All valve filaments expand when heated, and unless this expansion is automatically, continuously compensated the position of the filament will vary. Then consistent, true reproduction is impossible! But OSRAM'S far-reaching development in valve design (the new OSRAM automatic cushion filament-springing) ensures true reproduction with absolute consistency. This very remarkable OSRAM achievement clears away microphonic disturbance once and for all—it eliminates all effects of both internal and external vibration. Further, it ensures a silent background that really is dead silent and a longer, more useful life.

Please Mention "A.W." When Corresponding with Advertisers
B.B.C.'S NEW SECRET VOICE

To that select coterie of unknown voices of the microphone will shortly be added the personality hiding under the pseudonym of Francis Iles, author of Malice Aforethought and other thrillers. He—or is it she?—will do a broadcast serial during the months of August and September.

THE ROYAL VISIT

The King and Queen at Portland Place

On Thursday, July 7, the King and Queen and a Royal party visited the B.B.C.'s new home at Portland Place to see the wonders of the Control Tower at Broadcasting House. First came the inspection of the large concert hall, where the whole of the B.B.C. staff was assembled. A great cheer of welcome went up and then the staff sang "God Save the King." The King was especially interested in the Control Room. A special demonstration of the dramatic control panel was staged under the direction of Mr. Val Gielgud. One of the items that gave His Majesty much personal interest was the Blattnerphone record reproduction of a recent speech made by the King at Glasgow. All the effects were demonstrated, including the famous B.B.C. train!

CUTTING THE CACKLE!

Fewer Special Service Broadcasts

Those who dislike too much talk on the radio will be glad to hear that the B.B.C. has decided to cut down the amount of microphone time previously devoted to some of the special services. The London and New York stock exchange reports are to be discontinued. Fewer regimental re-union announcements will be made. The Parliamentary reports are to be "pepped up" and instead of long verbatim speeches we shall have short and snappy sketches. About time, too!

WORK AT WASHFORD CROSS

Progress is going ahead at the new West Regional Station—here is one of the 500 ft. masts in the course of erection.

HOW ATHLONE CAME OVER

From recent measurements made by B.B.C. engineers during the tests of the new Irish Free State station at Athlone, an idea of the future range has been gained. Strong signals will certainly be heard in the Isle of Man and in Wales. In London it is expected that the signals from Athlone will be on a par with the strength of Scottish Regional, that is good strength at night, with some fading, but not much, during daylight. The transmitter will have much the same power as London Regional and Beromuenster—about 50 kilowatts. At present it is off the air for the final adjustments and completion of the station building.

IN THE "HAZARD" SERIES

On July 23, P. C. Wren, the author of the famous " Beau Geste " stories, will come to the microphone to give his talk in the " Hazard " series. The subject will be: "Twenty-four Hours in the Foreign Legion." It should make exciting hearing.

ADVERTISING THE EMPIRE

Part of the time of the forthcoming Imperial Conference at Ottawa will be devoted to a discussion of the possibilities of making use of the new Empire stations to advertise the Empire's products. It is expected that this new Imperial wireless link will be used as a medium of general trade propaganda and not for the dissemination of sponsored programmes as has been suggested in some quarters.

TELEVISION PLANS

Details of the Sound and Vision Channels

If possible the B.B.C. will start its new series of television broadcasts on July 20. The apparatus is now being installed at Broadcasting House. A great extension of television activity is indicated by the decision to broadcast four evenings per week, on Mondays, Tuesdays, Wednesdays and Fridays, from 11 to 11.30 p.m. The vision will be on London National and the sound on Midland Regional. These two stations normally shut down during the proposed periods, so there will be ample scope for varying the programme material of the television broadcasts.

NEXT WEEK: THE "MASCOT 2"—A NEW SET BY PERCY W. HARRIS
NEW VAUDEVILLE PRODUCER

FOLLOWING the resignation of Bertram (Jack) Fryer, the B.B.C. has brought down from Edinburgh Martyn Webster, who will assist the vaudeville department to produce programmes for Londoners. He has had considerable experience in Edinburgh and Glasgow.

BALANCE AND CONTROL CHANGES

A NEW policy will soon come into operation at Broadcasting House in connection with the engineers responsible for the balance and control of the programmes from the studios in the Control Tower. Until recently there has been a squad of engineers taking over any programme control at will, but in future the engineers will specialise in each type of programme. In this way greater finessse will be exercised, with resulting improvement in the light and shade of the broadcasts.

IN THE DEBATES STUDIO

Home Truths From the Talks Department

RECENTLY a group of engineers, anxious to test the "atmosphere" of the Debates Studio at Broadcasting House, asked two or three of the "high-brow" members of "Talks" to carry on an animated discussion as a test. Apparently what the engineers heard on their pilot loud-speaker was not good enough and one of them popped his head in the studio and told them to "get on with it." Still the right idea was not forthcoming, so a senior engineer laid down his slide rule and patiently implored the talks laddies to do their stuff. When the engineer returned to the distant loud-speaker he found the others convulsed with laughter. Apparently as he had left the Debates Studio one Talks man had turned to the others and remarked: "Well, anyway, he was much more of a gentleman than the last one!"

HENRY HALL'S SINGERS

TO assist Val Rosing, the official vocalist of the new B.B.C. dance orchestra, Henry Hall frequently engages outside vaudeville singers. The recent quartet singing was done by four members of the B.B.C.'s Wireless Chorus. The deep-voiced vocalist who sang "Drums In My Heart" so well the other evening was George Baker, who will frequently be heard in the future.

A MATTER OF TACT

GOOD relations have been established between the B.B.C. and its neighbour, All Souls, Langham Place, by the recent broadcasting of a service by the Reverend Arthur Buxton. This was a tactful move, to say the least of it, when we remember that the chimes of the All Souls' bells are frequently heterodyned by the raucous loud-speaker reproduction of Big Ben from the roof of Broadcasting House!

CONCERT HALL EXPERIMENTS

AFTER the recent Saturday night vaudeville concert from the large Concert Hall at Broadcasting House engineers decided that the experiment of erecting a temporary proscenium had proved a success. Later a trio and soloist were tried out and direct listening tests were carried out to see how this type of broadcast would suit an audience. Surprisingly enough, the studio has been found very successful for the trio.

MORE ELECTRICAL INTER-FERENCE

ALTHOUGH complaints of poor reception form a very small proportion of technical correspondence now received by the B.B.C., the number of letters asking for advice on curing electrical interference noises is considered considerably too high—200 a week. The B.B.C. anticipates that this form of trouble will be on the increase during the next winter, owing to the spread of the grid system and the increasing use of electrical appliances in the home. Listeners are warned to try out these labour-saving devices when the set is on, in order to see whether reception will be spoiled by their installation.

RIDGEWAY'S RETURN

LOOK out for the Ridgeway Parade on July 19 on the National and July 20 on the Regional. Described as a song-and-dance show, the Parade will include excerpts from the stage show that has been on tour during the past five months. The Ridgeway Girls will take part in the show, which will be supported by the B.B.C. Theatre Orchestra, conducted by Leslie Woodgate. Philip Ridgeway tells us that he is looking forward with great zest to his microphone return. "You will like the show," he said.

The latest edition of the Baird Televisor makes use of an extended screen, the image having a black-and-white texture; it is a great advance on the machine first put on the market. This photograph shows John L. Baird with his new television receiver, which will shortly be placed on the market.
HOW TO MAKE A TRickle CHARGER

End your charging worries with this easy-to-make unit which will keep the filament battery in a fully-charged condition and at negligible expense.

For those using some form of high-tension eliminator on A.C. mains the trickle charger shown by the illustrations will be specially useful. With this simple little unit you can make an end to accumulator charging worries. At negligible cost you can run the accumulator and have the satisfaction of knowing that it is always fully charged.

Trickle charging is at once simple and inexpensive. Simple because with the modern metal rectifier a minimum of apparatus is required to convert the A.C.-mains current into low-voltage direct current. Inexpensive because the charging current, say .5 ampere, is delivered at low voltage with the result that the wattage consumed is very small, being the product of the charging current and the charging voltage—5 or 6 watts at the most.

Another advantage of the trickle charger is its foolproof maintenance. It is almost impossible to go wrong once the charger has been installed. When correctly connected to the accumulator the charger may be left connected, even when the mains are switched on. There is no need to disconnect the accumulator from the set every time it has to be charged.

The End of Charging Worries

In general the idea of trickle charging is suggested by the name—you allow a trickle of mains current to keep the accumulator up to the mark, usually by putting on the charger for about the same number of hours as the set is in use.

With a .5-ampere charging rate, as in this charger, you put into the accumulator in one hour about the same amount of energy that is taken out by an hour's total filament current consumption. The charger can either be put on for a few hours every night or left on all night for two or three nights a week—it is purely a matter of convenience.

Suitable rectifiers for accumulator charging have been produced by the Westinghouse people, one of whose units forms the basis of the charger shown by the illustrations. This is type LT2, which is bridge-connected to give a direct-current output for an A.C. input.

Between the input terminals of the rectifier and the mains must be inserted a transformer, otherwise the rectifier will be heavily overloaded.

Between the D.C. output terminals of the rectifier and the battery being charged must be connected a ballast resistance, the value of which is stipulated by the makers.

Apart from these simple points there is nothing in the design of a charger likely to cause the amateur any trouble. The charger we have produced has the circuit shown by the diagram.

It will be seen that there is a tapped mains transformer suitable for A.C. mains between 200 and 250 volts.

In addition to the tappings on the primary, to make the unit suitable for all the normal mains voltages we have tappings on the secondary winding. These are needed to make the charger useful for 2-, 4-, or 6-volt accumulators.

