, which will keep the high-tension current consumption of the set down to a minimum.

A medium- or triple-capacity high-tension battery is recommended and a 120-volt job is required. An eliminator

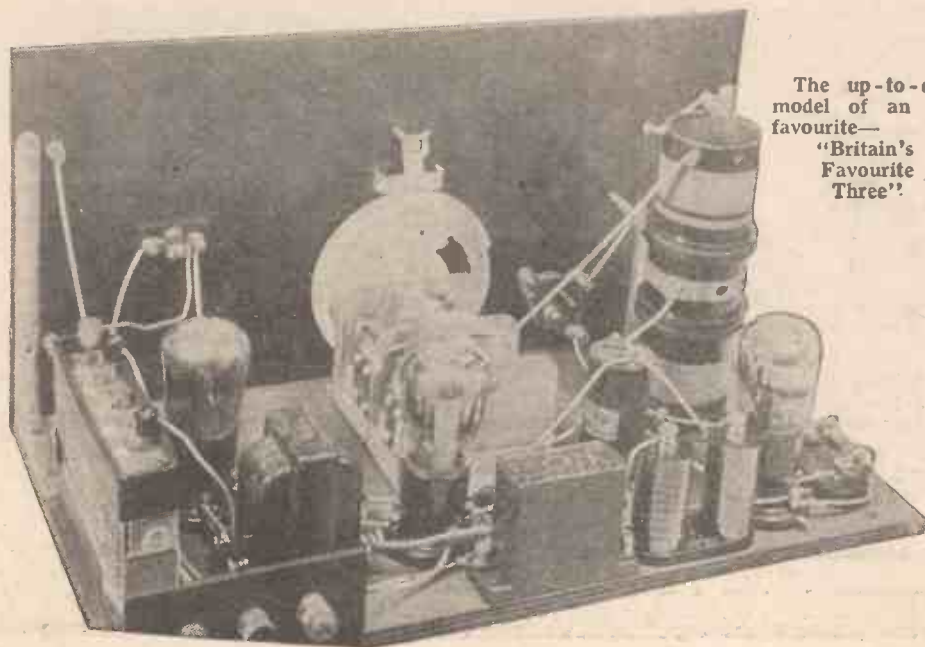
should give 120 or 150-volts and should preferably be capable of standing up to a current discharge of 20-25-milliamperes, without causing a serious voltage drop.

There is only one high-tension tapping in the "New 'Favourite' Three" and this should, of course, be put to the point of highest voltage on the battery or eliminator. The voltages for the L.F. and detector stages are cut down by the 50,000 and 100,000-ohm resistances.

There are two grid bias batteries. The G.B. —1 lead should be put at about 1 1/2-volts on the battery, the G.B. —2 at 7 1/2 or 9 volts and the G.B. positive wander plug, of course, in the positive end of the battery. The aerial, earth and speaker connections are conveniently made in the front of the set.

Operating

If the wiring is O.K., and a reasonably good aerial and earth are employed, you should pick up the local stations at once. Set the reaction condenser with its vanes wide apart, pull out the wave-change switch, switch on the dials and slowly turn the knob of the dual-gang condenser. In all probability stations will be very weak. That is because the trimmer on the condenser has to be adjusted to bring the two sections into gang.



The up-to-date model of an old favourite—
"Britain's Favourite Three"

VALVES FOR THE NEW "FAVOURITE" THREE

Make	Det.	L.F.	Power
Mullard	PM1HL	PM2DX	PM2A
Marconi	HL2	L210	P215
Osram			
Cossor	210Det.	210LF	220P
Mazda	HL210	L210	P220
Six-Sixty	210HL	210LF	220P
Lissen	HL2	L210	P220
Triotron	HD2	SD2	2D2
Tungsram	H210	LG210	P215
Fotos	BC18	BC9	BD5
Eta	BY2023	BY2010	BX604
Dario	HF	S. Det.	SP

This adjustment of the trimmers is quite easy, but you will need to make constant readjustment for ten minutes or so to get the set sharply tuned. There are two concentric tuning knobs on the two-gang condenser and the smaller one should be set so that the vanes are about half

(Continued on page 462)

A SURPRISE PACKET FROM FERRANTI



5/6

**THE NEW AF10
TRANSFORMER
RATIO 1:3**

A welcome surprise from Ferranti. Just what the Radio world has been hoping and waiting for. A transformer in the very low-price class that is really good. Good inside and out. Good from the core to the performance curve.

The name Ferranti is of world-wide repute wherever L.F. Transformers are known. The famous AF5 gives a performance which has never yet been surpassed.

You can be certain it's good if it's Ferranti, because Ferranti would not run the risk of damaging their great reputation by releasing a product that is not as good as it can be made for the money.

The new AF10 is NOT the AF5, but it bids fair to dominate the low-price class just as the AF5 dominates the quality class.

FERRANTI LTD. Head Office and Works : HOLLINWOOD, Lancs. LONDON : Bush House, Aldwych, W.C.2.

Please Mention "A.W." When Corresponding with Advertisers

"HOW THE 'HOME-LOVER'S ALL-ELECTRIC 3' WORKS"

(Continued from page 438)

The connections between the detector and the output power valve are perfectly standard, comprising a de-coupled transformer, with a 20,000-ohm de-coupling resistance and a 1-microfarad de-coupling condenser.

The power output circuit is also very straightforward. The .0001-microfarad fixed condenser has been connected across the transformer secondary to prevent undue accentuation of the very high notes and minimise interference due to heterodyning.

The 750-ohm bias resistance in the cathode lead of the power valve provides roughly 13 volts grid bias. This is, of course, at the expense of anode volts, so although there is a 200-volt high-tension supply, the anode actually gets about 187 volts. The bias resistance is shunted by a 1-microfarad fixed condenser.

I have now analysed all the essential details of the circuit used in the "Home-Lover's All-electric 3," but so far I have not mentioned the power supply. An entirely separate circuit is used for obtaining power from the mains to drive the three receiving valves.

It consists essentially of a mains transformer, a mains rectifier valve and a smoothing choke. The mains transformer has three secondary windings, two of which are for the mains rectifying valve, one going to the two anodes and the other supplying filament current. The

third secondary provides the A.C. for heating the filaments of the three indirectly-heated receiving valves.

The centre tap of the anode secondary gives us the negative high-tension output terminal and the centre tap of the rectifier filament transformer gives us the high-tension positive output terminal. Across these two terminals is connected a 2-microfarad fixed condenser. Then comes a smoothing choke in series with the positive side of this condenser and the positive output terminal. Across the output is another 2-microfarad fixed condenser. The two condensers and the choke altogether form the smoothing circuit.

A very important feature of this power unit circuit is the provision of two 1-microfarad fixed condensers between the anodes of the mains rectifying valve and the centre tap of the filament of this valve.

I hope this description of the theoretical circuit of the "Home-Lover's All-electric 3" has clearly shown how much careful thought has been expended by the designer. The minute attention to circuit details has been amply rewarded by the results I have experienced with this set. It is uncannily selective considering that there are only two tuned circuits. It has a rare "pep"—getting foreign stations with great ease. Mains hum is entirely absent. Control of volume, as effected by the new variable-mu valve, is a revelation. And finally, the general "feel" of the set is most satisfactory, all the controls working admirably.

THE "NEW 'FAVOURITE' THREE"

(Continued from page 460)

out. That is the trimmer adjustable from the front of the set. The other trimmer is a small knob at the side of the condenser.

Turn the main knob of the two-gang condenser until a local station is picked up and tuned in as accurately as possible. Slight adjustment of the trimmer on the side of the condenser may make the station weaker, but as the main knob is turned a little one way or the other, the strength may be increased.

You must find the best adjustment of the trimmer on the side of the condenser so that the station comes in as loudly as possible and so that as the condenser is turned up to the point of tune, the station gets rapidly to its full volume and decreases as the knob is rotated further.

In this way you will get a distinct tuning "hump" for each station.

If, on a first test, you gang up on a station which comes in at about 50-degrees on the dial, then stations down the 10-20 degree end and up at the 90-100 degree end may not come in strongly, or may give double-tuning humps.

