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Edited by F.J. CAMM

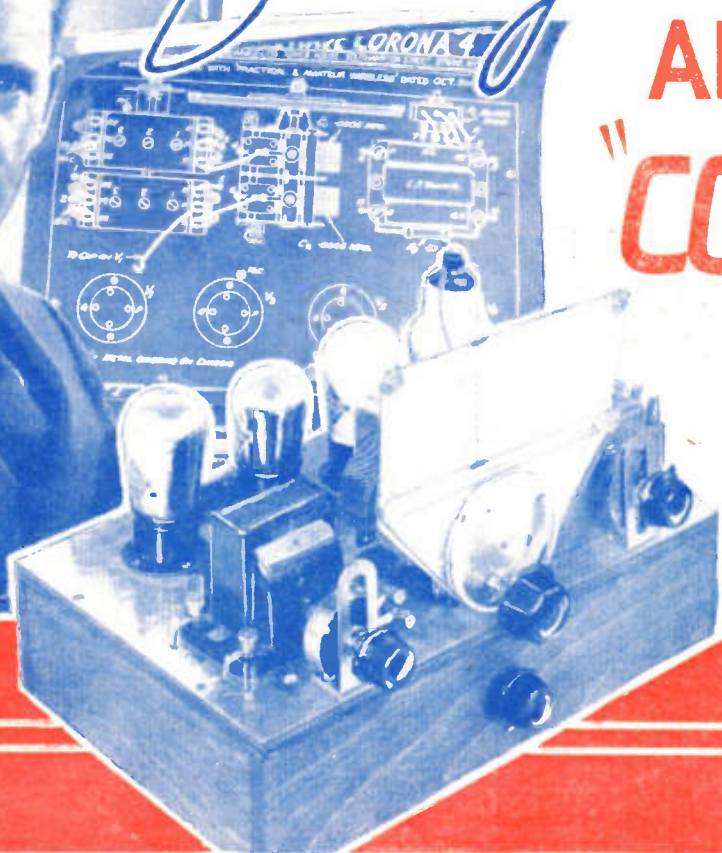
a GEORGE
NEWNES
Publication

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October 9th, 1937.

AND PRACTICAL TELEVISION



Building



**F.J. CAMM'S
ALL-WAVE
"CORONA"**

Four

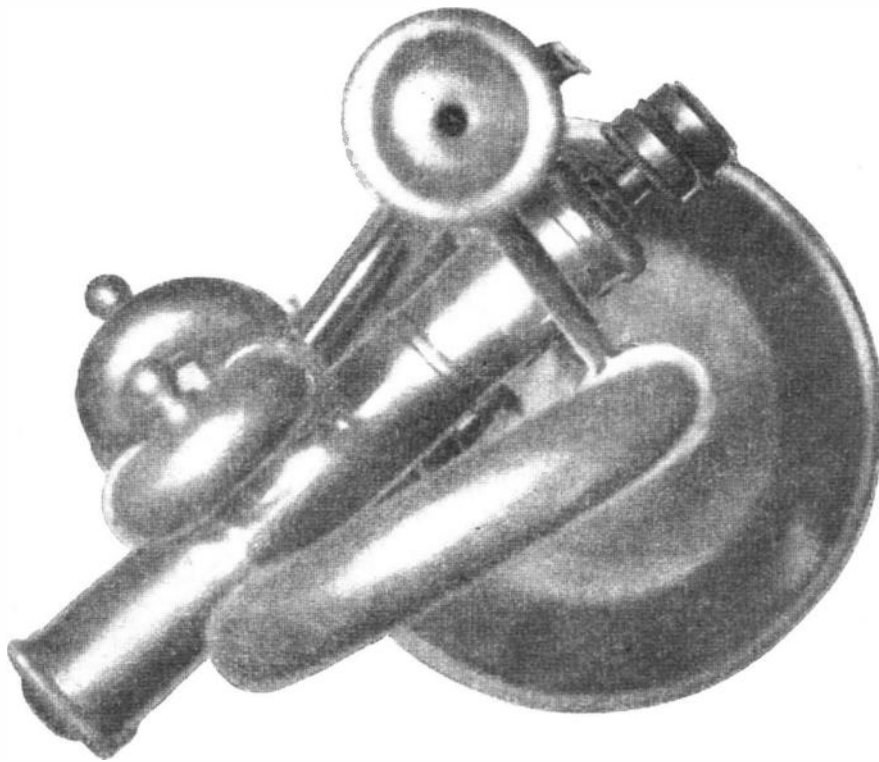


NEW Stentorian speaker—

"AN IMMENSE STEP FORWARD"

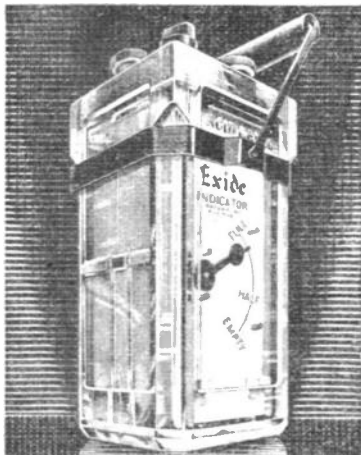
Says Mr. Camm

Make a noise like this



What—can't recognise it? Can't see it's a cornet? If you have as much difficulty in recognising a cornet on your radio as you have here, it's high time you did something about your batteries. Get an Exide.

R.15



Exide

BATTERIES FOR RADIO

'Still keep going when the rest have stopped'

EXIDE 'HYCAP' BATTERY (*High Capacity L.T. Battery*)

For modern multi-valve sets—lasts longer on one charge. For small sets use the Exide 'D' Type. Both have the Exide Charge Indicator. Your dealer will tell you which to use. For High Tension use Drydex.

From reputable dealers and Exide Service Stations. Exide Service Stations give service on every make of battery. Exide Batteries, Exide Works, Clifton Junction, near Manchester. Also at London, Manchester, Birmingham, Bristol, Glasgow, Dublin and Belfast.

test. Note the positions of the valves—the H.F. valve being on the right when viewing the set from the panel, the metallised detector valve coming next, then the clear valve and finally the output valve—type P. 220. Turn the reaction condenser anti-clockwise as far as it will go so as to remove all reaction effects, and

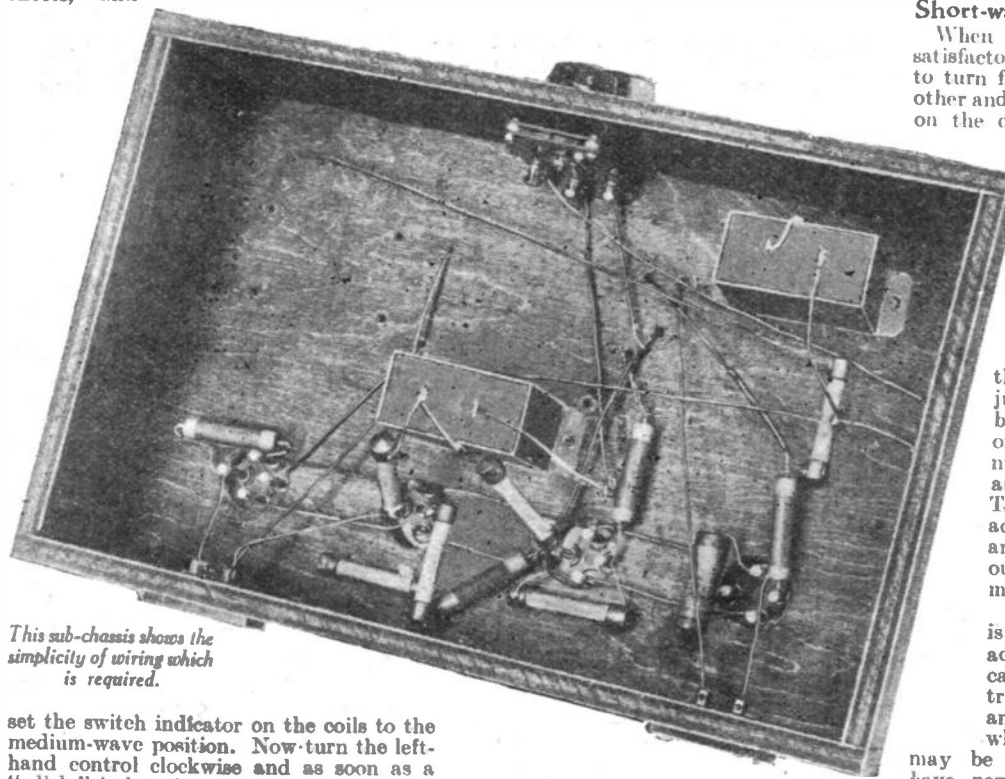
Alternatively, you can unscrew them entirely, and open them out so that they have no effect at all on the inter-circuit wiring. By doing this you will make quite sure that the minimum wavelength on the short-wave band will be covered. The trimmers which have to be adjusted for the medium-wave band are in the coil unit and are identified by the number "2." Use a thin screwdriver or a pointed or sharpened slip of wood for

increased with the trimming adjustments, the volume control should be turned back so that a weak signal is maintained, as this enables the adjustments to be more easily made. It is very difficult to notice an improvement in strength if the station is blaring out on the loudspeaker, but if turned so that only a very weak signal is heard, the slightest improvement or loss of volume will be noticed.