The Heavyd type W36 transformer has been specially designed to work with the LT2 rectifier and is provided with the

(Continued at foot of next page)
WHAT IT IS FOR

LOW-FREQUENCY DE-COUPLING

The idea behind de-coupling, as applied, for example, to the anode circuit of the detector, is to prevent the common impedance of the high-tension power supply, which may be a battery or a mains unit, from forming a coupling between one valve stage and another.

A voltage will develop across any impedance such as a high-tension battery. So it is quite possible for a voltage developed in the later stages of the set to be banded back to the earlier stages by battery-impedance coupling, with resulting instability and distortion.

To prevent this form of undesirable coupling we usually connect a fixed resistance in series with the low-frequency current but we must offer it an alternative path.

This fixed resistance will offer an impedance to the passage of the low-frequency current but we must offer it an alternative path. We connect a fixed condenser of low impedance between the junction of the anode impedances and earth. The impedance of the de-coupling resistance must be high with respect to two other points, one being the power-supply impedance and the other the by-pass condenser impedance. We must not make the resistance of the de-coupling component any higher than is necessary, otherwise undue high-tension anode voltage will be dropped across it.

How then, do we arrive at a suitable value for the resistance? In this way:

DE-COUPLING RESISTANCE

LOW
FREQUENCY COUPLING

DE-COUPLING
CONDENSER

This diagram shows the main essentials of low-frequency de-coupling. As explained in the text, the values of the resistance and condenser must be carefully chosen to conform with impedance requirements.

The great point to note is that the rectifier voltage is always twice the mains voltage.

The important of having the correct secondary voltage tappings for the different voltages of the charger is essential.

The mains switch is moved to charge an accumulator. The only point being to make sure the mains switch is at the correct rate so as to make up for any back voltage.

Spurred to action by the low-frequency coupling, it pays to use a large de-coupling condenser, since this enables a smaller voltage drop across it.

The above considerations show how important it is to follow a designer's circuit values. Often, as with de-coupling, there are several conflicting points that finally determine the value chosen.

HOTSPOT.

"HOW TO MAKE A BATTERY CHARGER" (Continued from preceding page)

correct secondary voltage tappings for the different voltage accumulators. The only point is that the correct secondary terminals must be connected up before attempting to charge an accumulator.

The makers suggest a fixed ballast resistance in series with the tapped secondary and the accumulator, but for convenience we have used a variable 4-ohm resistance.

The importance of having the correct secondary voltage is twofold. Firstly, we have to make sure that the charging voltage is greater than the back voltage of the accumulator being charged. Secondly, we have to choose a voltage that will enable the charging rate of 5 ampere to be maintained for the different voltages of the accumulators, that is 2, 4 or 6 volts.

The Charging Rate

The function of the variable ballast resistance is to adjust the charging current to the correct rate so as to make up for any slight variations in the input voltage from the mains. It is quite independent, under-charging, but it is important not to over-charge.

Because this matter of charging rate is rather important we have included in the unit a simple Bulgin ammeter reading from 0 to 1 ampere.

The practical layout of the charger can easily be followed from the illustrations. The great point to note is that the rectifier is vertically mounted to give it as much air cooling as possible.

The transformer and rectifier are mounted on a small wooden base, with an ebolute panel to carry the variable resistance, ammeter, mains on-off switch and accumulator.

Wiring

Care should be taken when wiring up the charger. This work can be done with insulated tinned-copper wire although it is more convenient to make the mains input connections of flex, this wire also being useful for the variable secondary voltage tapping. Note that the mains switch is connected in series with the primary of the transformer and the mains leads.

The rectifier's A.C. input and D.C. output terminal tags are clearly marked, the only point being to make sure the positive and negative tags are connected to their correct panel terminals.

The ballast resistance, ammeter and accumulator are connected in series across the D.C. output of the rectifier. And that completes the job. As it is advisable to give the charger plenty of air the covering might well be of perforated metal.

In operation the charger is entirely foolproof. All you have to do is to connect the secondary flex under the appropriate terminal for the 2-, 4- or 6-volt accumulator and then, having switched on the mains, move the ballast-resistance knob on the panel until a charging rate of 5 ampere is registered on the meter.

The route used for relaying the speeches of Prince George and other eminent people on Dominion Day was from the Savoy Hotel by means of local broadcasting circuits to Broadcasting House and from there to the Radio Terminal of the General Post Office Trunk Exchange. Thence the circuit passed to Rugby Radio Station for short-wave transmission to the Yamachichi receiving station of the Canadian Marconi Company, near Montreal.

At the National Radio Exhibition which opens at Olympia on August 19, the B.B.C. will be represented by some specially interesting exhibits. One which is certain to attract wide attention is a model of Broadcasting House, the new headquarters of broadcasting in Britain. The organizers of the exhibition are arranging for fifty miniature theatres, all sound-proof, in which manufacturers can demonstrate their sets.

COMPONENTS REQUIRED

<table>
<thead>
<tr>
<th>Component</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ebonite panel, 4 in. by 4 in.</td>
<td>4</td>
</tr>
<tr>
<td>Brassboard, 4 in. by 7 in.</td>
<td>1</td>
</tr>
<tr>
<td>Mains transformer (Cameo, type W90).</td>
<td>1</td>
</tr>
<tr>
<td>Metal rectifier (Westinghouse, type L79).</td>
<td>1</td>
</tr>
<tr>
<td>Gobot variable resistance (Claveron, type R90).</td>
<td>1</td>
</tr>
<tr>
<td>0-1 Ammeter (Bulgin type D5S).</td>
<td>1</td>
</tr>
<tr>
<td>Single-pole toggle switch (Gorcan, Bulgin, Ormond, Claude Lyons).</td>
<td>2</td>
</tr>
<tr>
<td>Two terminals, marked L.T.-1, L.T.- (Belling, Lee, Clix, Bulgin).</td>
<td>1</td>
</tr>
<tr>
<td>Connecting wire and sleeves (Levec, Jijelone, Quickways).</td>
<td>1</td>
</tr>
<tr>
<td>Length twin flex (Lexcos).</td>
<td>1</td>
</tr>
<tr>
<td>Mains plug (Bulgin, Cotman).</td>
<td>1</td>
</tr>
</tbody>
</table>
Here are the technical details of the experimental ultra-short wave transmissions now being made by the B.B.C. with the Marconi plant at the top of Broadcasting House in London.

**BROADCASTS** are now being made at intervals with the 7.5 metre transmitter at the top of Broadcasting House, so it is time to get out your ultra-short wave sets and pick up the B.B.C. transmissions! This is the first time that the B.B.C. engineers have experimented with ultra-short wave transmissions, and it is anticipated that the field in this direction may be considerably extended.

Now that the first transmissions are "on the air" there is no point in keeping the technical details secret. Moreover, "A.W." readers will want to know the power and wavelength range of the new gear so that they can make use of single-valve ultra-short wavers or super-het. adaptors.

The gear, which the B.B.C. is using can tune from 6 to 8.5 metres and the 7.5-metre transmission is the most general one.

An input of 1.2 kilowatts to the final amplifier stage has been allowed for. This is a relatively high power, so far as ultra-short-wave transmissions are concerned.

The engineers find it very difficult to measure accurately the H.F. power output in the aerial, but they know that it is something in the nature of 300 watts.

**The 7-metre Transmitter**

The transmitter itself is in the room immediately beneath the Clock Tower of Broadcasting House, that is on the seventh floor. There are four panels, one being the rectifier for the power supply from the mains, the second an auxiliary rectifier, the third the modulator, and the fourth the oscillator.

The 450-volt A.C. mains supply provides the "juice" for the transmitter. This is stepped up by a power transformer and rectified by three valves. The actual H.T. supply on the short-waver is about 4,000 volts. Care is taken to keep the voltage absolutely constant. There is, as a matter of fact, an induction regulator. Voltage variation would cause fading.

Many amateurs have wondered how it is possible to work a transmitter constantly and with accuracy on such a short wavelength as 7.5 metres. A master oscillator valve of the Franklin type is used to keep the transmitter steady. This is worked at what—if it were a transmitter—would be a wavelength of 139.5 metres. Frequency doublers and amplifiers are connected up to this, which pick up various harmonics, 46.5, 13.5 and 7.75 metres. All these circuits can be retuned so that the B.B.C. can broadcast on any wavelength between the limits of 6 and 8.5 metres.

The Franklin type aerial is supported between the two 35-ft. masts on the roof. These are steel masts, but it is found that no damping is caused. Two half-wave aerials are used.

Critics have maintained that Broadcasting House is not an ideal centre for the short-wave transmissions as the optical range is limited. A B.B.C. official says that the normal optical range extends to about Hampstead, the Crystal Palace, the Tower of London and Kensington, in the north, south, east and west directions respectively.
PERCY W. HARRIS ON-
STRANGE FAULTS, AND
HOW TO CURE THEM

NOTHING is more annoying than to find after several evenings’ hard work that a new receiver is, to use a popular expression, “not a patch on the old one.” You would not mind so much if you got no signals at all, for then you would be sure that something was wrong, and that sooner or later you would find the fault. The real worry is when you get signals which are poor in quality, selectivity, or strength, or perhaps in all three.

In an experience spread over many years I have met a number of such cases, and in curing them have discovered all kinds of strange and unexpected faults. Some of the most interesting have been where really big mistakes in wiring up have been made, and where, on inspection, any expert would be prepared to swear that nothing could come through. And yet results have been such that the builder has been inclined to believe that everything was all right. I remember one case, for example, where a reader was getting quite good results although he had entirely forgotten to wire up the filament circuit of the high-frequency valve! This was in the pre-screen-grid days when oscillation was prevented by a neutralising circuit. In this case I recognised the symptoms at once, as actually the signals could be conveyed from the aerial circuit to the detector circuit by way of the unbalanced capacity between the grid and plate of the H.F. valve.