This can be corrected by turning the small knob at the front of the set to one side or the other. The correct procedure is to tune in a station as loudly as possible, with the main condenser knob, using a judicious amount of reaction and then to make a rapid trial and error adjustment of the small concentric knob, to see if this makes any increase in strength.

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1 Telsen 25,000-ohm Spaghetti Resistance	1 0
1 Telsen .01-mfd. Mansbridge Condenser	1 6
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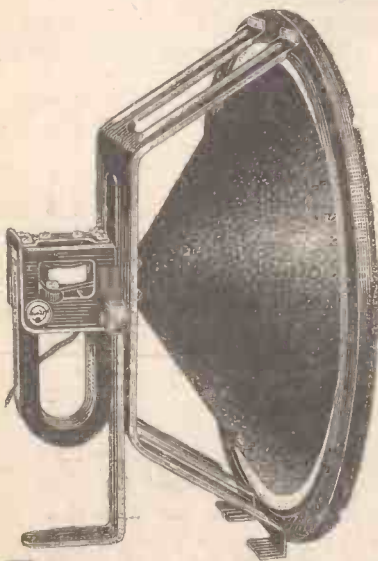
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A weekly review of new components and tests of apparatus conducted by J. H. Reyner, B.Sc., A.M.I.E.E.

Eddystone Short-wave Condenser

THE name Eddystone has been associated with short-wave products for some years. The firm has made a speciality of this class of reception, and has developed many components in which special attention has been paid to the refinements necessitated by the ultra-high frequencies in use.

The Eddystone short-wave condenser which we are reviewing this week is an interesting sample of this class of production. There is a surprisingly small amount of spare metal in the construction. The main bearing is carried in a small metal stamping on which are screwed three protruding arms of an insulating material which has been chosen on account of its low dielectric loss. At the end of these arms are three pillars which carry the fixed plates, these being assembled by being forced into grooves in the pillars, the joints sweated up to form a thoroughly firm contact.

A somewhat similar construction is used for the moving plates which are forced into grooves in the centre boss, while the spindle is carried in a journal $1\frac{1}{8}$ in. long. No second bearing is provided, nor does it appear necessary as there was absolutely no shake on the condenser.



A good short-wave component, the Eddystone variable condenser

The spindle and the bearing are of brass, and one end of the bearing is split so that it forms an excellent rubbing contact with the spindle. Owing to the use of two similar metals it appears that this gives quite a silent operation, and avoids any possible inductive effects which might arise from the use of a pigtail.

The condenser is of .0003 microfarad and is not only solidly constructed, but has obviously been carefully thought out. Terminals are provided on each of the three pillars holding the fixed plate so that leads may be taken from the most convenient point on the condenser, and closed loops in the tuning circuit thereby minimised. This, of course, is an important point in short-wave technique.

Puretone Unit

THE new Puretone speaker unit placed on the market by Messrs. J. and H. Walter, Ltd., is a small neatly made instrument of the moving-iron pattern. The

(Continued on page 466)

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2 Telsen Grid-Leak Holders	1	0
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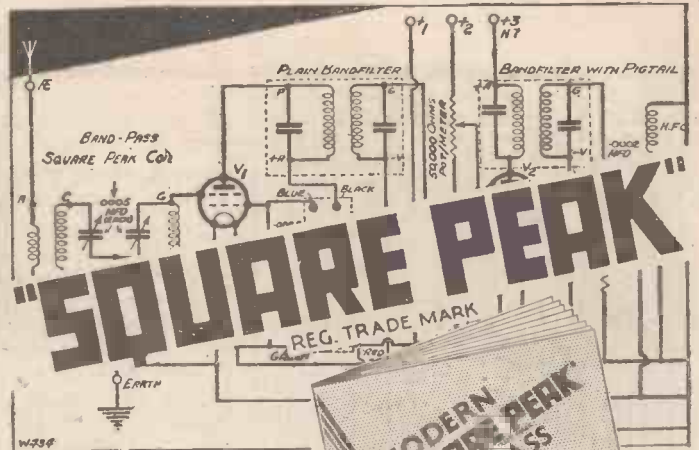
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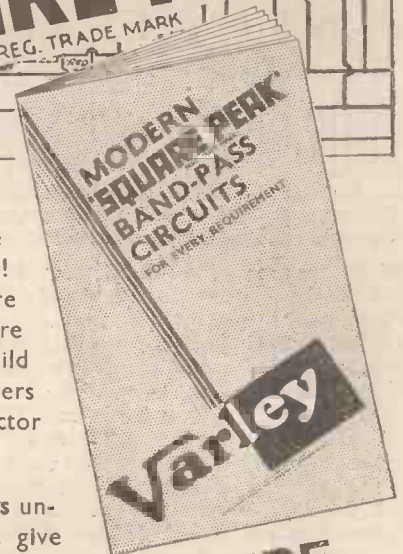


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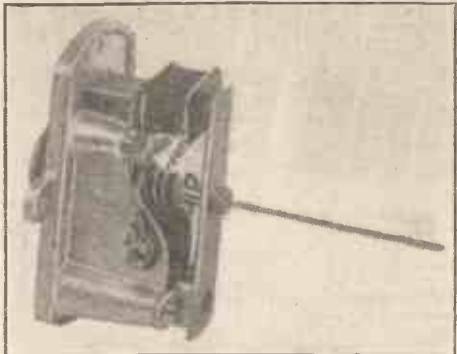
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A.W.

"WE TEST FOR YOU"

(Continued from page 464)

movement is of the common differential type and employs a ring magnet, rectangular in shape. The operating coil with its associated pole piece is mounted at one



A Puritone speaker unit with the cover removed showing the armature movement

end of the magnet, while the armature is held firmly against the other end. This armature is in the form of an L, its free end being positioned just above the pole piece, and moving in a gap formed by this pole piece and another which encircles the coil. The armature is controlled by a spring, its exact position in the gap being adjusted by means of a screw at the back of the unit. The unit is built upon a cast aluminium base, the cover being of pressed aluminium. On test the unit was fitted to a 9-in. cone and mounted behind a three-foot baffle board. For so small a unit the overall results were really very pleasant, the frequency response

being fairly good from about 200 cycles to about 3,000 cycles. The sensitivity was, perhaps, a little below the standard.

The unit was capable of handling sufficient power for all normal home uses, but if the input was much increased, rattling occurred. The retail price is 7s. 6d:

New Igranic Transformer

THE Igranic Parvo intervalve transformer on which we are reporting this week is a very small neatly made component of conventional appearance. It is housed in a moulded bakelite case, shaped to fit the core and winding, and extended at the base to carry the terminals and lugs for baseboard mounting.

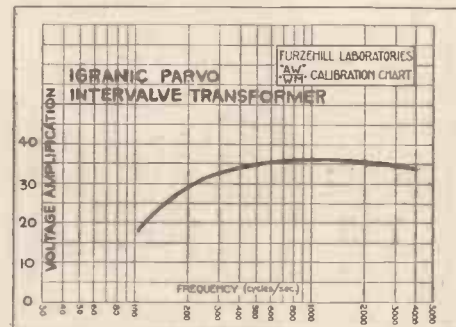
The transformer has been designed for parallel feed circuits, or in direct-coupled circuits if the steady current does not exceed some 3 milliamperes maximum. The core is constructed of laminations of a special high-permeability iron which enables a good primary inductance to be obtained when carrying the maximum direct current. The overall dimensions are 2½ in. by 1½ in. by 1½ in., and its small size should make it very suitable for use in portable or other receivers in which economy of space is essential.

A test was conducted with the object of determining the voltage step-up to be obtained from an amplifying stage employing the transformer. The direct-coupled circuit was used, with an L210 type valve preceding the transformer, the steady anode current being just under 2 milliamperes, which is well within the range allowed.

It will be seen from the curve accompany-

ing this report that the overall amplification obtained is between thirty and thirty-five over the greater part of the audio-frequency range. The results obtained will, of course, be modified by use of the parallel-feed scheme, a somewhat lower amplification being obtained, but with more bass response. It is useful, however, to find that the performance is quite creditable even when using the simple direct-coupled circuit.