Short-wave Trimming

When the medium waves have been satisfactorily trimmed it should be possible to turn from one end of the scale to the other and pick up stations at various places on the dial, the stations heard in your particular locality depending upon local conditions. For this reason, we do not publish a list of the stations which are likely to be heard. The direction of your aerial, its height above ground, any screening which might be introduced by surrounding buildings, trees, hills, etc., will all affect results and, therefore, it is not possible to say just what you will hear. It should be possible, however, in most parts of the country, to pick up quite a number of stations, both English and Continental, at good volume. The long-wave band is trimmed by adjusting trimmers numbered "3," and the same procedure is carried out as has been mentioned for the medium-wave band.

For the short-waves the process is slightly more difficult, and all adjustments must be made very carefully indeed. This time the trimmers used are numbered "1," and the location of a station upon which to make the adjustments may be found rather difficult if you have never used a short-wave receiver before. In spite of the reduction gearing on the tuning control, the very slowest adjustments should be made, and you will probably find that the reaction condenser may now be used as an aid to trimming. Advance the reaction condenser until the receiver is brought to the verge of oscillation. This will be indicated by a rushing sound in the loudspeaker, and if carried too far, a whistle will be heard. When a station is tuned, a rising whistle will be heard, and this may fall as the condenser is turned still further. Slacken off the reaction control until the whistle ceases and re-adjust the tuning condenser.



This sub-chassis shows the simplicity of wiring which is required.

set the switch indicator on the coils to the medium-wave position. Now turn the left-hand control clockwise and as soon as a "click" is heard, you will know that the valves are switched on, and that the volume control which forms part of this two-purpose component is at the minimum volume position. Turn the tuning dial to the point indicated for your local station, and then turn up the volume control. A rushing noise should be heard as this is advanced and the local station should then be heard.

Trimming Adjustments

Remember that the trimmers on the ganged condenser are not used with this particular coil assembly, and thus they should be opened to their widest position.

adjusting this screw, so that no undue capacity effects are introduced. Turn each of the trimmers marked "2" until maximum volume is obtained at the dial setting given for your local station. Of course, it will be assumed that when mounting the dial you have first set the moving vanes of the condenser to either the minimum or maximum setting and have placed the point on the dial to a similar position. If this is not done, of course, the pointer will not travel completely across the scale and the station indications will be all out of position. As the signal strength of a local station is

LIST OF COMPONENTS

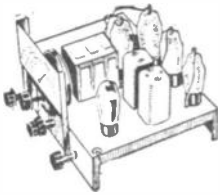
- | | |
|--|--|
| Two all-wave coils, type Triogen, with 2-gang spindle (Wearite), 20s. 6d. | (R4); One 15,000 ohms (R5) Type F½ (Dubilier), 3s. 6d. |
| One 2-gang condenser, bar type .0005 mfd. (C1, C2) (Polar), 12s. 0d. | Four valve-holders, 4-pin chassis mounting type (Clix), 2s. 8d. |
| One S.M. drive, V.P. horizontal, with station names (Polar), 6s. 6d. | Two socket strips, A.E. and L.S. (Belling and Lee), 1s. 6d. |
| One differential reaction condenser .0003 mfd. (C3) (B.T.S.), 2s. 6d. | Two component brackets (Peto-Scott), 8d. |
| One potentiometer, 50,000 ohms, with 3-pt. switch (R1) (B.T.S.), 4s. 6d. | One Plymax chassis, 12in. by 8in. by 3in. (ready drilled for valveholder) (Peto-Scott), 3s. 9d. |
| One L.F. transformer, type AF8 (Ferranti), 11s. 6d. | Eight plugs: H.T.—, H.T.1, H.T.2, H.T.3, G.B.—, G.B.—1, G.B.—2, G.B.—3 (Belling and Lee), midget type, 1s. 4d. |
| Seven fixed condensers: Two 2 mfd. (C7, C10) (type 65); One .0001 mfd. (C6); One .0005 mfd. (C4); One .005 mfd. (C9); One .01 mfd. (C8); One .1 mfd. (C5) (tubular) (T.C.C.), 10s. 8d. | Two spades, L.T.—, L.T.+ (Belling and Lee), 4d. |
| Seven fixed resistances: One 1 meg. (R3); Three .5 meg. (R2, R6, R8); One 100,000 ohms (R7); One 50,000 ohms | One fuse and holder, 100 mA (Microfuse), 1s. 6d. |
| | Four valves: 210VPT (met.), 210DET (met.); 210DET (plain), 220P (Cossor). |
| | One speaker, Stentorian Junior (W.B.). |
| | One H.T. battery, 120v.; One G.B. battery, 9v.; One accumulator, 2v. (Exide). |

PETO-SCOTT EVERYTHING ALL-WAVE

PETO-SCOTT'S 1938 Range of ALL-WAVE and SHORT-WAVE APPARATUS is again unsurpassed for RELIABILITY, QUALITY and VALUE. This all-round supremacy is the natural outcome of PETO-SCOTT'S long experience in Direct-to-the-Public Radio. You know in 1919 . . . you know TO-DAY, that you may order from PETO-SCOTT in the knowledge that you will receive BRAND-NEW GOODS, backed by a GUARANTEE of SATISFACTION. PILOT AUTHOR KITS are guaranteed to specification . . . build one and be SATISFIED. YOU ARE WARNED AGAINST CHEAP SUBSTITUTES—only PILOT AUTHOR KITS are EXACT to AUTHOR'S SPECIFICATION.

ALL-WAVE Battery 5-valve SUPERHET KIT

Save £1—buy a Complete Kit!



Wavelengths: 18-52, 200-550, 900-2,100 metres. New design and ganged and trimmed I.F. tuning unit simplifies building. Nearly 20 years' experience in superhet design has produced this super-efficient All-Wave Kit. KIT "A," comprising all parts, with ready-drilled chassis, instructions and drawings, lens valves, speaker, batteries. List Value - £5:19:6

OUR PRICE £4:19:6

Or 9/- down and 11 monthly payments of 9/3

KIT "B," with valves, £7:15:6, or 14/3 down.

9% DOWN

PILOT AUTHOR KITS—Exact to Specification

CORONA ALL-WAVE 4

THESE ARE THE PARTS SPECIFIED and USED by Mr. F. J. GAMM and INCLUDED in KIT "A"

Any item supplied separately. Orders over 10/- sent C.O.D. and carriage charges paid.