A Puzzling Case

One of the most puzzling cases I came across, however, arose from a number of faulty valve-holders in which the plate and grid terminals were connected to the filament socket and vice versa. You can have quite an interesting time in drawing out the circuit to see what will happen when you switch on in these circumstances. On another occasion, after trying to assist a reader through the post he sent me the cause of his trouble—a valve (of foreign manufacture) in which the plate and grid connections had been reversed.

Cases such as the above are in the nature of freaks and occur so rarely as to be negligible. There are, however, one or two faults which occur fairly regularly and are generally among the chief causes of trouble in the cases of those sets where, as I have said, you get signals which are poor. A very large number of faults in wireless sets are due to bad contact, and because many home constructors do not realise just what happens at a bad contact, they often think there is nothing wrong with the connection. To understand the position remember first of all that wireless signals can be conveyed through a set conductively—that is to say, by direct contact between two conductors—inductively, by means of a magnetic field across the space between the conductors—and capacitively, by an electrostatic field between two conductors. If you take a loop of clean wire and screw it underneath a clean terminal you will get a satisfactory joint, the resistance at the contact being negligible. We will imagine the lead in question goes from the top of a tuning coil to the grid of a valve, and if everything else in the circuit is satisfactory you will get good signals.

Effect of Poor Contact

Let us now see what will happen if you have not a clean wire and if you do not screw it firmly underneath the clean terminal. Let us imagine you are using ordinary bell wire, for example, which has a cotton covering, and often on the surface of the wire itself a very thin layer of semi-transparent rubber. We will assume that you have removed the cotton covering but have not noticed the presence of this thin rubber. With a pair of pliers you bend a loop and then screw this loop underneath the terminal. Again we assume everything else in the set is right, and you switch on.

Although the wire is completely insulated at the terminal you will probably get good signals from the local station, although they will be by no means up to the strength you ought to get. "How is this?" you will say. "If the wire is insulated from the terminal how can any signals get through?"

A Small Condenser

The answer is that you have made a very neat, if small, condenser in series with the grid of the valve, consisting of the loop of wire as one plate, the terminal as the other, and the thin rubber as the dielectric. The capacity will be very small, but not by any means too small to pass a radio-frequency signal.

If the rubber is good rubber of high insulation the grid will be isolated from the filament (or cathode in the case of a mains valve) and after receiving speech or music for a short time the valve will "pack up" or choke, giving a kind of strangled signal due to the accumulation of a negative charge on the grid.

Other Capacity Effects

It is only in grid connections of a valve that this fault can happen, for if you make such a connection to the plate circuit, no high-tension current will flow through the valve and similarly in the filament circuit the insulation will stop the current. Signals will still come through, however, if you have a connection of this kind from the aerial to a tuning coil, and with most of the tuning coil connections. A similar capacitative connection is sometimes found in a badly-soldered set where the constructor has used the soldering iron just hot enough to melt the solder but not sufficiently hot to make a good connection. Inexperienced solderers sometimes try to make up for lack of heat in the iron by the superfluity of flux which often consists of an insulating jelly with which have been mixed certain chemicals. What is thought to be a soldered contact is sometimes a large blob of solder on the end of a wire, this blob being separated from the lug by a layer of soldering flux acting as an insulator and therefore as a dielectric in a small condenser.

Always check up all of your connections carefully. Remember that the grid circuit of a valve is operated by very small charges of voltage and often signals will come through a sensitive set not merely with a bad contact between the wire which is supposed to join the grid terminal of the coil and the grid itself, but even when this wire is as much as an inch away from the valve terminal! It is for just such reasons as this that those of us who design sets take a great deal of care in the disposition of our leads, and always try to impress upon the reader the following exactly the method of wiring shown.
IT IS MOST REMARKABLE...

Remarkable for its tremendous popularity, remarkable for its performance, remarkable for its economy in consumption.

The P.M.2A power valve is designed for use in 2-valve and 3-valve receivers with one L.F. stage, and gives "excellent volume for the average-sized room.

Price 8/9d.

MADE IN ENGLAND

The following Mullard valves are specified for the General-purpose Portable, described in this issue: one PM12, one PM1HF, one PM1HL, one PM2A.

The following rectifying valve is specified for the Percy Harris Mains Unit, described in the issue of July 2: one DW2.


Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention
British Radiophone ganged Condensers are used by discerning amateurs and set designers in preference to all others because of their extreme accuracy—the trimmers being first adjusted, our guarantee is for a maximum error of 1/2 m.m.f. + 1/2 per cent.

This unequalled precision is achieved by virtue of sound mechanical construction which maintains the electrical characteristics at fixed values under the most exacting conditions.

Built up from sheet steel and treated with a special anti-corrosive medium, the cases resist all tendency to distort or rust—an important factor where high and lasting accuracy is concerned.

The rotor bearings are designed so that any end-wise movement of the spindles is effectively prevented and smooth silent action is ensured during rotation.

The values of British Radiophone Ganged Condensers are as follows:

- Minimum Capacity: 26 m.m.f.
- Total variation of trimmers: 60 m.m.f.
- Total variation in capacity: 500 m.m.f.

The maximum capacity is therefore greater than 500 m.m.f. according to the amount of minimum capacity introduced, ensuring knife-edge selectivity.

**PRICES:**
- 2-Gang Condenser: 15/-; Dustproof Metal Cover, 2/6
- 3-Gang Condenser: 25/-; Dustproof Metal Cover, 3/-
- 4-Gang Condenser: 30/-; Dustproof Metal Cover, 3/6
- Drum Drive: 8/6

Oxidised silver escutcheon and drive assembly, complete with pilot lamp attachment, 5/-.

Write for details.

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**RADIOPHONE**

**GANGED CONDENSERS**


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Wherever an L.F. Transformer can be fitted a Benjamin Transfeeda will give you what you have been looking for—wonderfully pure and powerful reproduction with a uniform response throughout the audible scale right down to the deepest bass. The Transfeeda will be the making of your receiver giving you luxury transformer results for the modest price of 11/6.

May we send you the fully descriptive two-colour leaflet giving curves and circuits? Ask for list 1290 shown left.

The Benjamin Electric Ltd., Tariff Road, Tottenham, N.17

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**METAL RECTIFICATION**

How much better would you enjoy your wireless if you could dispense with the troubles and expense of accumulator charging and battery renewals?

With the advent of the new WESTINGHOUSE METAL RECTIFIERS, it is now possible to convert your present battery set to mains operation by means of an eliminator for the H.T. and a trickle charger for the L.T. supply. And the initial cost is very low, in fact, than you would normally spend on renewals and charging during a year.

Take the first step towards the removal of your wireless troubles by sending for "The All-Metal Way." NOW. It costs only 3d., and contains a mine of information on mains working.

**COUPON**

WESTINGHOUSE PUBLICITY, 82 York Road, King's Cross, London, N.1.

Please send me a copy of your booklet, "The All-Metal Way," for which I enclose 3d. in stamps.

NAME: ............................................

ADDRESS: ........................................

............................................ A.W. 14/7/32

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Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention
NEW SEASON'S GOODS

WING to the early date of this year's Wireless Exhibition, some of next season's goods are already making their appearance on my test bench, though 1932 is only just half over. They are not yet, of course, available for the public to purchase, and most of them won't be until the Exhibition. Those that have come our way are mostly very attractive. I haven't yet seen anything entirely particular in the way of inventions, and I don't think that we are going to have anything revolutionary in the way of circuits or parts—nor, indeed, do I mean, like the screen-grid valve and the pentode, each of which astonished the world of wireless in its season. But it is going to be a year of good components and of remarkable efficiency.

THE NEW SETS

This year our set manufacturers seem to have been competing with each other to be first out with next season's goods. The result is that several of our largest concerns have already announced their new lines and many of the new sets are actually on the market. As I anticipated there is nothing very startling but the detailed improvements on existing technique are nevertheless important. For example, the widespread adoption of the screen-grid stage means that the screen-grid stages must mean great improvements not merely in selectivity but in control of volume. Probably the most important development of the coming season will be the super-het., which seems likely to become the standard type of multi-valve of the de-luxe console type. Such sets will be a boon to those suffering—and who will not be suffering?—from intense foreign-station jamming. Provided the price can be brought down to the means of the man in the street next season may well be known as the super-het year.

TAKING IT KNEELING DOWN

Ne or two firms pay me the compliment of sending me, in what we may call soap-box form, preliminary models of their new season's sets asking for candid criticism. Sometimes a designer is so taken up with the circuits and general appearance of his set that he quite forgets about the fellow (or lass) who will have to operate it. Here is a queer instance. The other day I was asked to cast my critical eye over the first model of a big pedestal radiogram. Before asking for any demonstration of sensitiveness, selectivity, and quality—all of these were found subsequently to be excellent—I said to the proud designer, who was standing beside me, fondly surveying his beautiful set: "Would you mind just going across to the set and tuning it to 261 metres or any other wavelength you like?" Rather puzzled, he went over and proceeded to make the required movement of the single knob. Then he called out with a smile, "But I think you'll find it's a lot easier than that!" He remarked: "That was a simple enough business, anyhow." I asked him not to move, but just to take careful note of exactly what his position was. Actually he was kneeling (very much kneeling) on the carpet. The control knobs have been so placed that it was impossible to tune the set without assuming an undignified position!

WHAT'S YOUR VIEW?

The position of the tuning controls is one of the problems in pedestal sets, whether radiograms or purely wireless receivers. I always think that the best place for them is under the lid, but many feel that they should be at the front of the cabinet and near the top; you can then tune either sitting in a chair or standing up. I am quite sure, though, that they should not be placed half way down the front of the cabinet or quite near the bottom, as is too often done, for there is simply no way of getting at them in any position that is at all comfortable. Certainly they should not be lower than the height of the average table top.