The actual effective step-up ratio of the transformer can be obtained at any point by dividing the overall amplification as



Performance curve of the new Igranic Parvo transformer

read from the curve by 15.6, the amplification factor of the valve, and will be seen to be just over 2 for the greater part of the range. The primary inductance measured with 1 milliampere A.C. was approximately 75 henries with no D.C., while with 3 milliamperes D.C. this fell to 18 henries. The transformer is good value for money.

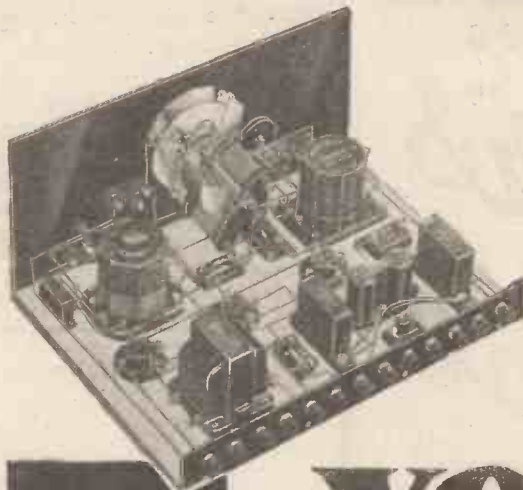
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Here "Observer" reviews the latest booklets and folders issued by well-known manufacturers. If you want copies of any or all of them FREE OF CHARGE, just send a postcard giving the index numbers of the catalogues required (shown at the end of each paragraph) to "Postcard Radio Literature," "AMATEUR WIRELESS," 53/61, Fetter Lane, E.C.4. "Observer" will see that you get all the literature you desire. Please write your name and address in block letters.

A Good Inductor

It seems to me that the Blue Spot inductor speaker, type 100U, is deservedly popular just now. The special inductor unit fitted to this model can be matched up without alteration with a pentode or triode, and although remarkably sensitive it will stand full power-stage volume without overloading. The principle of this type of speaker is good, and technical details of the Blue Spot 100U are given in a folder, copies of which you can get free through my catalogue service. Mention number. **712**

New Polar Condenser

I hear that the Polar people are bringing out a new Condenser in the .00075 size, which appears to be very popular just now. The tuning range covered is, of course, greater than with a standard .0005-microfarad condenser. Full technical details can be had free. **713**

New Igranic Folder

There are some novelties in a new pocket-size Igranic folder. Igranic super-hot coils, new dual-range coils, midget transformers, spaghetti resistances, and handy switches and jacks are among the new parts. Set constructors should get a copy of this. **714**

Mullard DO25

Owners of Mullard loose-leaf catalogues should get the new sheet, VR106/2A, giving details of the DO25 amplifying valve. This takes 1.1 amperes at 6 volts (it can be mains-operated), and is suitable for an anode voltage of up to 400. **715**

Garrard Gramophone Motors

Gramo-radio enthusiasts should have the new Garrard folder. Spring and electrically driven motors are described. There are two induction motors in the range and one universal motor for A.C. or D.C. working. **OBSERVER. 716**

On March 19, listeners to the Belfast programme will hear a relay of a concert in aid of the Musician's Union Benevolent Fund, in which the Belfast Wireless Symphony Orchestra will be conducted by E. Godfrey Brown.

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A.W. 27/2/32



IN MY WIRELESS DEN

Weekly Hints —
CONSTRUCTIONAL & THEORETICAL
BY
W. JAMES

Rectifier Advice

METAL rectifiers are used in most A.C. mains units and in many A.C. receivers because of their reliability.

The life of this type of rectifier is to be measured in years, provided the rectifiers are used according to the published information. It is necessary, for example, to see that the rectifier is fitted in a position in the set or mains unit where the ventilation is enough to avoid over-heating. A rectifier used in a closed box might overheat and eventually lose its usefulness.

The output from a rectifier is found to vary a little with the temperature. When first switching on, the output is less than when the parts have warmed a little after, say, half an hour's working. This is an important point to remember, because, if the value of the A.C. input is adjusted in order that the output soon after switching

on shall be the maximum rated value, there is a chance that the output may increase after running for a time and this may shorten the life of the rectifier.

Ganging Circuits

I have often said in these notes that you cannot gang true, using an ordinary condenser, two coils having different inductive values.

It is easy enough to show this by simple arithmetic. The two circuits will be in tune so long as the product of the capacity and inductance of the separate circuits is equal. Now suppose one coil has an inductance of 200 microhenries and the other of 182.

Then if the circuits are brought into tune by adjusting one of the trimmers we have, with the gang condensers set at .0001 microfarads, accurate tuning at this point. Thus,

Coil inductance.	Capacity trimmer.	L.C. value.
200	.0001	.02
182	.0001 + .00001	.02

When the gang condenser is adjusted to .0002 microfarad the position is as follows:

Coil inductance.	Capacity trimmer.	L.C. value.
200	.0002	.04
182	.00021	.038

The circuits are, therefore, no longer in tune and the error increases as the capacity of the gang condenser is raised by tuning.

Pentode Quality

It seems to me that the pentode power stage has taken the place of the parallel connected and push-pull output stages that were so widely used not very long ago when a fair amount of volume was needed.

(Continued on page 469)

What "Audirad" is - and does

Practically all L.F. chokes are defective to the extent that they offer no appreciable impedance to currents of a frequency much higher than some few thousands of cycles per second. In other words, the impedance offered by low-frequency chokes is proportional to the frequency of the currents they attempt to pass up to a limiting frequency, beyond which the choke fails in its purpose and begins to function as a capacity and not as a choke, with the result that many of the frequencies, known as interference frequencies in mains circuits, are not impeded by ordinary chokes but are simply by-passed or conducted by choke capacity.

DUX AUDIRAD is an entirely new form of choke capable of dealing with low frequencies and high frequencies which an ordinary choke cannot do. It incorporates an H.F. "stopping" device which effectively bars H.F. current that normally would be passed by the self capacity of the ordinary L.F. choke and cause hum or other H.F. interference.

FOR MAINS UNITS AND SETS In mains circuits it is an extremely efficient smoothing or output filtering device for A.C. or D.C. sets, and reduces the passage of unwanted H.F. impulses to absolute minimum.

FOR BATTERY SETS It gives super output filter service and is satisfactory for practically all receivers and amplifiers. It ensures freedom from unwanted current fluctuation and as a result gives better speaker performance.

Ask for the "Dux" Audirad Leaflet which includes diagrams and full technical information.

L.F. Inductance - 25 Henries
H.F. Inductance of H.F. Stop-
per - 10,000 micro-henries
Maximum D.C. Current-50 m.a.

Overall dimensions:
2 ins. x 2 1/4 ins. x 2 1/4 ins.
Weight - - - - 15 ozs.
List No. - - - - DY31

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Specified for the "Home-Lover's All-electric 3"



RIDUX THE DUAL PURPOSE
AUDIRAD Choke for L.F. and H.F.

LTD.

Advertisement of Radio Instruments Ltd., Croydon, England. Phone: Thornton Heath, 3211

I doubt, though, whether the quality obtained from the usual pentode stage is as good as that from, say, a push-pull stage fitted with ordinary valves. The point that always strikes me about the pentode stage is that it must be so carefully adjusted in order to obtain decent quality.

In many sets having a pentode power valve the quality is not very good, simply because the circuit has not been properly made up to suit the loud-speaker and the characteristics of the set as a whole.

The push-pull stage has advantages in that overloading does not produce very serious results and smoothing is easier. A pentode stage that is even slightly overloaded usually distorts badly, and I, personally, would rather have the push-pull circuit.

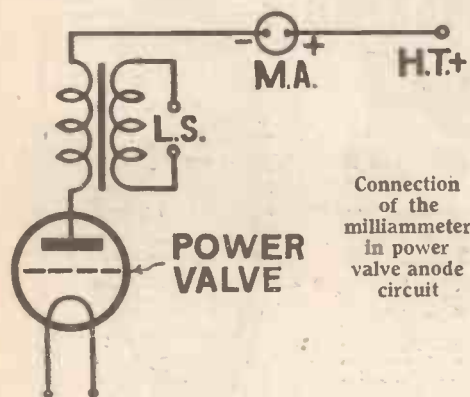
Watching It Move!