- | | £ | s. | d. |
|--|----|----|----|
| 2 Wearite All Wave Coils type Triogen with 2-gang spindle | 1 | 0 | 0 |
| 1 Polar 2-gang condenser bar type, 0005 mfd | 12 | 0 | 0 |
| 1 Polar S.M. Drive V.P. Horizontal, with Motion names | 6 | 0 | 0 |
| 1 B.T.S. differential reaction condenser, 0003 mfd | 2 | 6 | 0 |
| 1 B.T.S. potentiometer 50,000 ohms with 3-pt. switch | 4 | 6 | 0 |
| 1 Ferranti Transformer type AF8 | 11 | 6 | 0 |
| 7 Dubilier fixed resistances (1) 1 meg. (3) .5 meg. (1) 100,000 ohms, (1) 50,000 ohms and (1) 15,000 ohms type FJ 4-w.t. | 3 | 6 | 0 |
| 7 T.C.C. fixed condensers type 65 (2) 2 mfd, (1) .0001 mfd, (1) .0005 mfd, (1) .0003 mfd, (1) .01 mfd and (1) .1 mfd (tubular) | 10 | 8 | 0 |
| 4 Cliz chassis mounting valveholders with terminals | 2 | 8 | 0 |
| 4-pin type | 1 | 6 | 0 |
| 2 Belling-Lee socket strips A.E. and L.S. with plugs | 1 | 6 | 0 |
| 2 Peto-Scott component brackets | 1 | 6 | 0 |
| 1 Peto-Scott Plymax chassis 12" x 8" x 3" drilled for valveholders | 5 | 9 | 0 |
| 6 Belling-Lee plug Midjet type: HT—, HT1, HT2, HT3, GB+4, GB—1, GB—2 and GB—3 | 1 | 4 | 0 |
| 2 Belling-Lee spades LT— and LT+ | 1 | 6 | 0 |
| 1 Microfuse fuse and holder 100 m.a. | 1 | 6 | 0 |
| Wire, flex and screws | 3 | 0 | 0 |

KIT "A" Cash or C.O.D. Carriage Paid £4 7 6

Set of 4 specified Coross Valves £1 : 6 : 6

KIT "A" £4:7:6

Cash or C.O.D. Carriage Paid

COMPRISING

complete kit of FIRST SPECIFIED parts, including Peto-Scott specified ready-drilled PLYMAX chassis, wire, flex and screws, lens Valves, Cabinet and Speaker.

76 DOWN

and 11 monthly payments of 8/-

KIT "B" As Kit "A" but with 4 specified valves, less Cabinet and Speaker. Cash or C.O.D. £5 14s. 0d., or 10/- down and 11 monthly payments of 10s. 6d.

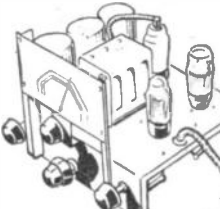
KIT "C" As Kit "A" but with Valves and Peto-Scott Walnut-finished Console Cabinet, less Speaker. Cash or C.O.D. £7 11s. 6d. or 12 6 down and 11 monthly payments of 14/-

KIT "CB" As Kit "C" but complete with W.B. Model 38J Speaker as specified. Cash or C.O.D. £9 4:0 or 16 9 down and 11 monthly payments of 16 11.

Peto-Scott Plymax Chassis, ready-drilled, 12" x 8" x 3". £ 5. 9
2 Peto-Scott Component Brackets, per pair 5 9
B.T.S. Potentiometer with 3-pt. switch 4 6
B.T.S. Differential Reaction Condenser, 0003 mfd. 2 6
2 Wearite All-Wave Triogen Coils, with 2-gang spindle 1 0 6
IMPORTANT.—Any item supplied separately. Orders over 10/- sent C.O.D. and carriage charges paid. Orders over £1 supplied on Easy Terms.

ALL-WAVE S.G.3 KIT

Save 26/-—buy a Complete Kit.



4 Wavebands. 14-31, 28-62, 200-550, 900 - 2,100 metres. Self-contained ready-assembled switched coil unit simplifies construction. New Peto-Scott Duplex Epicyclic slow-motion tuning system simplifies world-wide reception. Screened air-cored coils.

KIT "A." All parts including ready-drilled chassis, drawings and instructions, lens valves, speaker, batteries. List Value £4 9 3.

OUR PRICE £3:3:0

Or 5/- down and 11 monthly payments of 5 9. KIT "B," with valves, £4 5 9, or 8 6 down.

5% DOWN

1-valve ALL-WAVE KIT

Save 11/-—buy a Complete Kit!



Wavelengths 18-52, 200-550, 900-2,000 metres. A unique All-Wave single-valve combining simplicity of assembly with extraordinary efficiency and low cost. The ideal kit for the beginner in all-wave construction. Ready assembled tuning unit incorporates all windings and switching and needs only six simple connections for incorporation.

KIT "A" comprises complete kit of parts for building, including ready-drilled steel panel and chassis, drawings and instructions, lens valves and cabinet.

List value, £2:0:10 Our Price £1:9:6

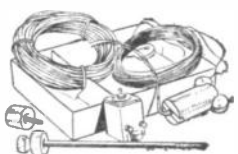
Or 2/6 down and 11 monthly payments of 2/9

KIT "B" with valve, £1/13/3 or 3/- down.

2/6 DOWN

Peto-Scott Noise Suppressing ALL-WAVE AERIAL

Obtain almost entertainment by using this aerial outfit, the first really convenient solution for overcoming the noise of man-made static. Increases signal strength on all bands. Improves selectivity. Waterproof and Weatherproof. Two transformers. Aerial outfit comprises Duplex incoherent aerial, inductances, waterproof "lead-in" wire, aerial and set transformers, assembled and ready with instructions and drawings illustrating the method of erection.



Cash or C.O.D. 17/6

Or 8 monthly payments of 2 6.

2/6 DOWN

1938 STENTORIAN SPEAKERS



MODEL 38J (illustrated), specified for the CORONA All-Wave 4. Further improvement on the famous W.B. Senior 37J. New higher flux density and increased sensitivity. Microphone device for matching any receiver. "Whitley" speech coil improved W.B. centring device. Cash or C.O.D. Carr. Pd. £1:12:6, or 2/6 down and 11 monthly payments of 3/-.

MODEL 38S, with over-sized cone. Cash or C.O.D., Carr. Pd. £2:2:0 or 2 6 down and 11 monthly payments of 4 6. HIDGET MODEL 38E. A new thoroughly efficient permanent magnet moving-coil speaker in extremely compact form. Complete with 3-ratio transformer. Cash or C.O.D. Carr. Pd. 17 6, or 2 6 down and 7 monthly payments of 2 6.



2/6 DOWN

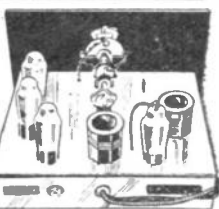
FREE—2 BOOKLETS and 9 BLUEPRINTS!

Peto-Scott ALL-WAVE and GENERAL CATALOGUE

No matter whether you require a small condenser or a 9-Valve All-Wave Superhet Receiver, Peto-Scott will supply you by post, either for Cash, C.O.D., or on Easy Terms, at astonishingly low prices, made possible only by our direct-to-customer method of trading. Every item in the new Peto-Scott range of quality Radio apparatus is described and illustrated in a coloured art catalogue sent free to all who post the Coupon.

The PILOT "SHORT and ALL-WAVE EXPERIMENTER"

. . . a booklet of 24 pages featuring 9 new PILOT Short-Wave Kits, one of which is illustrated. Each of these designs incorporates standard valves and panels. Constructing with a 1-valve Adaptor Converter, you may, when you please, build this up, on the same chassis, into varying forms of 1, 2, 3, and 4-Valve Short-Wave Receivers. Post the Coupon for your free copy of this 6d. booklet, together with a set of 9 Blueprints, for each of the sets described.



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PLEASE SUPPLY..... against Cash, C.O.D./H.P.

I enclose s. d. Cash H.P. deposit

Please send me entirely free (a) The Pilot "Short and All-Wave Experimenter," described above (priced at 6d.), together with 9 Blueprints, and (b) The Peto-Scott All-Wave and General Catalogue, illustrating the Complete Range of Peto-Scott 1938 Productions. (Enclose 3d. stamps) to cover postage.

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The Hivac Harries A.V.C. System

How it is Used with All-stage Valves

AUTOMATIC volume control using ordinary valves involves the use of a variable- μ grid in the valve. This grid has to perform two functions, namely,

strength due to fading, the resulting change of output with the new valve is inaudible. This is not the case with the older and more-complicated type of A.V.C. circuit. With

small limits from 10 micro-volts up to 1 volt.