ASKING FOR IT?

In these columns I showed recently how limited the market for big mains sets must necessarily be and said what a pity it was that nobody ever thought of making a large and economical set for the man who must use batteries. I am wondering whether our manufacturers have not gone slightly mad, for of the new season's sets programmes that I have seen most seem to contain a great many sets of all kinds and sizes, whereas I have not yet come across anything bigger than a four-valve battery set and very few with more than three valves. It seems to me that unless the manufacturers realise that the market for mains sets is not the only one, they are in real danger of over-producing, on the one hand, and under-producing, on the other. And I would beg them to remember that there are at least two big sets for battery operation of American make which are stated to have been designed specially for the European market. Both of these are eight-valve super-hets, and it would be a pity if they swept the market for mains sets.

WATCH YOUR WATCH

You can best realise the strength of the permanent magnet of a good loud-speaker by laying a screwdriver on the palm of your open hand and moving its point slowly towards the middle of the magnet at the back. You may be surprised to find how big a distance it will jump. Incidentally, you can kill two birds with one stone in this way, for you will very rapidly magnetise the screwdriver and enable it to hold steel screws firmly when you are putting them in awkward corners. Beware, though, of bringing a wrist or other watch too close to the magnet. Unless it happens to be of magnet-proof type, you can easily make a mess of it by magnetising the springs, spindles and other steel parts. What's that? Oh, yes, I have done it.

A MOVING-COIL YEAR

This is going to be a moving-coil year, for there is sure to be a tremendous run on the moderately priced but very satisfactory instruments of this kind that have been brought out. The M.C. loud-speaker could never have achieved wide popularity had it not been for the development of the permanent-magnet type. Only those with suitable electric-lighting mains could operate economically the instruments requiring energising current. I have had several battery models, but found all of them too expensive to run. On the average, they needed for really good quality a good three-quarters of an ampere at 6 volts! This means 4½ watts, and it seems rather fierce to have to put this into the magnets alone for a total output of half a watt at 1000. Equally absurd, too, was the fact that the speaker required more accumulator current than did the combined filaments of the set. The permanent-magnet instrument costs exactly nothing to run, since it needs no energising current at all. Early P.M. models were not too satisfactory, owing to the very small volume that they could handle. This year's, though, will deal faithfully with all the volume that you are likely to want.

A WORD VERY MUCH IN SEASON

Hot weather is thirsty weather, not for the wireless man only, but for his accumulator H.T.B. Don't forget that a few minutes' immersion can type and you can easily make a mess of it by magnetising the springs, spindles and other steel parts. What's that? Oh, yes, I have done it.
**GREASING THE WHEELS**

Don’t neglect your gramophone or radiogram motor, whether it is of the electric or of the clockwork kind. Many people, I find, regard these motors as things which require no attention at all. They let the poor things run as long as they like without ever giving them so much as a spot of oil. They don’t require a great deal, it is true, nor do they need it very often; but it does pay every now and then to cast an eye over the motor and to apply a little oil to the pinions and the governor. Be on the look out for those bits of fluff (goodness knows where they come from or how they get there) which seem to have an uncanny way of insinuating themselves into the best-fitting cabinets and, once there, of attaching themselves with a loving embrace to the works of motors. The best lubricant for gramophone and radio-gram motors is sewing-machine oil of high quality.

**TELEVISION AGAIN**

The latest demonstration by the Baird people has re-awakened interest in television. I hope I shall not be considered unkind if I suggest that such was the intention! I mean, while progress must apparently be very slow, it is necessary to give the public an occasional reminder that television is coming, be it ever so far away.

This time I think there has been a real advance. For one thing the picture is much bigger. More important the tone is very much better, the images being in black and white.

Added to the success of this demonstration is the increased activity on the part of the B.B.C. It is significant of the new importance that is being attached to television at Portland Place that television broadcasts are shortly to be given four evenings a week.

What is not so generally understood is that these broadcasts are being conducted entirely by the B.B.C. engineers. Correctly described, these should be called B.B.C. television broadcasts—by the Baird process.

This procedure is not a mere quibble, for it means that the B.B.C. is open to try, if not immediately to broadcast, any other system of television that may happen along.

Some sort of guarantee to purchasers of the Baird apparatus is obviously only fair and the B.B.C. has made quite a long-term promise to stand by the Baird system of television transmission. No one can pretend that the present owners of Baird “televisors” enjoy anything like a television service, so that if at some future time a really foolproof television system were developed and made commercially practicable it is not likely that existing apparatus would get a great deal of consideration.

Meanwhile the main hope of television seems to rest in short-wave transmission around the 7-metre band. The 1½-kilowatt transmitter is now testing on top of Broadcasting House and there is no knowing when the B.B.C. may attempt to broadcast its television on 7 metres. Real success in this direction would mean a considerable speeding up of a nation-wide participation in television because the cost and maintenance of these ultra-short wave stations is quite small. Moreover, the service area of each such station is limited to about 12 miles, so there would be no interference.

**PICK-UPS AND BASS**

If you know that the grooves on a gramophone record do not form quite a truly proportioned portrait of the sounds made in the studio. The trouble is mainly with the deep notes, which would require grooves of comparatively enormous width to record them at their full value. The well-designed pick-up acts as an automatic corrector. It is so made that it has a much greater response to low frequencies than to high.

If the balance is just right it is able to play records via the valves and the loud-speaker in such a way that the bass comes out at its proper strength. Tastes in the matter of bass vary very considerably. Some people like an extra large share, whilst others prefer to have hardly any at all. Remember, when you are choosing a pick-up, that there are patterns on the market to suit every taste. Hear several of different makes tried—or, better still, arrange for a demonstration with your own set—and you will find one which just suits your own preferences in the matter.

**AN INTERESTING COMPETITION**

WAS an interested spectator a week or two ago at the annual direction-finding competition of the Golders Green Radio Society. This event seems to grow more popular each year and there were ten or a dozen teams competing. The usual stunt, of course, is the location of a hidden transmitter, but this year as a variant the transmitter was made mobile for part of the tests and the various reception teams, who were all assigned their positions beforehand, took bearings on the transmitter at three distinct times, the location being different each time. Finally, more to collect the troops for tea than anything else, the transmitter parked itself in a convenient field near Shirley and the various teams set out to locate it and track it to its lair in the best style.

**A SUGGESTION TO WIRELESS CLUBS**

Watched the group of judges, one of whom was our Technical Editor, busy with compasses and protractors, finding out the error between the observed bearing and the true position. Incidentally, this error proved very small in the majority of cases, many bearings being accurate to one degree. Considering that the gear used was all amateur constructed this is very good. All the equipment seemed to be thoroughly up-to-date, screened frames being in evidence on practically all the sets. The receivers varied from a detector, using an old Cosmos Blue Spot, followed by two note mags, to screen-grid threes of the latest design. One is bound to say that both types of set were successful in locating the transmitter. All told, I found the afternoon much more enjoyable than I had anticipated. Direction-finding is a simple hobby and one which is worthy of more attention by the keen amateur.
ON THE TRACK OF THOSE RADIO ECHOES

How an intensive year's study of the upper layers of the atmosphere will be carried out at Tromso, in the Arctic Circle, is explained in this interesting article by ALAN HUNTER

Most wireless amateurs have heard of the layer of ionised atmosphere that reflects wireless waves shot upwards from the transmitter. Rightly named this is the Kennelly-Heaviside layer jointly discovered by Oliver Heaviside in England and Kennelly in America. These two scientists had their theory confirmed when Professor Appleton, working with the Radio Research Board at Slough, proved the existence of the layer beyond all dispute.

Not only did Professor Appleton determine that the Kennelly-Heaviside layer existed at about 60 miles above the surface of the earth, but also that a second layer existed some 150 miles high. Further experiments have now shown that wireless waves below 100 metres tend to be reflected by the upper layer after passing through the lower layer, while waves above 100 metres are reflected by the lower layer and never get any higher.

At short distances, such as in the service area of a broadcasting station, we are not concerned with reflected rays from the upper atmosphere, because the energy is received by the direct or ground ray. For long-distance transmission, especially on short waves, we are very definitely at the mercy of the reflected rays.

Special Lines of Inquiry

Because of this it is obviously of great interest to determine just how wireless waves are reflected and under what conditions the maximum reflection takes place. As is fairly well known, the reflecting effect is produced by ionisation of the upper atmosphere. Under the influence of electric and magnetic forces a considerable quantity of free electrons are created.

What causes these ionised layers has not exactly been determined as yet, but it is thought that one layer is due to the effect of ultra-violet light and the other layer to small particles or corpuscles shot off by the sun.

An expedition will shortly leave for the Arctic Circle to advance our knowledge of these reflecting layers, these experiments being a part of a very extensive international scientific effort to be spread over a period of time known as the "second polar international year" which means 13 months as from August Bank Holiday.

The exact location of the expedition will be at the Norwegian town of Tromso, to which point Professor Appleton and his party sailed from Newcastle on July 9.

During a recent visit to the Radio Research Board's laboratories at Slough I had a chat with the station's superintendent, Mr. R. A. Watson Watt, who has knowledge of the 'ionosphere' with the aid of what we have called a radio polarimeter," explained Mr. Watt.

"The first object of the expedition is to measure the heights of the two regions. With our apparatus we hope to measure the electron density per cubic centimetre—to measure how many electrons are present in a thimbleful of air at these regions."

I asked how these long-distance measurements could possibly be made with an earth-bound receiver. Mr. Watt clearly explained the scheme.