It is very interesting to watch how the needle of a milliammeter moves when the instrument is joined in the anode circuit of a power valve, especially when the valve is one of the steep-slope modern ones.

The meter is joined as shown in the accompanying diagram. First adjust the grid bias to the value indicated by the makers and then switch the set on and note the current. Tune in a signal and do not get it so strong that the needle vibrates. Now reduce the bias a little. The anode current increases, of course, and probably the needle no longer stays steady, but varies its position, loud notes moving it below its normal point.

This shows that distortion is occurring. The current is greater than necessary and there is distortion.

Now make the grid bias a little greater than the normal value. Note that the



Connection of the milliammeter in power valve anode circuit

current is less than before and that now a strong signal tends to move the needle further across the scale. The position now is that there is distortion and the current is below normal.

If the distortion is audible you cannot work the valve with this value of grid bias, but you must go back to the correct value. A point of interest in the test is that nothing is gained by having more than the normal high-tension current.

On March 9 a recital by Joyce Haydon Bull and Jenny Ware will be given. Following this West Regional listeners will hear the Bon Marché Light Orchestra, relayed from the Bon Marché Restaurant, Gloucester.

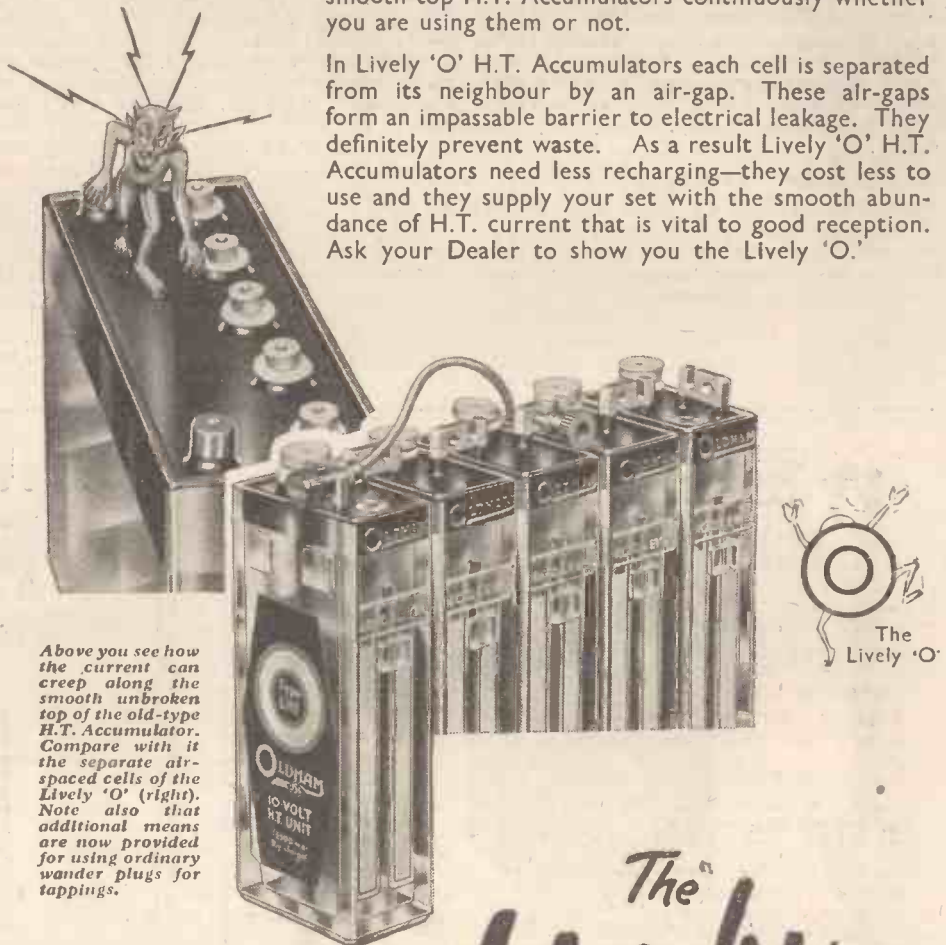
A symphony concert by the Leicester Symphony Orchestra from the de Montfort Hall on March 10 will be led by Grace Burrows.

BAULK THE LEAK THIEF!

Lively 'O' Air-spaced H.T. Accumulators definitely end electrical leakage

If you use an old-fashioned, smooth-top H.T. Accumulator you are harbouring a menace to your pocket and to your set. Electrical leakage can sneak along smooth top H.T. Accumulators continuously whether you are using them or not.

In Lively 'O' H.T. Accumulators each cell is separated from its neighbour by an air-gap. These air-gaps form an impassable barrier to electrical leakage. They definitely prevent waste. As a result Lively 'O' H.T. Accumulators need less recharging—they cost less to use and they supply your set with the smooth abundance of H.T. current that is vital to good reception. Ask your Dealer to show you the Lively 'O.'



Above you see how the current can creep along the smooth unbroken top of the old-type H.T. Accumulator. Compare with it the separate air-spaced cells of the Lively 'O' (right). Note also that additional means are now provided for using ordinary wander plugs for tappings.

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(2,750 Milliamps)
Each

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TYPE LHT
Extra large capacity 10-volt Unit
(5,500 Milliamps)
Each

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9837

OUR LISTENING POST

By JAY COOTE

CONDITIONS during the past week have not given cause for any special grumble and long-distance transmissions have been well received. Between 1 and 4 a.m. it is still possible to hear a number of American broadcasts on the medium waveband.

No doubt, many of you will have noticed the total disappearance—or, alternately, the merely casual appearance—of Madrid (EAJ7) in your logs. The fact is that the transmissions on most evenings are completely swamped by Moscow-Stalin. For your guidance, however, you should know that the Spanish broadcasts from the capital do not all emanate from EAJ7, but that Radio Espana shares both time and wavelength with the older transmitter. EAJ7 is on the air daily from 7 to 8.30 p.m. and again from 10 p.m. until midnight, except on Mondays, when its work is taken over by Radio Espana running a continuous performance between 5 p.m. to midnight and sometimes to a later hour. On other days Espana makes but a short appearance, namely, from 5 to 7 p.m. G.M.T.

New Prague Wavelength

Have you picked up a call from Prague recently on 210 metres? It is a channel allotted to Czecho-Slovakia, of which up to the present that country has made little use. Tests, however, were carried out with the old Prague transmitter on Sunday (February 14) between 2 and 2.30 p.m.; on Thursday (February 18) between 4 and 4.30 p.m., and again on Saturday (February 20) between 6.15 and

6.45 p.m. Make a note of the wavelength, as these experiments are to be repeated with a view to the establishment of an alternative programme service. As the station is rated at 3 kilowatts, in the later hour the signals should be well heard in the British Isles.

Although at different times, through Continental stations we have heard many operative relays, to date the Paris Grand Opera House has persistently refused to be linked up to a microphone. If, however, you switch over to Radio Strasbourg on February 29 you may hear Wagner's *Valkyrie* as performed at the Municipal Theatre at Metz by singers from the Grand Opera House, Paris.

"Canned" Music at Brussels

Both Brussels stations are now to be heard daily at 12.15 p.m. with a programme of gramophone records; although favouring "canned" music for these transmissions, they provide an alternative entertainment. On some days, for experimental purposes, tests are still being carried out with a 500-watt regional transmitter working on 283.6 metres. They are irregular, but may occasionally be picked up on Sundays between 10.30 a.m. and midday. A female voice usually gives out the following call: "*Ici poste d'essai régional à faible puissance (at low power) de la Société Belge Radio-Électrique,*" and announcements are made in both Flemish and French.