Automatic Local-distance Circuit

In Fig. 1 the new system of A.V.C. is combined with an automatic local-distance circuit. For the best amplification of weak and moderately strong signals the grid bias on the first valve is usually about -6 volts. When the receiver is tuned to a broadcasting station which is very near by, then a very large peak voltage will appear on the first grid of the valve, and the valve might overload. This overload is avoided by a grid leak and condenser R1 and C. The negative bias from R2 causes C and R1 to be inoperative unless the signal becomes very powerful. When it becomes strong enough the A.V.C. cuts down the anode current and changes the characteristic of the valve so that it will operate with a greatly increased negative bias. The valve will then draw a very small grid current, which, flowing through the resistance R1, causes an additional negative bias to be

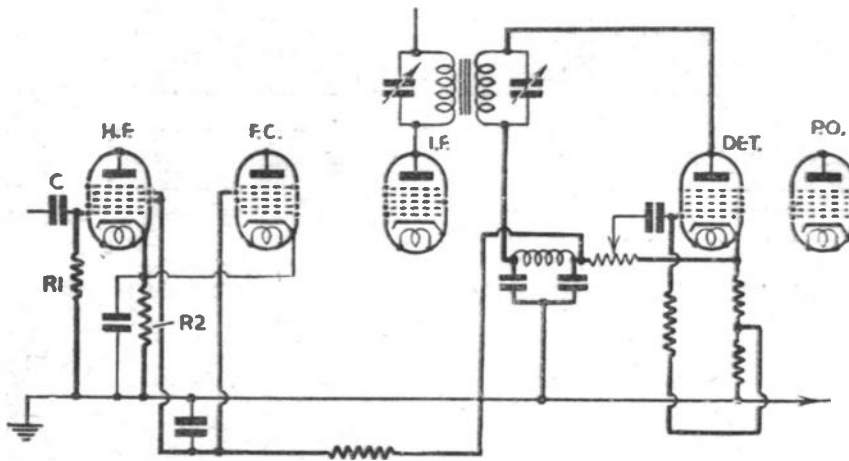


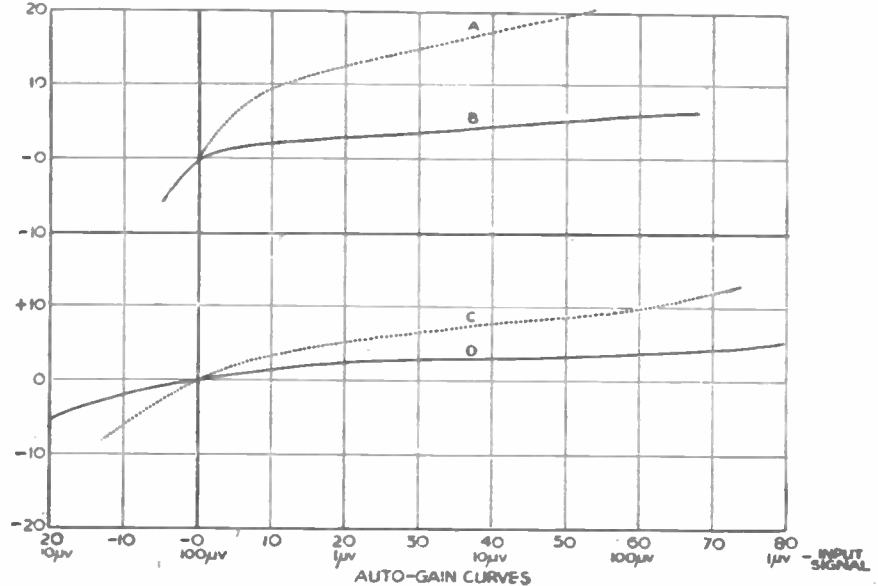
Fig. 1 above shows a circuit of the type referred to, and Fig. 2 (right) the auto-gain curves.

that of amplifying, and that of A.V.C. to decrease fading. The design of this grid is, therefore, a compromise.

The new method involves the utilisation of two separate grids in each controlled valve. One grid is used for amplification, and has what is known as a "straight characteristic," which is that most suited for distortionless amplification, and for the reduction of undesired noise level. The A.V.C. voltages are applied to another grid. That is, no compromise is involved. The A.V.C. performance can be made very considerably higher, and the otherwise unavoidable distortion and sensitivity to noise of variable- μ valves is avoided.

Delayed diodes and amplified A.V.C. circuits are rendered unnecessary.

The drawing Fig. 2 shows a comparison between the characteristics of ordinary A.V.C. and the new system of A.V.C. used with the Hivac Harries All-stage valve. The heavy line curves are those of the new valve. The dotted curves are those of receivers using corresponding ordinary valves. A change of output has to be of at least 4 db. to be audible. It will be seen that, over ordinary changes of signal



two of the new valves controlled in a five-valve receiver a very remarkable result is obtained of holding the output within

applied to the control grid enabling the valve to accept the very strong signal without distortion.

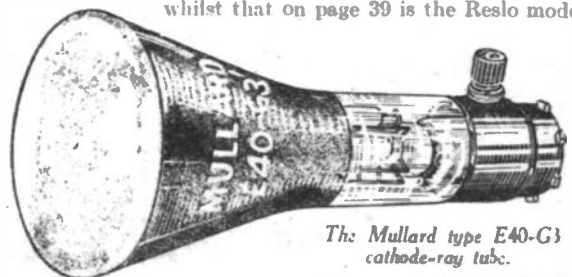
The Cathode-ray Oscillograph

THERE is no piece of apparatus more valuable in radio testing than a cathode-ray oscillograph. This is a piece of apparatus employing a small cathode-ray tube, and by suitable design it is possible to measure such features as amplification, distortion in L.F. amplifiers, modulation depth of transmitters, distortion in valve stages, performance of L.F. transformers, voltages and many other factors which are necessary either in connection with the design or the performance of modern radio apparatus. Not only may these various factors be seen in a very clear manner, but it is possible to take photographs of the results and thus keep a permanent record of the tests. An ideal cathode-ray tube for use in this type of apparatus is illustrated, and is supplied by the Mullard Company. It has a 4-volt 1-amp. heater,

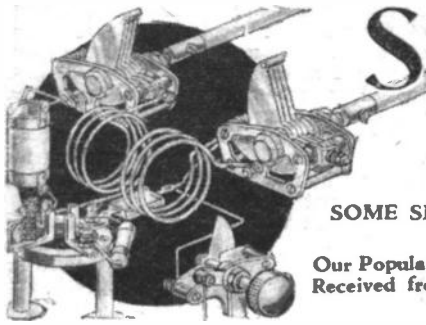
and for the first and second anode potentials of 300 and 800 volts are required. The screen diameter is 7 cm. A valuable handbook is supplied by the Mullard Company giving full technical details of the tube and of the method of supplying the requisite voltages, together with the method of making many of the tests mentioned above. It also includes a few pages on the method of photographing the images thrown on the screen of the tube. The book may be obtained on application to the Mullard Company at Mullard House, 225, Tottenham Court Road London, W.1.

P.M. or Energised?

IN our issue dated September 25th, 1937, we included on pages 38 and 39 illustrations of two public address loudspeakers. Unfortunately the captions for these two models were transposed, and it should therefore be noted that the speaker on page 38 is actually a Goodman model, whilst that on page 39 is the Reslo model.



The Mullard type E40-G3 cathode-ray tube.



Short Wave Section

SOME SHORT-WAVE PROBLEMS EXPLAINED BY THE EXPERIMENTERS.

Our Popular Contributors Reply to Some of the Inquiries Received from Readers Concerning Difficulties in Short-wave Reception.

WE are flattered to think that readers of PRACTICAL AND AMATEUR WIRELESS have taken an increased interest in short-wave reception since we began to devote more attention to this aspect of home construction. Letters received regularly tell us that new recruits have been gained for the ranks of S.W. experimenters. This is a good sign, because short-wave work always provides an interesting change from normal broadcast reception, and gives real spice to experimental work.

On the short waves we are always coming up against new problems and new difficulties—and they make home construction worth while. Among recent letters there have been a few from readers who have built their first short-wave receivers, and who have met minor difficulties that they find rather confusing. For example, one reader has built a two-valve Det.-L.F. battery set, and finds that it is almost impossible to obtain oscillation at the "top end" of the tuning scale, although the detector oscillates very easily, with only about one-third of the reaction-condenser capacity, at lower tuning-condenser readings. Our friend concludes his letter with the word "why?"