The way we measure the effect on wireless waves of these upper regions is rather interesting. First we send out a signal from a transmitter. We then receive the direct ray and also all the other rays that have been up and down through the ionised regions. We are able to measure the time taken en route and thereby to determine how far the various up-and-down rays have travelled."

The Apparatus Used

For the Radio Board's experiments the main receiving station will be located at Tromso and the transmitter will be 12 miles away at Simavik, where the power for the town of Tromso is generated.

At Slough I saw the apparatus that is to be taken out for these Polar experiments. The main receiver is a superhet, but instead of a loud-speaker there is a cathode-ray oscillograph. This instrument makes use of a fine beam, or jet, of electrons, producing on a white screen a bright trace of light.

As demonstrated to me the beam of light was turned into a circle retracing its path every fifth of a second. Various signals were tuned in and it was possible to see the effect of wireless echoes-rays arriving perceptibly later than the direct ray—as noted by sharp deviations in the circumference of the circle of light.

In addition to the apparatus being taken out to Tromso for scientific purposes the expedition will be equipped with short-wave transmitting and receiving gear, by means of which contact with Slough will be maintained. Experiments have already shown that the short-wave transmissions from Slough can be received by an amateur in Bergen.
Building the General-Purpose Portable

Construcational details of the portable set introduced in the middle

AN EFFICIENT AND EASILY-CONSTRUCTED PORTABLE SUITABLE FOR INDOOR OR OUTDOOR USE

This plan view will be helpful in studying the rest of the circuit and by putting metal foil on that part of the baseboard covered by the screening grid valve components. The first job therefore is to cut the panel and baseboard according to the overall size given by the blueprint. For those working in small working, get the full-size blueprint, which can be obtained, price 3d., from the Co-operative Department, Amateur Wireless, 36-38 Petty France, London, S.W.1. The frame aerial and the set are wired up as shown on the next page.

When you have cut the panel and baseboard and drilled the eight small holes on the panel, screw the two parts together. The piece of foil should be stretched quite flat and tucked to the right-hand side of the baseboard, leaving at the set back. Make sure that the foil is not tautened, as earth connections have to be made to it. Next mount the vertical screen, screwing it firmly down to the foil and baseboard. The major parts, such as the four valve holders, the tuning coil and one or two of the smaller condensers can be screwed down. It is not advisable to mount all the components on the frame as this is the wrong way to go about it. The layout is compact and some of the leads are very short. There is no common space to spare, and if you use a spare part, the main parts below the set are screwed in place you will find it much easier to connect up the wires and get a pair of leads in the right place. The wire should be connected to the terminal leads, and if the set looking back, there are three small routes which link up with the frame aerial windings and these should be left loose when the set is being wired up, connection being made later to the three terminals on the frame aerial box.

The Frame Aerial

The frame aerial must be wound before you can try out the set. Dimensions of the frame aerial box are given in the small sketch on the next page.

Connections are simple. You will see that one wire from the three-point switch goes to the centre terminal of the frame aerial box. The two windings are put on at that side of the former remote from the front of the cabinet. There isId a small space between the windings, both windings being in the same direction. The medium-wave winding consists of 15 turns of 29/64" wire and the long-wave winding of 40 turns of 9/64" wire. The long-wave winding goes to the centre terminal of the frame aerial box. The plane of the windings has a very slight directional effect; the plane of the windings will be needed when the set is worked outdoors. There is a grid leak holder, and an equivalent type by Exide, Ever Ready or C.A.V., type 2VN9/3 or accumulator, such as the 2-volt accumulator, type 2VN5/3, Exide, Ever Ready or C.A.V., type 2VN9/3 or 9-volt grid bias battery (Drydex "Green Triangle," C.A.V., type 2VN9/3). The battery should be used for the main connections.

The circuit embodies all the most desirable portable-set features and of checking over all the wiring before you mount the set in the cabinet and connect up the batteries. Checking is not an insinuous job if you have the blueprint at your side. It is certainly a safety measure.

Assembling

When you are sure that everything is O.K., then you can slide the set into its compartment in the frame aerial box and the frame aerial. To keep the set as compact as possible, the former can be removed, then take care that one wire does not disturb any of the wiring when clamping the condensers and switches to the actual front of the cabinet.

The frame aerial as shown on the blueprint. You will see that one wire from the three-point switch goes to the centre terminal of the frame aerial.

The accessories used carefully if the most is to be made of the available battery-compartment space. A radio dynamo dry battery and a 9-volt grid-base battery will be needed when the set is worked outdoors. There is a grid leak holder, and an equivalent type by Exide, Ever Ready or C.A.V., type 2VN9/3. The battery should be used for the main connections.

The three-point switch being wired up, connection being made later to the three terminals on the frame aerial box. The two windings are put on at that side of the former remote from the front of the cabinet. There is a small space between the windings, both windings being in the same direction. The medium-wave winding consists of 15 turns of 29/64" wire and the long-wave winding of 40 turns of 9/64" wire. The long-wave winding goes to the centre terminal of the frame aerial box. The plane of the windings has a very slight directional effect; the plane of the windings will be needed when the set is worked outdoors. There is a grid leak holder, and an equivalent type by Exide, Ever Ready or C.A.V., type 2VN9/3. The battery should be used for the main connections.

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THE main construction of the General-Purpose Portable is extremely simple, but there are one or two points which should be noted, especially by those who are making up this set as a first attempt in home construction.

The cabinet can be bought complete or can be made up from plywood.

The cabinet front sets the controls, and at the back it is a box-like formation on which are mounted the frame aerial turns. The set itself is supported on wooden ledges on the sides of the frame aerial box and beneath there is space for batteries or a mains unit, the latter for use when the set is worked indoors.

The speaker is mounted on the front of the cabinet, and is butted up against a ring of felt. This plywood is used for the panel, but this can be removed when all the parts are wired up and the three condensers and two switches mounted direct on the front of the cabinet—the thin temporary plywood panel being used as a drilling template.

A Compact Layout

The set layout is compact as the whole equipment for the four-valve circuit is grouped on the one small baseboard! Stability is ensured by having a vertical screen between the H.F. valve side and the driving unit and clamped so that the set is worked indoors.

For ease in working you should get the terminals in place you will find it much easier to connect up the batteries. Assembling

The circuit's flexes are three small flexible leads which link up with the frame aerial windings and these should be left loose when the set is being wired up, connection being made later to the three terminals on the frame aerial box.

The Frame Aerial

The frame aerial must be wound before you can try out the set. Dimensions of the frame aerial box are given in the small sketch on the right of the page.

The frame aerial is connected to the set's flexes by two wires, one side to one terminal and the other to the other terminal of the frame aerial group. A' 108-volt 2-volt accumulator (C.A.V., type 2VN)-3, Exide, Ever-Ready (General-Purpose Portable).

When you have cut the panel and baseboard and drilled the eight small holes in the panel, screw the two parts together. The piece of felt should be stretched quite flat and tucked to the right-hand side of the baseboard, looking at the set from the back. Make sure that the felt is not damaged, as earth connections have to be made to it. Next mount the vertical screen, screwing it firmly down to the foil back.

This gives the screen between the H.F. valve side and the driving unit and clamped so that the set is worked indoors.

Stability is ensured by having a vertical screen, screwing it firmly down to the foil back. There is a small space between the windings, both windings being anchored to the foil, and between the windings being anchored to the foil.

The two windings are put on at that side of the former remote from the front of the cabinet. There is a small space between the windings, both windings being in the same direction. The medium-wave winding consists of 15 turns of 27/40 wire and the long-wave winding of 40 turns of 27/40 wire. The long-wave winding is connected to the frame aerial box by two leads one of which is a feed for the medium-wave winding. The medium-wave winding goes to the centre terminal of the frame aerial group.

An Efficient and Easily-constructed Portable Suitable for Indoor or Outdoor Use

For testing and operating the set is given.

The circuit embodies all the most desirable portable-set features.

AN EFFICIENT AND EASILY-CONSTRUCTED PORTABLE SUITABLE FOR INDOOR OR OUTDOOR USE

For testing and operating the set is given.

The circuit embodies all the most desirable portable-set features.
USE NON-INDUCTIVE.

There is always the chance of trouble in circuits having resistances and condensers which are not practically non-inductive. The resistances generally lend themselves of a wire wound upon a thin core, and are therefore, slightly inductive. A copper strand of carbon or other material is, however, non-inductive, for practical purposes. Condensers may be inductive or practically non-inductive according to how they are made. Some of the so-called non-inductive types, while being better than the old coiled condensers, are not truly non-inductive. This is a pity, as a user may easily be misled.

Volume control performances of the wire-wound type are often inductive. It is often shunted by a non-inductive condenser, and the results are usually satisfactory. A grid leak is non-inductive. A high lead may be sufficiently inductive to cause trouble, and in some cases, it may have a marked electric field that conflicts with another circuit and produces oscillation or other difficulties.

A CONDENSER DETAIL.

The capacity of the condenser is usually shown in terms with the various saturation. The recommendation of a non-inductive condenser is against the use of large condensers.

Now it is sometimes almost as important to know the capacity of a condenser with the varying values. The maximum value of capacity adds peculiar importance when the range of the capacity variation is the maximum. You can see that it is of importance by referring to the accompanying sketch. Condenser C1 is in the aerial circuit and is used as a volume control. If the range is from 0.0002 to 0.0001 the variation obtained is naturally very much greater than when the maximum capacity is 0.0001. Further, it might not be possible to reduce the strength of the circuit and provide the range that is required.

A TRICKY BUSINESS.

Hand effects may be very serious. You know what is meant by hand effects? You adjust the tuning condenser, for example, to get the station nicely and then, when you take your hand away, the station gets weaker or a howl appears.