In the matter of small fry, Belgium is rapidly overhauling France; Liège appears to be a centre of great activity. If you care to make a search, here are the details of four

newcomers. Try for Liège-Régional on about 216 metres; on weekdays it broadcasts between 11 a.m. and midday, and again from 4 to 5 p.m. Liège-Expérimental works on 240.8 metres every day from 5.30 to 7.30 p.m. and on Sundays from 10 to 11 a.m. From 2 to 6 p.m. Radio Wallonie, which previously transmitted on 280 metres, has now reduced its wavelength to 208.3 metres, and gives out programmes on Mondays, Wednesdays, and Fridays from 7.30 to 9.30 p.m., and on Sundays from 4.50 to 7 p.m. On 259 metres Radio Cointe is to be sought for on Sundays between 9 a.m. and 2 p.m.; on Mondays, Thursdays, and Saturdays between midday and 2 p.m., and again from 8 to 11 p.m.

WIRELESS IN PARLIAMENT

CAPTAIN PETER MACDONALD asked the Postmaster General if he could state at what date it was anticipated that it would be possible to commence the Empire broadcasting service; and whether any of the dominions or colonies had yet expressed their intention of making any contribution towards it.

Sir Kingsley Wood said he understood that the work of constructing a new station for Empire broadcasting was in hand, and that the British Broadcasting Corporation hoped to be able to provide a regular service from this station before the end of the present year. The scheme was being financed entirely out of the Corporation's revenue, and no question of overseas contributions would be raised until the new service had been established. The Corporation was free, however, to reopen this question in the future.

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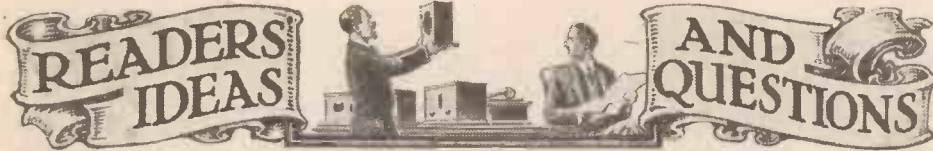
Write us for descriptive Literature, sent post free and ask your dealer to give you a demonstration.

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BRITISH MADE.

Type 100

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"Short-Wave Results"

SIR,—In reply to "H. L. Prestwich's" letter in a recent issue, I stand corrected. This should have read "midnight in London (to-day)" equivalent to 10 a.m. to-morrow morning at Sydney. I cannot blame the compositor as I find this slip of the pen in my original "copy."

With regard to the "mystery" Italian station it was the high-power transmitter at Coltano (Pisa) testing with a view to the establishment of a short-wave wireless telephony service. "Jay Coote."

Television Transmissions

SIR,—In "A.W." for February 6 I noticed a paragraph to the effect that there are television transmissions from P.T.T. on the Barthelemy system.

I have now had an opportunity of investigating this, and learn that there are regular daily television transmissions from the P.T.T. station, but these are by the Baird process, using Baird apparatus. Furthermore these transmissions are associated with sound in a manner similar to the dual Baird transmissions emanating from Brookmans Park.

H. J. Barton Chapple, (London, N.W.7).

From North Borneo

SIR,—With regard to Empire broadcasting, we too would like to be able to listen to a home programme, being English ourselves, but unfortunately Chelmsford is too weak for us to listen to and enjoy. We should get the luncheon hour programme here at 8.30 p.m., but we can only get the carrier wave and very faint distorted music.

At 9 p.m. sharp, coming down the dial we hear Paris Radio Coloniale perfectly, likewise Khabarovsk (Siberia), and Kootwijk (Holland), but no English station! We hear several Australian stations, with the Sydney-London telephony particularly strong the Sydney end, but not a sign of London at the other end!

I should like to mention Saigon and Manila, our two best stations, the latter especially as the programmes which go on all day are sponsored, and therefore the most versatile and interesting station "on the air" as far as we are concerned. This is a medium wave station, 500 metres, call sign KVRM Radio Manila. It is a long time to wait for the new Daventry station, and we get rather tired of hearing Dutch, French, Russian, American, and other foreign languages. Cannot we get a little stronger transmission and more frequent programmes from Chelmsford?

I am sure all overseas listeners in Malaya, if not elsewhere, will appreciate more English.

D.T. (British North Borneo.)

Output Valves

SIR,—"Thermion's" remarks on the limited handling capacity of two-volt output valves suggest to me that he may not have tried out Pen 220A carefully matched to the speaker.

For years I have aimed at "1-watt

undistorted." This I take to be the limit required for nearly all domestic purposes. The Pen 220A arrived simultaneously with mains at my house, but I have not the slightest desire to change over from my present arrangement to mains valves.

I use quite a "hot" super-het. in front of an L2 second detector resistance coupled to a small power valve which is again resistance coupled by very low step-up to Pen 220A, on 150 v. 150 v. The latter is carefully matched to an inductor speaker. A 250 volts supply of W.H.10 accumulators feed the L2 and L.F. valves (before voltage drop), and the whole arrangement is very completely filtered and decoupled.

As far as I can judge by meter readings, the pentode overloads first, and by this time the volume is intolerably great for the average room; and as an old Mazda S.G.207 has been found to be a very quiet first detector, pronounced "hiss" is not evident on many European stations.

A. F. K. (Evesham.)

"Britain's Super"

SIR,—I have built the "Britain's Super" and whilst I am entirely satisfied with the number of stations I can receive, I feel that a little more power from the stations would give me the last word in what, in my opinion, I would call a first-class receiver. Do you recommend my adding a further low-frequency amplifying stage to get the extra power I require or are there any other modifications you could suggest to enable me to get what I require? D. McD. (Aberdeen).

As we have already anticipated the requirements of those readers residing at great distances from the southern British and Continental stations and are now experimenting with a more elaborate version of the "Britain's Super," we suggest it would be to your advantage to await publication of the revised set of this name before going to needless or unnecessary expense. During your wait, however, you could experiment by using a screen-grid H.F. valve in place of your bi-grid first detector. The alterations to the wiring, to use an S.G. valve are as follow. Disconnect wire No. 25 from the anode terminal of the valve holder and connect it to the actual anode terminal on the top of the S.G. valve. Now take the flexible lead No. 64 and connect it to the terminal marked p on the first detector valve holder. You should apply a full 120 volts to the anode of the valve, via H.T. plus 1, to get satisfactory rectification.—Ed.

Two religious services will be relayed for West Regional listeners on March 6, one Welsh and one from the West Country. The former at 6.30 p.m. is the monthly Welsh service relayed on the Daventry National wavelength.

A repeat performance will be given from Glasgow station on March 10, of one of the most successful of last year's plays—*Empire's End*, by W. Cumming Tait.

Mr. Joseph F. Duncan will broadcast on March 9 to the Scottish Region. His subject is "Emigration—The Closed Doors."

DELIBLE LETTERINGS

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FOR EVERY RADIO CONNECTION

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The

ECONOMY RADIO GRAMOPHONE



PRACTICAL GUIDE TO GRAMO-RADIO

A special feature of the March issue of WIRELESS MAGAZINE is a 20-page practical guide to gramo-radio. Here are the articles it contains: Getting the Best from Your Pick-up, by S. Rutherford Wilkins; Electric Drives for Turntables; Pick-up Damping, by Noel Bonavia-Hunt, M.A.; More About Feather-weighting; Overhauling Your Electric Gramophone Motor, by E. J. G. Lewis; Your Choice of New Records, by Whitaker-Wilson; and Long-playing Records, by P. K. Turner, M.I.E.E. Everything you want to know to get the best results!

OTHER FEATURES

This 132-page number contains fifty fine features covering every radio interest and is "The Best Shillingsworth in Radio." Some of the contents are: Are We Using the Right Type of Condenser? by P. K. Turner, M.I.E.E.; The Double Band-pass Four, a Screen-grid Set with Two Band-pass Tuning Circuits; Secrets of Super-hot Success, by W. James; "The A-P-A," an A-quality Power Amplifier and Power Supply Unit for A.C. Mains, by P. K. Turner, M.I.E.E.; How a Play is Broadcast, by Frank Rogers; Microphones: Some Recent Developments, by H. J. Round, M.I.E.E.; and Radio Medley, by BM/PRESS.