Several Possible Reasons

We don't know, but we can make various suggestions, from which he can easily find out the reason. You see, unless a number of tests are made it is impossible to give a definite answer; that is because there are so many things which could produce precisely the effect described. You might think that increasing the capacity of the reaction condenser would overcome the trouble, but we doubt if it would. More likely, such a change would not make the slightest bit of difference.

If the coil is a home-made one, it might be that the number and arrangement of reaction-winding turns is unsuitable. Sliding the reaction winding down the former so that it is slightly nearer to the grid coil often cures a trouble of this kind. On the other hand, it might be better to add, say, a couple of turns to the reaction winding, and then to slide it a fraction of an inch further away from the grid coil. Another reason for the fault could be that the aerial is connected to one end of the grid coil, through a condenser of too great a capacity; a .0002-mfd. variable or pre-set condenser is often useful in this position, for then the most suitable setting can easily be found. An alternative method is to join the aerial to a tapping on the coil, or to use a separate aerial winding, as shown in Fig. 2.

Using a Doublet

The last-mentioned is the method that we prefer. You can place the aerial winding either over the grid coil, or near one end of it. In either case it is worth while to experiment with the number of turns, although it is generally satisfactory to use one-half to one-third the number on the

grid coil. A great advantage of this method is that the size and self-capacity of the aerial become of little consequence. Another advantage is that you can use a

by The Experimenters

doublet aerial, which is ideal for short-wave reception. This consists, as many of you are aware, of two separate lengths of insulated wire arranged end to end, and

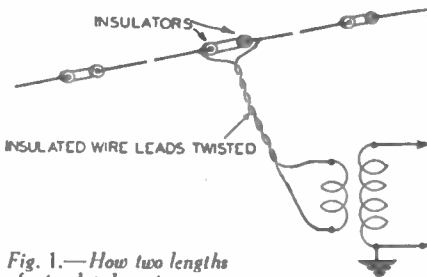


Fig. 1.—How two lengths of insulated wire are used to form a doublet aerial; also, how the aerial is connected to a separate winding on the tuning coil.

with the two leads-in twisted together, as shown in Fig. 1. Each horizontal portion of the aerial should be about 30ft. long whilst, theoretically, the down-lead should be half the wavelength long. That is, for 40-metre reception the lead-in should be approximately 60ft. Of course, it is rarely convenient to work to this, besides which you do not want to be restricted to any particular wavelength. In consequence, it is customary to make the lead-in of any convenient length, unless outstand-

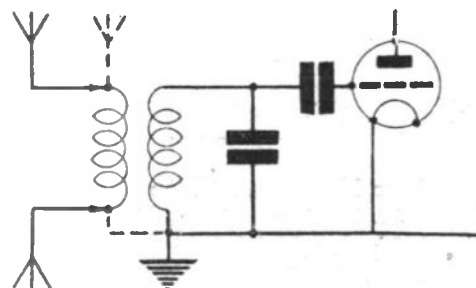


Fig. 2.—When using a four-pin aerial coil, it is often worth while to add a separate aerial winding. This may be connected to a doublet, or to an aerial and earth in the usual manner. If using aerial and earth, as in broken lines, try the effect of reversing the aerial and earth connections.

ing efficiency is desired on one particular band.

The two leads from the doublet are connected one to each end of the aerial coupling winding, the earth lead being joined to the "bottom" of the grid coil and to L.T.—in the usual way. Lest you should think that the aerial can be used only for short-

wave work, it should be made clear that it is quite suitable on the broadcast bands if a separate coupling coil is used. If not, you can take both leads-in to the aerial terminal, using the aerial almost as if it were of the T type. We have spoken of the horizontal parts of the aerial, but this is not intended to convey the idea that the aerial should be placed in a perfectly horizontal position. In fact, it is not at all critical in this respect.

Unstable Reaction

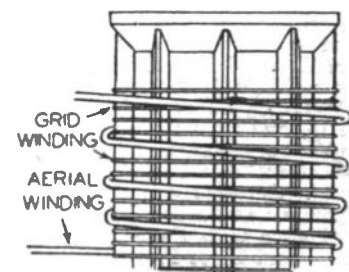
Quite another reason for the trouble under discussion might be that there are long leads in the reaction circuit, which result in a peculiar form of damping. That is why, in the portable receiver described a fortnight ago, we included a 250-ohm fixed resistance in series with the reaction winding. It tends to reduce the tendency for oscillation at lower settings of the tuning condenser, but in doing so smooths out reaction over the tuning range.

One rather unusual form of reaction trouble was noticed recently in a simple type of single-valve-with-reaction set. Oscillation could just be obtained when the tuning condenser was set near to its minimum capacity and the reaction condenser fully advanced. At higher tuning positions, oscillation ceased completely. In this case the set had previously operated correctly, so it was evident that a fault had arisen. It was eventually found that one terminal of the H.F. choke was loose, so that a proper contact was not made with the end of the winding. Measurement with a milliammeter showed that only a small fraction of a mA was passing to the detector anode. The same fault can arise if the choke is defective, or if the L.F. transformer, coupling resistance, or de-coupling resistance has developed a partial open circuit.

Screening on S.W.

A letter which was received recently was from a reader who was rather surprised to find that we rarely advocate the use of screening in the simpler type of short-wave receiver. He pointed out that he had always found that hand-capacity effects, difficult tuning and unsteady reaction were experienced if use were not made of a metal panel and metal screens between the coils and the L.F. portion. Another point that he made was that he considered that condenser extension spindles were a practical essential.

We disagree. It has always been our view that if stability cannot be obtained without



screening (in the simpler type of set, of course), the design is wrong, or the earth lead is inefficient. For that reason, we use screening only when it is absolutely necessary. It is not just pride that prompts this idea, but the fact that screening on short waves can produce far more losses than

(Continued overleaf)

SHORT WAVE SECTION

(Continued from previous page)

are desirable in a simple set. If you earth the frames, and rotors, of the condensers mounted on the panel, and carry a few of the earth leads behind the panel and fairly near to it, the screening is generally adequate. Of course, if electrical interference is picked up in the set, it is a different matter, and there is then every justification for housing it in a screening box, of which a number of different makes are available. In that case, make certain that the box is earth-connected.

Hand capacity is more often due to a bad earth than to lack of screening. It might also be due to the phone or speaker leads running close to the aerial lead-in (except with a doublet, when the lead-in is "dead" for practical purposes), or to the absence of a .001-mfd. condenser between the anode of the output valve and earth.

Another "Portable" Idea

Apropos our recent discussion on the question of making a short-wave portable, we received a circuit diagram and a number of interesting "snaps" from K. G. Hammond, of Portsmouth. We received his letter after writing the article on our portable, which was published a fortnight ago, so we could not make reference to it in that article. It appears that Mr. Hammond used a circuit almost identical with ours, and he tells us that it works very satisfactorily. Unfortunately, the "snaps" are not quite clear enough to reproduce, so we have asked a PRACTICAL AND AMATEUR WIRELESS artist to make a sketch to show the form of construction employed. The set is neat and

compact, being built on the "step" principle. Eleven flash-lamp batteries connected in series are used for H.T. supply and for G.B., whilst there is space for a fairly large two-voit accumulator. Other readers might like to try this form of construction if it happens to suit a carrying case which is available.

More Details, Please

Although it is not a short-wave matter,

we must refer to a letter received from J. C., of Coventry, concerning the single-valve set which we described in the issue dated June 5th of this year. We should have replied by post—as we do to all our correspondence dealing with subjects not necessarily of general interest—were it not for the fact that J.C. omits to give his full name; why not tell us who you are, J. C.? We will not mention your name in these notes if you wish otherwise. This reader

tells us, rather vaguely, that "when I tune in the stations I cannot get any sound at all without using a lot of reaction," and asks what is wrong. We suspect that either the detector valve is defective, or that his H.T. battery is run down, if all components are of the specified values.

We have had a few requests for details of a more advanced type of short-wave receiver preferably a superhet. What are your views on this subject, and what circuits or special features do you suggest? Drop us a line, you short-wave "fans."