Obviously, your hand has played a part in the tuning and it is not supposed to. If your hand comes into contact with an earthed part or lies near a part joined to earth it can have no effect. But if your hand is placed near the grid of the valve, or to a part joined to the grid, then the capacity of the circuit is changed when the hand is removed.

It is therefore, clear that the parts which the hands must touch or go near during tuning must be earthed.

By earthed is meant, strictly speaking, a circuit containing a shield, the battery is in this sense an earth point. As there are two terminals to a tuning or reaction condenser, the one united to the slide ought to be joined to earth or to the point of fixed potential. This simple rule, if carried out, will result in the avoidance of hand effects.

It is true that in some cases the spindle side of the condenser cannot be earthed. An example is where a frame aerial is being fitted, the mid-point of which is earthed. In this example the two wires to the frame condenser ought to be tied together between the terminal in one sense and the other in the reverse.

But not use a dial having much metal in it unless the metal part can be earthed and then be used as a shield. If there is a knob well away from the panel, so much the better as the hand will then be as far as possible from the spindle and plates of the condenser.

ON THE SHORTER WAVES.

One of the points in favor of moving the present broadcast waveband higher up the frequency scale is that it will open up more room not only for broadcasting, but also for television. For instance, between 500 and 550 metres there is a gap of only one million cycles for broadcasting, but this gap has been filled by using the frequency modulation for one hundred transmitters, provided these are spaced apart by three hundred cycles. Below 50 and 150 metres there is a frequency gap of at least four million cycles, and this may suffice to provide elbow-room for twice the present number of broadcast transmitters, and still leave half the available wave-band free for television. B.A.R.

An eye-witness account of the Test Trial Match at Cardiff will be relayed from the Western Region to National listeners on July 29.
Huge Success of Lissen Coils!

EVERY DESIGNER NOW USING THEM

Rarely three months ago the Lissen Shielded Dual Range Coil was produced. At that time Lissen claimed "For every set and every circuit!" NOW LOOK AT RECENTLY PUBLISHED CIRCUITS—the constant use of Lissen Coils proves beyond doubt that here, with their interchangeability, their precise matching, their electrical efficiency, their complete and modern shielding, these Lissen Coils are exactly what every designer wanted.

In set after set they have increased selectivity, eliminated long-wave break-through, made possible a new standard of tuning. Once again in the "A.W. General Purpose Portable" these Lissen Shielded Dual Range Coils are specified. GET THEM THIS TIME!

Price, complete with shielding cover and shielding disc: £6.

Specified in the "GENERAL PURPOSE PORTABLE"

Disc Type Lissen H.F. Choke

A disc-type H.F. Choke of outstanding merit, in very compact form. Will operate perfectly in any capacity reaction circuit wherever an H.F. Choke is specified. Suitable for both long and medium wavelengths. Will give perfect results in receivers employing Dual-wave Coils. Specified again this week in the "A.W. General Purpose Portable." Price £2.

To Ensure Speedy Delivery, Mention "A.W." to Advertisers
T HIS week I came across my title accidentally and perhaps undeservedly. I had been listening during the early part of the evening, but had switched off shortly before nine to do some other work. Glancing at the clock, I saw it was well after ten, and I realised I was too late to hear much of the recital by Eda Kersey and Norman Allin. At the same time, I noticed that the Dominion Day speeches were being relayed from the Savoy Hotel. Knowing that that kind of broadcast generally holds up the following item, I switched in. Prince George was still talking, so I was in time after all.

I listened to Miss Kersey with interest. I thought Sammartini's Passacaglia a sensible work to broadcast. Not too difficult of appreciation except, perhaps, for those who never even try to understand good music. Also, I liked her playing; sympathetic.

I do not remember having heard Norman Allin in better voice. I generally hear him roar. His business is to discover the chief reason I, personally, enjoyed their programme is to discover whether that purpose has or has not been carried out. As I write these words the Saturday night Music Hall has just finished. My impression is that the B.B.C. has done well to revert to this old-time form of entertainment. Given a reasonably strong cast, the hour goes very quickly.

In this particular vaudeville there was a liberal supply of comedians. They made interesting contrast, a compliment to the producer who foresaw that they would combine successfully in the contrasting sense. Taking them in no particular order, I am inclined to regard them from the standpoint of the listening public and to discount entirely the studio audience. Although studio audiences have probably come to stay, no criticism can be broadcast criticism if it considers them in the least. A study of audience is there solely to help the act as entertainment for listeners; no other excuse can be made for it.

Consequently, I am constrained to grumble a little at Collinson and Dean. They seemed to me to be playing to the studio audience and (as a wireless listener) I have some blanks to record. It is not good enough. I appeal to Messrs. C. and D. to remember the fact the next time. Their material was good.

Norman Long is, of course, an experienced broadcaster. His jokes are always new and consist of simple, direct narrative leading quickly to a climax. They could all be written down, reading as effectively as he speaks them; hence, perfect for broadcasting.

Lily Morris gave us songs in the real music-hall style. She discussed (as she sang) the important question of how a fly keeps his weight down, when he is eating all day, with considerable conviction. She pointed out that when he weighed himself on the butcher's scales he found he was the same weight as last year. I cannot say I was quite so interested in her second song, in which she broadcast a pathetic complaint that she was always the bridesmaid and never the blushing bride. It appears she had been through the experience no less than twenty-two times. Naturally, she felt strongly about it. She is a good broadcaster.

Charles Higgins was very funny and contrived to keep the invisible audience in his mental eye, even if he could not see any member of it with his physical optic. He taught me something. I never knew before that it is only the hairs on a gooseberry that keep it from being a grape. One does learn something from these people.

The Submarine Hazard was an amazing story. Admiral Gordon Campbell's account hardly be surpassed for sheer solid heroism. His story will have made some of us long for world disarmament.
Potentiometer Noises

Sir,—I have a high-grade potentiometer acting as a volume control. This has worked entirely satisfactorily for about a year, but now causes grating noises in the receiver whenever it is adjusted. I have had the instrument out of my receiver and pressed down the contact arm on to the sheet of flexible metal with which it makes contact. This has not proved to be a success. The resistance element is quite sound and there does not seem to be a faulty contact when tested with a small battery and meter. Can you account for the grating and suggest how I may remedy it? J. F. (Norwood).

The instruments in question usually have a blunt steel point attached to the end of the rotating arm and this point presses down upon the steel contact plate. If there is no lubrication between the two steel surfaces, grinding will be in evidence and this will account for the cracking. You are advised to make up a mixture of grease graphite and apply this thinly to the contact-arm track on the contact plate. Powdered lead pencil mixed with a little vaseline will be found effective.—ED.

Moving-coil versus Cone-type Speakers

Sir,—Why is it that moving-coil speakers are considered to be so far in advance of the ordinary cone-speaker and why cannot a cone-speaker be made equally as good, for reproduction, as a moving-coil speaker? It is possible to make cone-speakers reproduce as well as some moving-coil speakers, but, generally speaking, the moving-coil speaker is superior on account of there being no moving iron in its construction and having hardly any natural frequency period of its moving parts. The ordinary type of speaker employing a cone usually has some form of reed which is attached to an iron yoke. The reed tends to vibrate at its own natural period and consequently gives rise to sounds which are not the same as those being put into the speaker electrically.—Ed.

The “Short-wave 3” in the Tropics

Sir,—As a builder and operator of your “World-wide Short-wave 3,” I feel it my duty to let you know of its very satisfactory performance abroad. Being a seafarer and continually sailing in tropical waters, where reception on medium waves is poor, I made the above set with the object of keeping in touch with home.

On the route towards South America, my best received stations were Boundbrook, Schenectady, Pittsburg, Zeessen, and Rome. Boundbrook, especially, is very strong, and I have always received it free of fading effects. Unfortunately, the 25-metre band has not been well received lately, but it now shows signs of improving. Other transmissions heard have included Moscow, Chicago, Springfield, Buenos Aires, Ottawa, and Rabat.

S. S. M. (Glasgow).

The “Century Super” — a Wonderful Set

Sir,—I really must thank Mr. James and Amateur Wireless for this wonderful set.

Since building this set last year I have added several gadgets, i.e., gramophone pick-up, switches for remote speakers and headphones, and switch to change over from frame to indoor aerial and earth for "S.W." I have only just started "S.W." listing, my aerial being 14 ft. of electric bell wire round the picture rail. A few stations received, all on L.S., are W1 XAZ, W2 XAF, Zeessen (DJA), PRXA, etc.

J. W. B. (London), S.W.

The “Mascot”

Sir,—Wishing to bring this three-valve set up to date and remembering a set Mr. Harris designed a little while back I turned up my old numbers of Amateur Wireless, Nos. 509 and 510 (March 12 and 19), which gave full particulars of the "Mascot 3.” As the necessary coils for the band-pass tuning were described in detail, I found no difficulty in making these. The actual building of the set was so simple, that it calls for no remarks other than thanks for (Continued on page 75)

THE MILLIONS WHO SMOKE THEM MUST BE RIGHT

They say

Player's Please

The Quality and Quantity Cigarette

Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention
ALTHOUGH I ought to be hardened by now to wireless reception, I must confess that I enjoyed a new thrill when I tried out this Ferranti set. "In this one set," say the makers, "is united every single quality sought by the most exacting purchaser of an up-to-date radio receiver. I agree, without any reservation whatever."

This is a super-het console. Everything except the aerial and earth is inside the cabinet, which is itself beautifully fashioned. The seven-valve chassis, with its rustless cadmium and tin-plated steel parts, takes up the lower part of this cabinet. The moving-coil loud-speaker is fitted in the top section, with the back left open to ensure an unrestricted action.

An A.C. Super-het

The instrument is designed to work entirely from A.C. mains. The standard model is for 200- to 250-volt supplies, but with the addition of a special transformer it is possible to work on 100 to 125 volts. On normal supplies the running cost is very low, the total consumption being less than 60 watts.