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With this set ample loud-speaker volume can be obtained for many stations. There is good volume also for the electric playing of records, as two of the valves are used for gramophone reproduction. As this is a battery-operated set, a clockwork motor has been used for driving the turntable. As it stands the outfit is ideal for those with no electric light available.

This set is so designed that constructors who already have a number of spare components on hand will be able to use them in the assembly of this radio gramophone. It is no exaggeration to say that even the beginner will have no trouble with the construction.

Full constructional details, together with many diagrams and photos, are given in the March issue of the WIRELESS MAGAZINE, now on sale. Do not fail to get your copy to-day.

WIRELESS MAGAZINE

ON SALE TO-DAY, PRICE 1/-

OF ALL BOOKSTALLS



ANOTHER concert by the Leeds Choral Union will be relayed from the Town Hall, Leeds, on March 2.

The North Regional programme on February 28, will begin with a song recital by Ivan Mellodew.

Kenneth Ellis will be the vocalist at an evening concert by the Western Studio Orchestra on March 6.

An American radio enthusiast, whose wife had presented him with twins—a boy and a girl—named them respectively Mike and Condensa!

Jack Hylton and his famous band will give their first broadcast from a B.B.C. studio for several years on March 1. The programme will last an hour, will be heard by Regional listeners, and will be repeated on March 2 for National listeners.

On Sunday, March 6, Mr. Ainley will broadcast from the studio at Sir Barry Jackson's Repertory Theatre, Birmingham, in scenes from *Hamlet*. This is a Midland Regional programme.

The religious service for the whole country on February 28 will be relayed from Carlisle Cathedral, and the Bishop will give the address.

On March 4, the Northern Studio Orchestra and the Talk-o'-th'-Hill Male Voice Choir will give a concert.

The fifth of the present series of contemporary concerts takes place on March 4, when Bela Bartok's works will be performed. The composer will appear as soloist.

February 29 will see another entertainment by the Yorkshire Mummers, one of the most popular broadcasting concert parties.

A running commentary on the international rugger match between Wales and Ireland will be given by Captain H. B. T. Wakelam, on March 12, and relayed from Arms Park, Cardiff, in the National programme.

Conducted by Harold Gray, the City of

Birmingham Orchestra will give a Children's Concert on March 12, which will be relayed from the Birmingham Town Hall to Midland Regional listeners.

The annual concert of the Glasgow Caledonian Strathspey and Reel Society takes place in the St. Andrew's Hall, on March 12, from which a half-hour's extract will be relayed.

The Coburn Sisters, who will entertain in the Midland Regional programme on March 7, were two of the very first artistes to broadcast from the old Bournemouth station.

The Olympic Games, which this year are taking place at Los Angeles, California, are to be the subject of an international broadcast. On July 30, the Columbia Broadcasting Company of America will transmit a running commentary on the arrival of the competitors at the Los Angeles stadium. This broadcast will be relayed to a number of short-wave stations and arrangements have already been made to "pick up" the broadcast and to pass it on to Königswusterhausen and other German high-power transmitters.

It is expected that the new 75-kilowatt Leipzig station will be ready for its first tests by next June; it will exchange wavelengths with Frankfurt-am-Main.

In future, all radio-telegrams in Italy are to be called *marconigrams* and the former word is to be deleted from the Italian language.

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FOR EVERY TEST



Be your own radio doctor with the famous Wates "3 in 1" Pocket Meter. Its dead beat accuracy finds every fault. Tests L.T. (0-6 volts); H.T. (0-150 volts); Current consumption (0-30 milliamps). High resistance. All readings on one dial. This proved best meter is **BRITISH** made and finest value for your money. Ask your radio dealer or send for details.

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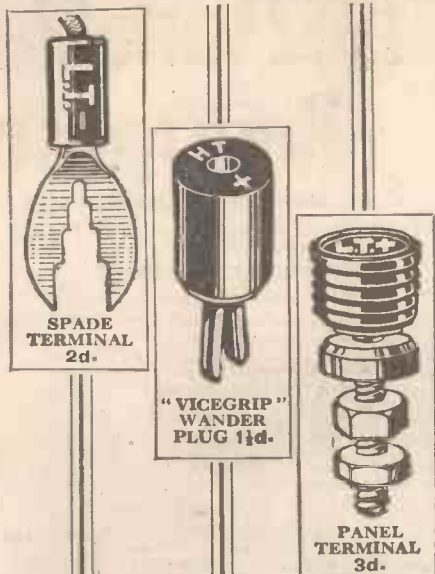
Select walnut veneer front, top and sides, hand-carved corners with solid side panels polished a rich two-tone shade walnut, satin finish, with oxidised fittings. Fluted and turned legs with opening at back of Cabinet. The fret is backed with black and gold silk. Height, 36 in.; baffle board, 19 in. by 13 in.; width, 22 1/2 in.; set board, 10 1/2 in. by 12 in.; depth, 17 in. Walnut, £5 12s. 6d.; mahogany, £5 7s. 6d.; oak, £5.

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Broadcasting Stations classified by country and in order of wavelengths. For the purpose of better comparison, the power indicated is that of the carrier wave.

Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)	Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)	Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)	
GREAT BRITAIN												
25.53	11,751	Chelmsford (G5SW)	10.0	315	950	Marseilles	1.6	LITHUANIA				
242.3	1,238	Belfast	1.0	327.5	916	Grenoble (PTT)	2.0	1,035	155	Kaunas	7.0	
201.6	1,147	London Nat.	50.0	329.3	911	Poste Parisien	1.2	NORTH AFRICA				
288.5	1,040	Newcastle	1.2	345.2	869	Strasbourg (PTT)	11.5	863.4	825.3	Algiers (PTT)	16.0	
288.5	1,040	Swansea	0.12	370.4	810	Radio LL (Paris)	0.5	416	721	Radio-Maroc (Rabat)	8.0	
288.5	1,040	Plymouth	0.12	also on 61 m. (4,198 Kcs.)					and 32.26 m. (9,300 Kcs.)			
288.5	1,040	Edinburgh	0.3	384.4	779	Radio Toulouse	8.0	NORWAY				
288.5	1,040	Dundee	0.12	447.1	671	Paris (PTT)	0.7	235.5	1,274	Kristianssand	0.5	
288.5	1,040	Bournemouth	1.0	466	644	Lyons (PTT)	1.5	240.2	1,249.2	Stavanger	0.5	
288.5	1,040	Aberdeen	1.0	1,445.7	207.5	Eiffel Tower	13.0	365.4	821	Bergen	1.0	
301.5	995	North National	50.0	1,744	172	Radio Paris	75.0	367.8	816	Frederiksstad	0.7	
309.9	968	Cardiff	1.0	GERMANY								
355.9	843	London Regional	50.0	19.73	15,226	Zeesen	15.0	1,083	277	Oslo	60.0	
376.4	797	Glasgow	1.0	31.38	9,560	Zeesen	15.0	POLAND				
398.9	752	Midland Regional	25.0	217	1,382	Königsberg	0.75	214.2	1,400	Warsaw (2)	1.9	
480	625	North Regional	50.0	217.5	1,379.9	Flensburg	0.5	234.9	1,283	Lodz	2.2	
1,554.4	193	Davenport (Nat.)	30.0	227.4	1,319	Cologne	1.5	312.8	959	Cracow	1.5	
AUSTRIA												
218.7	1,375	Salzburg	0.5	227.4	1,319	Münster	0.5	334.4	897	Poznan	1.9	
245.9	1,220	Linz	0.5	227.4	1,319	Aachen	0.25	380.7	782	Lvov	16.0	
285.2	1,052	Innsbruck	0.5	232.2	1,292	Kiel	0.25	409.8	723	Katowice	12.0	
352.1	852	Graz	7.0	239.4	1,253	Nürnberg	2.0	606	530	Wilno	16.0	
453.2	666	Klagenfurt	0.5	253.1	1,185	Cassel	0.25	1,411.8	212.5	Warsaw	120.0	
517	581	Vienna	15.0	259.3	1,157	Leipzig	2.0	PORTUGAL				
also testing on 1,287 m. from 7.0 p.m. (Mon., Wed., Sat.)												
BELGIUM												
206	1,450	Antwerp	0.25	269.8	1,112	Bremen	0.2	282.2	1,063	Lisbon (CI1AA)	2.0	
208.3	1,440	Liege	0.15	276.5	1,085	Heilsberg	60.0	also on 42.9 m. (Fri.)				
213.3	1,393	Chateleineau	0.2	283	1,060	Magdeburg	0.5	ROMANIA				
216	1,389	Liege	0.1	283	1,060	Berlin (E.)	0.5	394	761	Bucharest	12.0	
216	1,389	Bruxelles	0.2	283	1,060	Stettin	0.5	RUSSIA				
Conference												
22.1	1,357	Binche	0.1	318.8	941	Dresden	0.25	378	792.5	Moscow Regional	20.0	
240.8	1,245.8	Liege (Exp.)	0.1	325	923	Breslau	1.5	424.3	707	Moscow-Stalin	100.0	
273	1,095	Liege (Contel.)	0.4	360.6	832	Mühlacker	60.0	720	416.6	Moscow (PTT)	20.0	
283.6	1,053	Brussels (SBR)	0.5	372	806	Hamburg	1.5	937.5	320	Kharkov (Rv20)	25.0	
338.2	887	Brussels (No. 2)	15.0	389.6	770	Frankfurt	1.5	967.7	310	Alma-Ata	10.0	
509.3	589	Brussels (No. 1)	15.0	419.5	715	Berlin	1.5	1,000	300	Leningrad	100.0	
BULGARIA												
318.3	941	Sofia (RodnoRadio)	0.5	453.2	662	Danzig	0.5	1,053	284.5	Tiflis	10.0	
CZECHOSLOVAKIA												
249.6	1,201.8	Prague (2)	5.0	472.4	635	Langenberg	60.0	1,116	268.5	Moscow Popoff	75.0	
263.8	1,137	Bratislava	10.0	532.9	563	Munich	1.5	1,170	256.6	Taschkent	25.0	
CZECHOSLOVAKIA												
278.3	1,078	Bratislava	13.0	559.7	536	Kaiserslautern	1.5	1,284	233.5	Moscow (Trades Unions)	165.0	
293	1,022	Kosice	2.5	559.7	536	Augsburg	0.3	also on 50 m. (6,000 Kcs.)				
341.7	878	Bruce (Brno)	35.0	566	530	Hanover	0.3	1,380	217.5	Novosibirsk	100.0	
488.6	614	Prague	120.0	569.3	527	Freiburg	0.25	1,481	202.5	Moscow	100.0	
DENMARK												
281.2	1,067	Copenhagen	0.75	1,034.9	183.5	Norddeich	10.0	1,800	187.5	Irkutsk	15.0	
1,153	260	Kalundborg	7.5	2,525	119.3	Königswusterhausen (press)	15.0	1,910.8	157	Sverdlovsk	20.0	
also on 31.51 m. (9,520 Kcs.)												
ESTONIA												
296.1	1,013	Tallinn	11.0	2,900	103.5	ditto	15.0	HOLLAND				
465.8	644	Tartu	0.5	4,000	75	ditto	15.0	298.2	1,006	Huizen	8.5	
FINLAND												
291	1,031	Viipuri	13.0	299.5	1,001.3	Radio Idzera (The Hague)	3.0	1,071.4	280	Scheveningen-Haven	10.0	
368.1	815	Helsinki	12.0	also on 49.6 m.								
659.7	536	Tampere	1.0	1,875	160	Hilversum	8.5	HUNGARY				
1,796	167	Lahti	54.0	550	545	Budapest	18.5	ICELAND				
FRANCE												
219.9	1,364	Bédiers	0.5	IRISH FREE STATE								
221.6	1,353.5	Fécamp	5.0	224.4	1,337	Cork (6CK)	1.2	413	725	Dublin (2RN)	1.2	
237.8	1,261.2	Bordeaux-Sud-Ouest	2.0	ITALY								
249.4	1,203	Juan-les-Pins	0.5	25.4	11,810	Rome (2RO)	15.0	SWITZERLAND				
255.1	1,176	Toulouse (PTT)	1.0	247.7	1,211	Trieste	10.0	244.7	1,226	Basle	0.65	
265.9	1,128	Lille (PTT)	1.3	273.2	1,098	Turin (Torino)	7.0	246	1,220	Berne	0.5	
271.3	1,105.7	Rennes	1.2	312.2	961	Genoa (Genova)	10.0	403	743	Sättens	25.0	
285.4	1,051	Montpellier	0.8	318.8	941	Naples (Napoli)	1.5	459	653	Beromuenster	60.0	
286	1,049	Radio Lyons	10.0	331.5	905	Milan	7.0	TURKEY				
293	1,022	Limoges (PTT)	0.5	308.1	815	Bolzano	1.0	1,204.8	249	Istanbul	5.0	
304.9	984	Bordeaux (PTT)	13.0	441	680	Rome (Roma)	50.0	1,538	195	Ankara	7.0	
311.9	961.8	Natan-Vitus (Paris)	0.5	600.8	599	Florence (Firenze)	20.0	YUGOSLAVIA				
also on 43.75m. (6,865 Kcs.)												
LATVIA												
198.5	1,510	Riga (tests)	16.0	622.6	574	Palermo	3.0	307	977	Zagreb (Agram)	0.75	
525	572	Riga	15.0	NETHERLANDS								
also on 43.75m. (6,865 Kcs.)												

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A high-class job at a low price

THIS HANDSOME NEW WIRELESS CABINET

is fit to grace any room. It is 2 ft. 9 in. high x 2 ft. wide x 13 in. back to front overall, and takes a panel 20 in. x 8 in. which can be adapted to suit your particular requirements less than this size. The cabinet is constructed from first quality oak for front and top with best quality birch for the sides. Standing on shaped legs and fitted with hinged lid it has ample accommodation for batteries and accumulators.

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Assembled (white) 26/-
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Cash with Order. Carriage Paid anywhere in England and Wales, add 1/- extra for Scotland.

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ELECTRADIX

THE DIXONEMETER LEADS

NEW RADIO SET. MOVING-COIL METER

Case with Five Multipliers:



- RANGES:
- 25 micro—2 m/a.
 - 0—100 mil. volts.
 - 0—7.5 volts.
 - 0—250 volts.
 - 0—50 m/a.
 - 0—10 amps.
- Or equal values.

VOLT METERS, Weston type 301, flush 2 1/2-in. panel, 30 volts, on sloping desk stand, fitted 5 terminals and volt button for conversion to multi-range. Cost £4/10/-. Sale, 35/-.

MILLIAMMETERS, Mov. Coil, Fulton, 2 1/2 in. flush panel, 5 ranges: 0.5 m/a., with shunts for 50 m/a., 100 m/a., 150 m/a., and 250 m/a., 22/6 only. 5 m/a., 15/- Turner ditto, 100 m/a., 25/- Weston, 30/- B.T.H., 50 m/a., M.I., 2 in., 8/6.

AMMETERS, Weston, 2 1/2 in. flush, M.C., 1 1/2 amps., 30/- Turner or Ev. Edgecumbe, 5 amps., 10 amps., or 20 amps., 25/- Central zero 20 amps., 30 amps., or 50 amps., same size, 27/6. Microammeters, Weston 301, 45/-.

A.C. METERS, Thermo-junc. Rectifier, Moving Coil, for any frequency or D.C., 1 1/2 amps., 30/-; 6 amps., 35/-.

CELL TESTERS, Megger, 3 volts, 30/- Cirscale, 2 range, 3 volts and 30 volts, 25/-.

H.T. VOLT METERS, 2 1/2-in. panel, electrostatic, to 2,000 volts, 40/- Moving Coil Meters, any range, 100 volts to 500 volts, and 3-in. to 8-in. dial, from 12/6. Specify volts, A.C. or D.C.