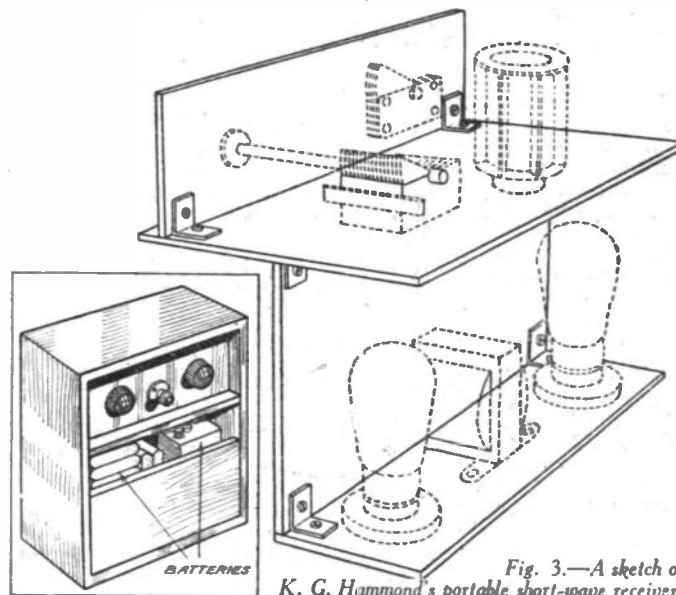


Fig. 3.—A sketch of K. G. Hammond's portable short-wave receiver.

Leaves from a Short-wave Log

New Australian Short-waver

AMERICAN listeners report good reception of experimental transmissions from VK5DI, Adelaide, on 25.42 m. (14.01 mc/s) relaying a programme from VK5AD, in that city. The station is owned and operated by the Adelaide Short-wave Club, and carries out its tests every Sunday between G.M.T. 03.15-06.45; occasionally 41.24 m. is used.

Panama on 25 m. Band

HP5A, Panama City, a 200 watt station owned by the Sociedad Publica de Radio, and calling itself *La Voz de Panama*, broadcasts daily on 25.64 m. (11.7 mc/s) from G.M.T. 16.45-18.15, and from 00.00-03.30; on Sundays from G.M.T. 15.30-18.15, and from 20.00-21.00. The call is put out every fifteen minutes coupled with an interval signal consisting of a two-note gong. Announcements are made in both Spanish and English. Transmissions open and close with the playing of a march, *The Black Horse Troop*.

Canada's Proposed 50 kW S.W. Transmitter

The Canadian Radio Corporation is seriously considering the installation of a high-power short-wave station for the relay of the Montreal programmes. The transmitter would be erected in the outskirts of either Ottawa or Montreal, but the former city is favoured, as it is suggested that the broadcasts should be heard throughout the world as *The Voice of Canada*.

The League of Nations Speaks

During the present session of the Assembly of the League of Nations special broadcasts will be made daily, from G.M.T. 19.00-19.15 (except Sundays), through HBO, Prangins, on 26.31 m. (11.40 mc/s), and from G.M.T. 00.30-00.45 (except Saturdays), through HBL, Prangins, on 32.10 m. (9.345 mc/s).

Radio Club of Zurich

A new transmitter working under call-sign HB9D, on 31.46 m. (9.535 mc/s), with a power of 100 watts, is being operated by the Zurich Radio Club twice weekly. The broadcasts will take place every Sunday, from G.M.T. 14.00-16.00, and on Thursdays from G.M.T. 18.00-20.00.

War News from China

JDY, Dairen, in the province of Kwantung, is a new station erected by the Manchuria Telephone and Telegraph Company; its wavelength is 30.33 m. (9.89 mc/s), on which channel a short programme of music and war news is broadcast daily from G.M.T. 12.10-13.15. XGOX, Nanking, on 43.99 m. (6.82 mc/s), 500 watts, is on the air every day with an official bulletin at G.M.T. 13.05, the transmission usually lasting about 15 minutes.

Broadcasts from Peru

During the past week transmissions from Peru have been logged in the British Isles. OAX4T, Lima, on 31.15 m. (9.63 mc/s), of

which the call is given out by both male and female announcers, would appear to work from G.M.T. 23.00 until 06.30 daily. OAX4J, also in the Peruvian capital, operates on 32.12 m. (9.34 mc/s), uses a three-note interval signal somewhat similar to that of the N.B.C., and styles itself *Radio Internacional*; it is also on the ether until the early morning hours. Address: P.O. Box 1166, Lima (Peru). OAX4Z, a 10 kilowatt station located at Lima, calling itself *Radio Nacional*, may be found on 49.33 m. (6.082 mc/s) (just above the channel used by VQ7LO, Nairobi). The broadcast is a continuous one from G.M.T. 22.00-04.00. The studio habitually closes down with the *Good Night Song* (Ted Lewis) already adopted by several foreign stations. Address: Radio Nacional OAX4Z (S.A.), Avenida Abancay, 915, Lima (Peru).

Programme Schedule of JZJ and JZK, Tokio

G.M.T. 20.00-20.05, call in Japanese, English, German and French; 20.05, news in English; 20.15, music; 20.30, news in German; 20.38, news in French; 20.45, news in Japanese; 20.55, call and close down with Japanese National Anthem.

Odd Jottings

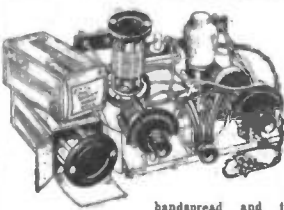
FZE8, Djibouti, French Somaliland (East Africa), on 17.38 m. (17.28 mc/s), works radio-telephony with Paris (France) on the first three days of each month, between G.M.T. 12.30-13.15.

HSE2, Bangkok (Siam), on 15.78 m. (19.016 mc/s) 20 kilowatts, will be found in radio communication with DFB, Nauen (Germany), daily at G.M.T. 14.00. The German station replies on 17.12 m. (17.52 mc/s).

SAVE £1 ON YOUR CORONA KIT!

★ SHORT-WAVE KIT ★ BARGAINS

"3-in-1" SHORT-WAVE KIT—RECEIVER—ADAPTOR—CONVERTER
List Value 37/6 **BARGAIN 25/-**



12-94 metres. ADAPTS or converts your battery set for short-wave reception, or may be used as one-valve Short-wave Receiver. Slow-motion bandspread tuning SIMPLIFIES WORLD RECEPTION! Air-spaced handspread and tank condensers. SPECIAL ANTI-BLIND SPOT CONDENSER. 3 scales calibrated in degrees.

KIT "1" comprises every part for assembly, including 3 4-pin coils, wiring and assembly instructions, less valve only. Cash or C.O.D. Carr. Pd. 25/-, or 2/6 down and 10 monthly payments 2/6.
KIT "2" With 2-valve valve £18/9, or 2/6 down and 11 monthly payments 2/9.

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2-valve BANDSPREAD S.W. KIT

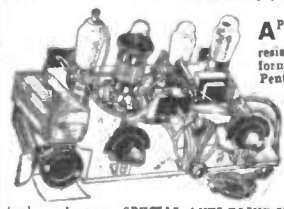
List Value 59/6 **BARGAIN 32/6**

ANOTHER amazingly efficient world-wide kit incorporating slow-motion bandspread tuning. Covers 12-94 metres. **KIT "1"** comprises every part for assembly, including 3 4-pin coils, wiring and assembly instructions, less valve only. Cash or C.O.D. Carr. Pd. 32/6, or 2/6 down and 11 monthly payments 3/-.
KIT "2" with 2 British valves, £21/9, or 4/- down and 11 monthly payments 3/10.

2/6 DOWN

New 4-valve BANDSPREAD Battery SHORT-WAVE KIT

List Value £4:9:6 **BARGAIN 42/-**



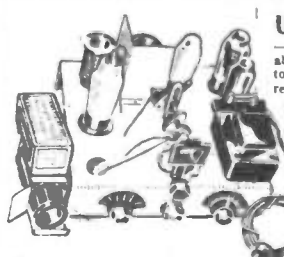
PERIODIC H.F. resonating detector, resistance and transformer L.P. Slugs, Pentode Output. Slow-motion bandspread tuning SIMPLIFIES WORLD RECEPTION! Efficient low-loss reaction condenser. Air-spaced bandspread and tank condensers. SPECIAL ANTI-BLIND SPOT CONDENSER. 3 scales calibrated in degrees and tenths.