In its technical conception the Ferranti super-het is ultra-modern. Built to meet the exacting needs of to-day it also anticipates the needs of the immediate future. The super-het system decisively combats the congestion of the ether, enabling high-power stations to be separated and received without mutual interference.

Looking over a blueprint of the circuit I see that the sequence comprises a first stage of amplification before the frequency-changing stage, first detector and separate oscillator, intermediate high-frequency stage, power-grid detector and transformer-coupled power output stage, with a valve for rectifying the mains supply.

Simple Control

Most of the valves are of Ferranti manufacture, the exceptions being the variable-mu screen-grids, which are Osram. The full-wave rectifier is a Ferranti R5, giving 60 milliamperes at 250 volts.

The control of this set is really the last word in simplicity. By the use of a very high-grade gang condenser of Ferranti design the tuning is reduced to one knob control. Apart from the tuning knob there is a volume control, a combination switch and a tone control.

These controls are simply arranged on the front of the figured-walnut cabinet, as can be seen from the illustration. The knob on the right works the gang tuning and also the illuminated wavelength scale mounted behind the escutcheon.

The knob on the left is for volume control, which is effected by varying the grid bias of two of the variable-mu screen-grid valves.

At the centre of the loud-speaker fret is a small knob for the tone control, which takes the form of a filter across the loud-speaker to cut down the high notes. The switch knob at the bottom is cleverly designed and works an indicator on the tuning escutcheon in addition to performing the wavelength changing and mains switching.

On test, I was immediately impressed with the ease of control. No finess is required to get wonderful results with this set. All you do is turn the tuning knob, with the volume half-way on—and the stations roll in.

The scale moves horizontally and the wavelength markings are clear and accurate. Stations can be immediately identified by this means.

This rear view of the Ferranti Super-het shows the neat layout and adequate screening.

The tone control exerts a remarkable effect on reception. It cuts down the high notes at will. In doing so, it cuts down much of the background noise experienced in receiving many of the distant stations at this time of year, as well as moderating the intensity of heterodyne whistles. I should say that this tone control will prove invaluable in the winter.

Volume and Quality

With the full tone there is really brilliant quality, with more than enough volume for ordinary requirements. Thanks to the extremely effective action of the volume control good quality is obtained from the powerful locals as well as from the foreigners available at this season.

You cannot fail to be impressed with the selectivity of this set. I got Mühacker clear of London Regional. Who could ask for more? This was on a 60-foot aerial, but by withdrawing the aerial plug a mains aerial comes into action and I got the German equally well that way.

True band-pass tuning is obtained. Stations have an appreciable spread around their wavelength marking, but fall away rapidly at the spread limits.

Considering the relatively complicated tuning arrangements of the circuit the action is remarkable, there being no trace of "double-humping" or of any other troubles so frequently encountered. The medium-wave selectivity is rather better than that on the long waves, but everywhere from the top to the bottom of the broadcasting gamut, there is an ease of tuning that cannot be too highly praised.

I consider this set is a great triumph of radio engineering skill and of manufacturing organisation. It provides de luxe reception at an extremely moderate cost.

A feature of this year's broadcasting in Scotland has been the successful relays from the concert parties entertaining at the holiday resorts. A very good show of this kind will be broadcast on July 30, when listeners will have a chance of hearing Popkewell's "Gaiety Whirl," from the Gaiety Theatre, Ayr. It is produced by Frankland Gray, and includes such stars as Dave Willis, Marie Nyman, Betty Jume, and Benny Loban.
OUR LISTENING POST

By JAY COOTE

With the reorganisation of the broadcasting system in Spain and its consequent development, there is a strong possibility that we shall witness a number of alterations in the wavelengths used by the new transmitters. So far, as is known at present, the 120-kilowatt high-power station destined to relay the Madrid programmes will take one of the longer channels, namely, between 1,314 and 1,334 metres; Bilbao will work on 220 metres, Seville on 263 metres, Valencia on 349.3 metres, or roughly where we now find 368 metres. The lower powered Madrid station, for the benefit of local listeners, will revert to its original 424 metres.

In the meantime, in Spain a drive is being carried out to rope in radio pirates, of which there is an increasing number, and much assistance is being given to the authorities by the Union Radio Association, which, with a view to securing a sole concession in that country, is anxious to increase the number of licence holders without delay. One rule which has lately been strictly enforced by the Spanish studios is aimed at all dramatic artists, singers, instrumentalists, and, in fact, everybody who may be engaged or invited to broadcast. In every instance they are required to prove possession of a listening licence and satisfy the authorities that they have owned a radio receiver for a period of at least three months. Such a measure is a perfectly fair one and might well be copied in other countries.

During the last few weeks Spanish studios have increased their hours of transmission. On some days Madrid has given a non-stop programme, doing away with all intervals by linking up items with gramophone records.

American Reception

At this period of the year the reception of American stations working in the medium wave band is peculiarly fitful; on some nights—or, rather, in the early mornings—between 2 and 3.30 a.m., it is possible to pick up faint transmissions; on others we can barely hear a carrier wave. Possibly within the next week or so greater success may crown our efforts, as I understand that both KDKA (East Pittsburgh) and WGY (Schenehtady) towards 5 a.m. B.S.T., or at the end of the day's programme, will test at high power. It is not a question of adding a few kilowatts, but something much bigger; in fact, their ambition is to boost up B.S.T., or at the end of the day's programme, will test at high power. It is not a question of adding a few kilowatts, but something much bigger; in fact, their ambition is to boost up...
In this article, the Scottish Regional Director, David Cleghorn Thomson, outlines his ideas for the Scottish programmes under the new Regional conditions.

If it were not for the limitations of the wavelength situation, and other conditions imposed by circumstances of geography and population, it would be possible in working out the final putting into practice of the Regional policy to make it not only a series of alternative programmes partly drawn from regional sources, but a series of complete alternatives. Just as the best Scottish and Welsh newspapers have their own leaders commenting on British politics from a regional or national point of view, and their own reviews on the books chosen by the Book Society, the Welsh, Irish and Scots programmes might quite well include news, book reviews, and talks on men and affairs based on the characteristic and historical outlook of the listeners in the areas served; but this is not either possible or desirable in the conditions as they exist at present. In the circumstances, however, the regional scheme (as it is being put into operation in Scotland) affords opportunities for a most interesting and significant contribution to Scottish life on the part of our programme makers.

Scotland's Many Demands

Our task, it is a platitude now to repeat, is manifold, and absorbing, whether it be in the sphere of perfecting a new brand of Scots vaudeville entertainment, fostering bee-keeping and forestry in the rural districts or giving a platform to the most stimulating and authoritative commentators on public affairs in the country to-day.

Scotland was the first broadcasting area in Great Britain to be regionally co-ordinated from a programme point of view; it is also one of the most difficult to cover graphically from the point of view of reception. We are only too conscious of the fact that it is a peculiarly anomalous position to have to admit that still the most fertile sources of our character programmes—the Highlands, the Islands, and the remote parts of Galloway and the Borders—are unable to listen really well to programme fare which is drawn from their midst. Suffice it to say here that no effort is being spared to overcome this difficulty, and that definite schemes are under consideration at the moment to this end.

When Twin Wavelengths are Available

To take programmes for sectional groups first, we propose, after September, when the twin wavelengths should both be in operation from Westerglen, not only to maintain the services already instituted for gardeners, bee-keepers, fishermen, Gaelic children, and followers of various sports, but to increase the time afforded to them by substitution for periods formerly taken from London and regional programmes of a definitely national character, such as recitals of Scots psalms, Scots country dance transmissions, Highland "Ceilidhs," and the like. We shall be relaying during the autumn and winter months all the Symphony Concerts of the Reid Orchestra, most of the latter from country centres which are seldom if ever able to maintain a strong pool of first-class professional musicians resident in the country for at least nine months of the year, and send this body into the smaller provincial centres with good choral bodies, where financial assistance is limited. Chamber music and the activities of the best choral societies will lack of opportunity to fill their due place in the programmes.

Vaudeville Developments

One sphere where considerable extension of activity is anticipated is that of vaudeville and variety—both in the way of studio shows and outside broadcasts. With the assistance of our old friend, Andrew P. Wilson, who used to be a "right-hand man" of Sir Oswald Stoll in the matter of Scots turns—we are concentrating on an extension and revival of this type of programme "with a difference"—and the microphone is also touring to a much larger number of provincial centres of entertainment in search of fresh talent and ideas. The "Radiotransmitters," who have held the boards for some years unchallenged as a radio concert party, have now serious rivals in the "Silver Citizens," the "Granite City," and in Ernie Gover, Guy Daebritz, Jimmy Ross, and Bunny Gordon we have a group of young and vital composers ready and willing to provide those companies with material.

Local Talent

We do not anticipate, at any rate for some time to come, filling too per cent. of our Regional wavelength with locally produced material. We shall supplement from other Regional sources—the Northern and the Midland Regional programmes, and the Belfast and Dublin ones too. But as the talent presents itself in increasing amount and steadily improving quality, we are ready and anxious to make way for it. Such an increase is almost inevitable following the increase of opportunity. It is lack of opportunity and demand for first-class musical and dramatic talent which has for so long impoverished Scotland and Scottish wireless programmes by tempting artists to leave us for London and New York.

So we hope that this new era of Regionalism will usher in a good time not only for Scottish artists, composers and writers, but also for the steadily increasing body of listeners.
NEW BULGIN SWITCHES

ONE of the components in a radio receiver which does not always receive the attention that it should is the switch. This is not a good policy, as some very annoying troubles may be caused by badly made switches.