HOT WIRE METERS, for A.C., 1/2 amp., 5/- 1 1/2 amp., 6/- Galvos, Vertical Teleg., 4/- Horizontal, Silvertown, 7/- Laboratory Reflector Mirror, 60/-.

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With Input Transformer, Bell Cone, Aluminium Chassis. The best of the 1931 speakers for your set at a cut price.

Jensen, 6 v., for battery sets, 25/-

Dynopus ditto, 30/-

B.T.H. R.K., 220 v., D.C., 40/-

Jensen A.C., 120/250 v. input and mains transformers and rectifier. Listed £5/10/-. Few new at 55/-.

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CHOKES, Big Parmeko 1/2 amp., 15/- B.T.H., mid. tap, 12/6. Electronic Screened, 10/- Irganic, 8/6. Varley Double, 4/6. Small Eliminator, 1/6.

CONDENSERS. All values up to 10,000 volts, at half price. T.C.C. and Sterling, 2 mfd., for 400 volts, 1/6. 4 mfd., 3/-, 8 mfd., 5/6. 10 mfd., 10/6. 1,500 volt., 1/2 mfd., 4/-, etc. for elimination of hum.

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1/20 h.p. Motors for Television off 6 to 12 v., with extended spindle, 12/6; with 12-pole interrupter, 15/-.

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R. & A. 40 SPEAKER

A TEST report on the new R. & A type 40 speaker was given in our "We Test for You" feature in AMATEUR WIRELESS for February 6, and the construction of this fine new instrument was described. A certain amount of ambiguity, however, appears to have arisen regarding the adjustment. The unit is of the differential type in which the armature moves between two pole pieces, and the function of the adjustment at the back is to centre the armature between the pole pieces and counteract the steady pull caused by the passage of D.C. through the winding.

This speaker chassis costs only 16s. 6d. complete, and full details can be obtained free on mention of AMATEUR WIRELESS from Reproducers & Amplifiers, Ltd., of Frederick Street, Wolverhampton.

The title of "Community Vaudeville" is attached to a National programme of February 27, in which Joseph Lewis will conduct the B.B.C. Theatre Orchestra. Well-known choruses, in which listeners are asked to join, will be sung throughout the programme. Artists who will entertain include Wilkie Bard, Elsie and Doris Waters and the Hulbert Brothers.

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Please write concisely, giving essential particulars. A Fee of One Shilling (postal order), a stamped addressed envelope, and the coupon on the last page must accompany all letters. The following points should be noted.

Not more than two questions should be sent with any one letter.

The designing of apparatus or receivers cannot be undertaken.

Modifications of a straightforward nature can be made to blueprints, but we reserve to ourselves the right to determine the extent of an alteration to come within the scope of a query. Modifications to proprietary receivers and designs published by contemporary journals cannot be undertaken.

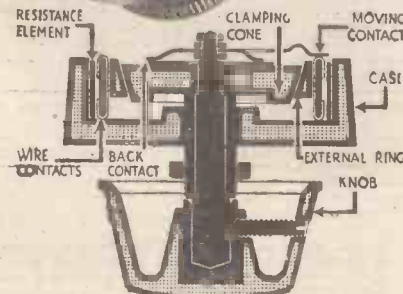
Readers' sets and components cannot be tested at this office. Readers desiring specific information upon any problem should not ask for it to be published in a forthcoming issue, as only queries of general interest are published and these only at our discretion. Queries cannot be answered by telephone or personally.

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TYPE 3



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ADVANTAGES

1. The extremely firm and even contact with the element. This is obtained by a new patented clamping cone which directly it is screwed down forces the external ring against the wire band. The pressure is so great that perfect all-round contact is made with the element which will not vary under any circumstances.
2. Non-inductive.
3. Self-cleaning wiping contacts. This ensures perfectly clean contact always.
4. Silent in operation.
5. Price 4/6

We recommend this resistance (Type 3) only for all values above 50,000 ohms where wire-wound potentiometers are not required.

Patents for this new resistance have been applied for.

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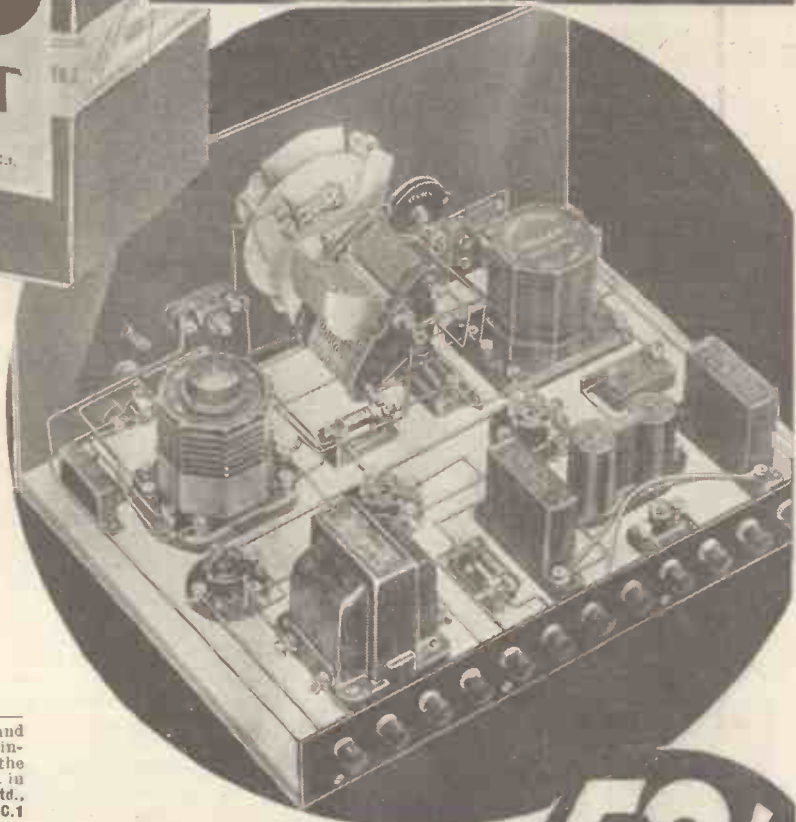
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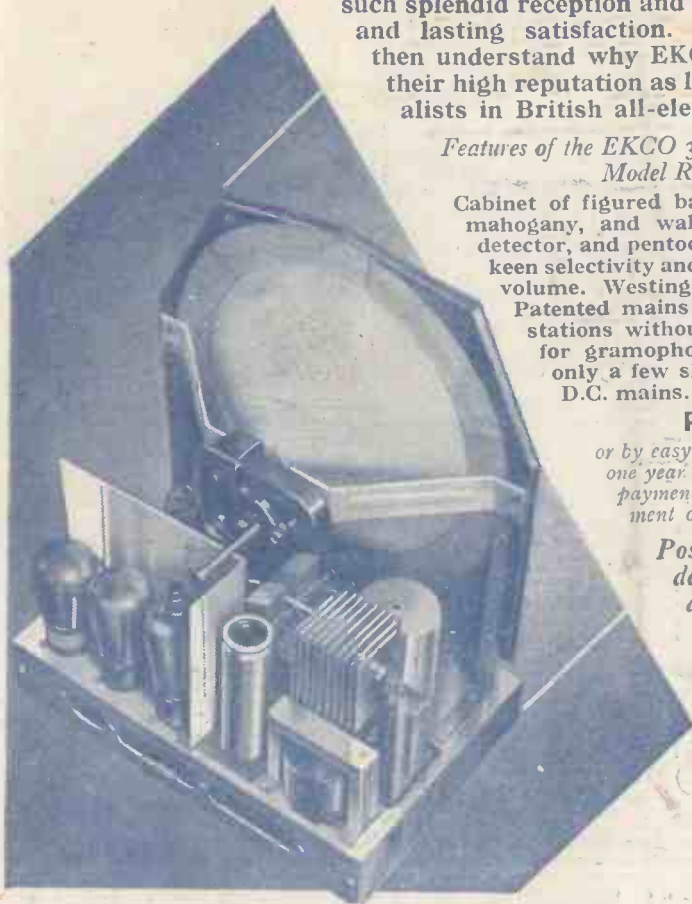
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