KIT "1" comprises every part for assembly including 3-pin coils, wiring and assembly instructions, less valves only. Cash or C.O.D. Carr. Pd. 42/-, or 2/6 down and 11 monthly payments of 4/-. **KIT "2"** with 4 British Valves, £3:9:0, or 5/- down and 11 monthly payments of 6/8.

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D.X. FANS' A.C.4 S.W. KIT

List Value £5:10:0 **BARGAIN 75/-**



UNIQUE All-World reception—12-94 metres. Variably Mu H.F. pentode, leaky grid reacting detector, pentode output and valve rectification. Slow motion bandspread tuning. 3 calibrated scales 0-180, 0-180, 0-10. For A.C. Mains 200-250 volts, 43-100 cycles.

KIT "1" comprises every part for assembly, including 3 pairs of 4 and 8-pin coils (12-94 metres), wiring and assembly instructions, less valves only. Cash or C.O.D. 75/- or 5/- down and 11 monthly payments of 7/-. 4 Valves 37/6 extra or add 9/6 to deposit.

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CORONA ALL-WAVE 4 KIT

Immediate Delivery

EVERY PART GUARANTEED MATCHED—PROVED—TESTED

KIT "1" CASH OR C.O.D. 67/6 CARRIAGE PAID 5/6 DOWN

Comprising all parts for Receiver, including Exclusively Specified WEARITE TRIODEN COILS, POLAR V.P. DRIVE with station names, CLIX VALVEHOLDERS, BELLING-LEE Terminal Strips, PETO-SCOTT PLYMAX Chassis and mounting brackets. Less valves, cabinet and speaker.

Balance in 12 monthly payments of 5/9.

THESE ARE THE ITEMS IN KIT "1"
Any part available separately. Orders over 5/- sent carriage and C.O.D. charges paid.

- | | | |
|---|--|--------|
| 2 | Wearite Trioden coils with 2-gang spindle | 10 6 6 |
| 1 | Polar V.P. Drive with station names | 0 6 6 |
| 1 | Peto-Scott drilled Plymax chassis | 0 3 9 |
| 2 | Peto-Scott component brackets | 0 0 8 |
| 1 | Variety Nickel L.P. transformer | 0 7 8 |
| 4 | CLIX 4-pin valveholders with terminals | 0 2 8 |
| 1 | N.T.S. differential reaction condenser .0003 mfd. | 0 1 6 |
| 1 | N.T.S. New type 2-gang .0005 mfd. condenser | 0 10 6 |
| 1 | N.T.S. 50,000 ohms potentiometer with 3-pd. switch | 0 3 0 |
| 7 | N.T.S. fixed condensers of specified values | 0 7 3 |
| 7 | N.T.S. fixed resistances of specified values | 0 2 4 |
| 2 | Belling-Lee terminal strips with plugs | 0 1 6 |
| 8 | N.T.S. plugs, marked | 0 1 0 |
| 2 | N.T.S. spade terminals | 0 0 3 |
| 1 | Microfuse and holder | 0 1 6 |
| 1 | Peto-Scott screws, wire and flex | 0 3 6 |

KIT "1" Cash or C.O.D. Carr. Pd. £3 7 6
Set of 4 Specified Valves £1 6 8

KIT "2" as Kit "1" but with 4 Specified Valves, less Cabinet and Speaker. Cash or C.O.D. Carr. Pd. £4:14:0, or 7/6 down and 12 monthly payments of 8/-.

KIT "3" as Kit "1" but with Valves and recommended Peto-Scott walnut complete cabinet. Cash or C.O.D. Carr. Pd. £6:11:6, or 10/- down and 12 monthly payments of 11/3.

AMPLIFIERS

For Public Address or Home Broadcasting.



7-watt A.C. MODEL Efficient 4-valve push-pull circuit. High-fidelity reproduction. Undistorted output 7 watts. For microphone or pick-up. Circuit: triode, resistance transformer coupled to 2 power amplifier valves in push-pull, valve rectifier, consumption 60 watts. Steel chassis. Size 7 1/2" high, 4 1/2" wide, 10 1/2" long. For A.C. Mains 200/250 volts, 40-90 cycles. Complete with 4 valves, ready for immediate use.

List Value £4:19:6 **BARGAIN £3:10:0** Cash or C.O.D. Carr. Pd. £3:10:0

Or 5/- down and 12 monthly payments of 6/- and 11 monthly payments of 3/6.

4-watt BATTERY AMPLIFIER Q.P.P. Output, providing quality reproduction on grammo, and microphone. Dimensions: 7 1/2" long, 5 1/2" deep, 7 1/2" high. For use with ordinary H.T. Battery 135-150 volts. With 3 valves, full tested.

List Value £4:4:0 **BARGAIN £2:15:0** Cash or C.O.D. Carr. Pd. £2:15:0

Or 4/6 down and 12 monthly payments of 4/9, Recommended Speaker. Goodman's P.M. Special Type, 19/6 or 2/6 down and 8 monthly payments of 8/6.

MICROPHONE. Transverse Current Carbon Type for use with above Amplifiers. Complete with transformer and grid bias battery. Cash or C.O.D. £1:12:6.

Or 2/6 down and 11 monthly payments of 3/-.



SPECIAL OFFER! New light weight super-type HEAD-PHONES, recommended for short-wave work and testing. List Value 15/- **BARGAIN 3/6** Postage 6d. extra.

SHORT-WAVE COILS Interchangeable plug-in coils. Low-loss material ribbed formers. N.T.S. coils are expertly wound with high-grade copper wire, to ensure accurate distributed self-capacity. 100% efficient. 4-pin: 12-24, 22-47, 41-94, 76-170 metres. List Value 2/9. Bargain Price, 1/9. 6-pin wavelengths as for 4-pin types. List Value, 3/6. Bargain, 2/-.

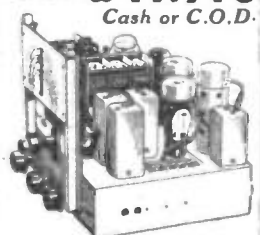
VARIABLE CONDENSERS Short-wave tuning and band-spreading, all brass single-end, suitable for ganging. .000025 mfd., 2/6; .000045, 2/8; .00016, 3/6; .0002 (double-end), 3/6.

★ 1938 RECEIVER ★ BARGAINS

ALL-WAVE 5-valve A.C. SUPERHET CHASSIS

Amazing Offer! Limited Stock! List Value 8 Gns. **BARGAIN £4:17:6** Cash or C.O.D.

COMPLETE WITH 5 VALVES, KNOBS & ESCUTCHEON.



You must order NOW to secure this wonderful N.T.S. bargain. Stocks are limited. First come, first served. Send immediately.

3 wavebands: 18-50, 200-550, 900-2,000 metres. A.V.C. bandpass on all bands. Input to triode hexode detector oscillator, V.M. H.F. pentode, double-diode-triode 2nd detector triode resistance capacity stage coupled to high-slope output pentode. Output 3 watts. Combined on-off switch and volume control. Separate tone control. 4-position wave-change and grammo-switch. Illuminated rectangular full-vision slow-motion dial, 80-1 and 9-1 reductions, scale engraved station names and wavelengths. Overall dimensions: 10" high, 11 1/2" wide, 8 1/2" deep. For A.C. mains 200/250 volts, 40/80 cycles. 10/6 down secures; balance 11 monthly payments of 10/6. Moving-Coil Speaker for above, 27/6. Add 2/6 to deposit.

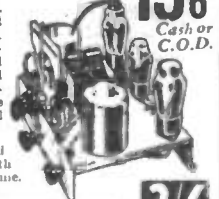
10/6 DOWN

S.G.3 CHASSIS

with knobs and escutcheon, less valves.

LIST VALUE 60/- **BARGAIN 19/6** Cash or C.O.D.

Latest Screened Grid, H.F. Detector and Pentode output circuit. Screened coils. Only 9 m.a. H.T. Consumption. Illuminated and Wavelength Calibrated Dial. Wave-range 200-2,100 metres. Complete with escutcheon and all knobs.



Wide choice English and Foreign programmes with amazing tone and volume. 19/6 Cash or C.O.D. only.