We have recently tested three types made by Messrs. A. F. Bulgin & Co.; the first two types are very similar, the only difference, in fact, being that one is arranged with two contacts and the other with three. The switches, are of the push-pull type having a spring-controlled action similar to that used in toggle switches. The central spindle is not insulated, thus forming the third contact in the one case, a point which should be remembered if a metal panel is used. The switches are built up on small bakelite mouldings, and arranged for one-hole fixing.

The remaining switch is of the quick-make-break type, and is suitable for controlling 750 watts at 250 volts maximum. The mechanism is enclosed in a small bakelite moulding, the whole making a

WATMEL WIRE-WOUND COMPONENTS

A RANGE of nicely made wire-wound potentiometers, of which we have tested one sample this week, is that manufactured by The Watmel Wireless Co. Ltd.

These potentiometers can be obtained in all normal values up to 50,000 ohms. They are built up into moulded bakelite bodies which are finished in a mottled brown colour. A small face plate also of moulded bakelite is provided giving an indication of the minimum and maximum positions.

The performance of the speaker on all types of signal was good, the response to the upper frequencies being especially marked. The sensitivity was also quite satisfactory, and very nearly as good as that of our standard encrusted model.

R. & A. CHALLENGER MOVING-COIL SPEAKER

WE have tested this week the new R. & A. Challenger moving-coil loudspeaker. This speaker employs a somewhat squat E-shaped permanent magnet, which is bolted to the back of the metal chassis which forms the frame of the speaker. The 6-inch paper diaphragm is suspended from the metal framework, the actual suspension being formed from the outer edge of the diaphragm, this being turned over and corrugated concentrically to give the necessary flexibility.

A low-resistance moving-coil is fitted, the necessary input transformer being mounted on the framework. This transformer is tapped to make it suitable for use with all types of power valves, including pentodes. The usual web type centering device is fitted.

The resistance element is wound on fibre and located just inside the rim of the cup-shaped body. The contact to the element is made by a spring-type moving arm which rides lightly on the wire.

The control tested was rated at 25,000 ohms, the actual value being 27,000 ohms.
We supply all good quality Radio Receivers, Components, and Accessories on deferred terms. Large stock of 'post and parcel' goods, to which we have always promptly,. Send list of requirements and we will endeavor to meet them, if possible, at an economy List free on request.

NEW CASSOR MELODY MAKER, Model 350 (post released). Complete Kit, £2 10s. 6d. West Country, £1 10s. 6d. and Low-speaker.

And 50% of monthly payments of 10/-.

MURPHY ALL-MAINS 3-VALVE With SET, Model A & Cash Price £1.07 1/12. And 12 months monthly payments of 2/-.

We are approved Murphys Dealers.

ATLAS ELIMINATOR, A.C.244. 3 HT. With Thermostat, 22 MA output. Cash Price £2/10/6. 2/-

And 12 months monthly payments of 2/-.

OMNIDRIVE PERM. MAGNET MOVING-CORE UNIT. Cash Price £2 3s. 6d. 1/-

And 11 months monthly payments of 10/-.

MARSHPHONE PICK-UP AND TONE-CHANGER. With Rear Motor. Cash Price £2 10s. 6d. 6/-

And 11 months monthly payments of 10/-.

NEW R. & A."CHALLENGER" PERM. With Control Unit. Cash Price £1/17s. 6d. 1/-

And 12 months monthly payments of 10/-.

SET OF THREE NEW VALVES, MURDOCH & CASSOR, S.C. Decker and Super Power. Cash Price £1/17s. 6d. 1/-

And 12 months monthly payments of 10/-.

EXIDE HIGH-TENSION ACCUMULATORS (100 cells, 30/10 superannum, with 5,000 milliamperes). The cheapest form of high tension supply where electro-light mains not available. Cash Price £3 17s. 6d. 6/-

And 12 months monthly payments of 10/-.

NEW W.B. FM4 PERM MAG MOVING-CORE UNIT. Cash Price £2/10/6. 2/-

And 7 months monthly payments of 5/-

To avoid delay, will customers kindly send deposit with order.

If you want to use the "BUSCO SWITCH" and other accessories in your order, there is no question point to your request. You have contact like a great deal so far.

The design of apparatus or receivers cannot be undertaken. Modifications of a straightforward nature can be made to order, but we reserve to ourselves the right to determine the extent of an alteration to comply with the scope of a query. Modifications on proprietary designs or receivers cannot be undertaken.

On July 27th Mr. Cyril Wood will present a programme for West Regional listeners only. It is a "Wake-Up Call" for the West Country programme of humour, song, and dance, and will include West Country dialect sketches by F. Marriott Watson and G. Edmund Hall. The cast includes T. B. L. Mabbott, George H. Leech, Osborne Leach, and Daniel Roberts, all of whom at West Country.
Postcard Radio Literature

GET THESE CATALOGUES FREE.
Here: "Observer," reviews the latest books and folders issued by well-known manufacturers. If you want copies of any of all of them, FREE OF CHARGE, just send us a postcard giving the index numbers of the catalogues required (shown at the end of each paragraph) in "Postcard Radio Literature," "AMATEUR WIRELESS," 29-31, Fetter Lane, E.C.4. "Observer" will see that you get all the literature you desire.

Tone Control
EVERYBODY is talking about the Multi-tone system of tone control and if you want to get the most up-to-date information on this, then write for a free copy of an interesting booklet produced by the Multitone Electric Co., Ltd. This gives curves, and full details. 794

Tungsram Prices
New literature about Tungsram valves has been produced following the price reductions a month or so ago. It pays every valve user to keep up-to-date with regard to valve prices and data and I advise you to get a face copy of the new Tungsram folder. 795

The Kenwell Power Pack
The Kenwell Power Pack, a new idea, is a mains-powered moving-coil sound pick-up, complete with a useful H.T., grid-bias, and L.T. trickle-charging unit. Full details can be obtained free through my Catalogue Service. From Kenrell Radio, Ltd., and I feel sure that it will interest main users.

Mullard PM13
Information has been released by the Mullard Wireless Service Co., Ltd., regarding the PM13 screen-grid valve. This takes 4 volts low-tension. Particulars can be obtained through the Catalogue Service. Observer 797

"SUPER POWER FROM BATTERIES"
With reference to the article on "Super Power from Batteries" in Amateur Wireless No. 547, the diagram, Fig. 2, showed the position of the milliammeter incorrectly. This should be inserted in the anode lead, as explained in the text, and not in the lead to the auxiliary grid.

London Radio Supply Co. have been appointed official Murphy dealers, and the terms of the Murphy All-Mains 3-Valve Set advertised in Amateur Wireless, July 9, should have read 3½s. with order and 12 monthly payments of 29s. 6d. Cash price 17½ guineas.

Some of the most beautiful songs by Richard Strauss will be heard when Percy Underwood gives a song recital from Midland Regional on July 30. The programme includes the "Dream in the Twilight," "All Souls Day," and ends with the well-known "Serenade."
PREPAID ADVERTISEMENTS

Advertisements enter this head are charged in advance, and any change of address must be notified at least four weeks in advance.

THREE SHILLINGS. DEPOSIT SYSTEM.

Advertisements so charged are only charged for 12 months, and for any shorter period, a deposit of 3 shillings must be paid in advance. The deposit will be refunded on demand and returned together with the materials when the advertisement is cancelled.

It is expected that all advertisements will be received at the office at least two months in advance of the date of publication, the exact date of publication being that of the date of the issue in which the advertisement is published.

It is recommended that all advertisers should adopt the services of the Post Office Special Delivery, as the delivery of advertisements is not guaranteed.

Advertisements are printed in black ink on white paper, unless otherwise specified.

Advertisements must be in type or letterpress, and must be submitted in triplicate.

The publisher reserves the right to reject any advertisement or portion of an advertisement which, in its opinion, is not in accordance with the general policy of the paper.

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The publisher reserves the right to reject any advertisement or portion of an advertisement which, in its opinion, is not in accordance with the general policy of the paper.

Advertisements must be submitted at least four weeks in advance of the date of publication.

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Whilst it moves —

It Stands

THE stability of the gyroscope, which has been utilized for the steadying of planes, ships, trains, comes from the movement of its fast revolving wheel. It is stable only whilst the wheel revolves. The movement steadies it.

Business is like the gyroscope. Its greatest stabilising force is movement—forward movement—progress. And the progressive business to-day is the business that advertises.

Many an advertised product has continued to increase its sales throughout the recent lean years. Its goodwill has proved a bulwark against the storm. Carefully planned advertising has kept it forging ahead.

Many another advertised product has faced a sudden change in the market—produced a completely new line—and triumphed. The goodwill was inextinguishable. It descended at once from the old product to the new.

In the company reports of the firms that advertise and in their advertising itself, you can hear the smooth re-assuring hum of the gyroscope. You can see them going ahead, expanding, building goodwill and consolidating it.

“IT Pays to Advertise!”

Issued by the Institute of Incorporated Practitioners in Advertising in conjunction with the Federations of Master Process Engravers and Master Printers, etc.

Mention of “Amateur Wireless” to Advertisers will Ensure Prompt Attention
If you are running a small set with a dry battery H.T. supply here is your chance to get Moving Coil performance with very little outlay and no structural alteration.

Blue Spot 100U is designed to work satisfactorily on very small inputs. In consequence it may be used with battery-operated receivers with every confidence as well as all mains sets.

Its performance is remarkable. It has all the sensitivity and richness of tone that distinguishes the good (and expensive) Moving Coil speaker. It gives the finest rendering of the difficult bass notes without detracting from the clear high notes of the treble.

For the man who wants a really good top notch speaker 100U provides good Moving Coil quality at economy price.

Send for Catalogue No. A.W. 41

ALL BLUE SPOT PRODUCTS ARE NOW OBTAINABLE BY INSTALMENTS.