COMPLETE WITH 3 BRITISH VALVES. List Value, £4:4:0. Bargain, £2:2:0. Cash or C.O.D. or 2/6 down and 12 monthly payments of 4/-.

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P.M. SPEAKERS. Goodmans. Limited stock for Power, Pentode or Class "B" (state which), 7/6. 8 1/2" for power, pentode, and terminals for low impedance matching for extension purposes. Similar speaker for Class "B" and low impedance matching, 13/6.

SPEAKERS, ENERGISED. Brand new, astounding offer. Celstion, 9 1/2", 2,500 ohms, Pent. Triax., 4-watt, 12/6.

VALVEHOLDERS. Chassis type paxolin, 4- and 6-pin, 21d., 7-pin, 31d., Octal, 6d. Baseboard 4- and 5-pin type, with terminals, 31d.

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Please send me CASH/C.O.D./H.P.:
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SHORT-WAVE BOOKLET, describing in detail, with actual photographs, 5 entirely new N.T.S. Bargain Bandspread Short-Wave Kits, including those above, together with Complete General Bargain Lists—Receivers, Accessories, Components, etc. etc. Post the Coupon to-day. N.T.S. supply all leading makes Radio and Television. Send us a list of all your Radio requirements for quotation by return.

BRIEF RADIO BIOGRAPHIES—20

By RUTH MASCHWITZ

Monte Rey

FANS of Monte Rey, the romantic singer of Geraldo's orchestra, may be interested to hear that he is single and that his age is thirty. Incidentally his real name is Montgomery Fyffe.

His parents are well-known amateurs in Scotland, and from early youth they trained him in singing and dancing. He was also taught the violin, and played and sang in a small country band. As a nigger minstrel he made his first public appearance at a Sunday school performance.

The family chose a business career for him so he went into an office, and passed many degrees for accountancy. However, while he was still in his teens he was singing grand opera in Glasgow in the rôle



Monte Rey in his Spanish gypsy costume.

of Radames in "Aida." Unfortunately, his clothes had been made for a very large man so that he had to be safety-pinned into them and take great care never to turn his back to the audience.

His firm transplanted him to London which gave him the opportunity to take lessons from a famous singer, and eventually he threw over his office job. The Duke and Duchess of Montrose, with other patrons, made it possible for him to study singing in Italy, and when he returned to London he began a professional career under the name of Fyffe. Through a serious operation he met the Italian singer Gaetano Loria, and continued his lessons in London. He gave recitals at the Wigmore and Albert Halls, and broadcast classics several times. He studied Italian, and went to Monte Carlo to appear in "Madame Butterfly," but a serious illness followed, and he returned to London a physical wreck.

Through an early broadcast he was offered an engagement at a Society function, and this led to an introduction to Geraldo for whom he still sings in his "Music Shop" programmes, as well as records and stage shows. He took the name of Monte Rey and the part of a

Spanish tenor. Then Joe Loss engaged him as well for late night dance broadcasts.

Monte lives in a quiet village twenty miles from London. His hobbies are gardening, dog breeding, bird keeping—and going to bed early!

Sutherland Felce

SUTHERLAND FELCE, the radio joker and compère, was first heard over the air at the age of seventeen from 2LO. Since then he has had over 60 engagements to broadcast in variety and music-hall shows, and with dance bands. His most exciting bit of compèring took place in the air whilst doing a stunt for Gordon Selfridge when he took up Gloria and Dawn with six other mannequins in an Imperial Airways liner. He was one of the first artists to be televised, and has made several appearances since then.

Sutherland is the only boy of his family and lives with his mother—whom he declares is his best critic—at Wimbledon. As a child, though good at his studies, his chief interest was conjuring. He used to baffle his schoolmates and masters with his tricks until one sad speech-day when he appeared in a sketch called "Mirth and Mystery." It was a great occasion with 2,000 people present. Sutherland was supposed to finish his programme with a handcuff stunt à la Houdini, but at the critical moment of "Hey, Presto" he discovered that instead of being able to bow to the audience in triumph he was still struggling with the handcuffs!



Sutherland Felce in characteristic mood.

On a summer vacation from school he went to the South of France, and one day, while watching professional dancers, decided to appear in cabaret. He began as a silent magician, and proved so successful that he was booked for a further three weeks.

Henry Sherek, the theatrical impresario, gave him his first big break as compère at the London Pavilion, since when he has appeared at numerous restaurants, theatres and clubs all over the country.

SPIRIT MESSAGES AND THE LOST CONCERTO

WITH reference to the first performance in England of the recently-discovered Violin Concerto by Schumann, which will be played by Jelly d'Aranyi at the first B.B.C. Symphony Concert at the Queen's Hall on October 20th, we are now able to give the full story of the sensational circumstances which led to the discovery of the Concerto. Written in 1853 at the end of the composer's life, the manuscript, after being in the possession of Joseph Joachim and his heirs, was finally deposited in the archives of the Prussian State Library in Berlin. Not more than two or three people had ever seen it, and its whereabouts was unknown to anyone outside the Curators of the Library and one or two members of the Schumann and Joachim families. Moreover, it had been stipulated that the Concerto should on no account be published or performed until one hundred years after Schumann's death.

This was the position until some three years ago, when a message purporting to come from the spirit of Schumann was received by Jelly d'Aranyi, urging her to find and eventually play a posthumous work of his for the violin. The recipient and her sister, the well-known violinist Adila Fachiri, had for some time been experimenting with a view to establishing contact with the spirit world, and many "spirit" messages had already been received. No medium was employed, but the system adopted was the well-known one of allowing an inverted glass or tumbler, upon which three or four persons, including a "sensitive," lightly place their fingers, to spell out messages by pointing to the letters of the alphabet disposed in a circle round the table, and all those taking part were at all times fully conscious and awake. The information received in this mysterious way about an unknown work for the violin by Schumann came as a surprise to all concerned, but steps were immediately taken to discover what the work might be and where it could be found.

First of all, however, the question was asked: Was it really Schumann himself who had sent the message? The answer came promptly—and in German this time, although the language used habitually was English—"Ieh war es selbst" ("It was I myself"). Fortified by this assurance (and by many others received during this period), the recipients of the mysterious messages began a serious search for the missing manuscript. Finally, after many disappointments, their efforts were rewarded and a score of the long-lost Violin Concerto was discovered in the Prussian State Library in Berlin. The manuscript, however, bore the inscription "Unfinished," and reports from other sources were received to the same effect. The sender of the "spirit" messages, however, denied this, and persistently asserting that the work was completely finished, suggested that the Berlin Library might not have got the right copy. As it turned out, this conjecture proved to be correct; for when Herr Strecker, of the firm of Schotts, the well-known music publishers (who by this time, had been acquainted with the facts), extended his investigations still further, he discovered that there were no less than four copies of the work extant, one of which was the manuscript score of the complete work.

Thus, the "spirit" messages proved to be accurate in every particular; and it is owing to them entirely that the missing Concerto was ever brought to light.

"A TECHNICAL HITCH!"

Interesting Details of How the B.B.C. Engineers Deal With Breakdowns Due to Lightning and Other Causes

IT sometimes happens that one of the B.B.C.'s many transmitters is "off the air" for a few minutes, a fact that is recorded in its technical nakedness in the log of transmissions at Broadcasting House.

But great technical progress has rapidly lessened the number of breakdowns, and also minimised the duration of any interruption to programmes that may be due to what engineers call a transmitter "shut down." To the ordinary listener, actual radiation of daily programmes is a mysterious process about which from time to time they ask many questions of the technical experts at Broadcasting House:

How many transmitters are operated by the B.B.C.? What is the commonest cause of breakdowns? Are masts used as aerials?

And many other questions of a similar nature.

Come, then, to an office near the Control Room, eight floors above Portland Place, and meet Mr. L. Hotine who, as Superintendent Engineer (Transmitters) knows all the answers.

"To-day," he will tell you, "the B.B.C. operates 23 transmitters at 13 different stations, including, of course, the Empire transmitters at Daventry.

Lightning Trouble

"The commonest cause of trouble nowadays is lightning; it strikes masts and aerials and creates terrific surges which damage the tuning circuits at the base of the mast. Of course, we see that these circuits are as

well protected as possible by lightning arresters and other devices, but man knows so little about lightning that our safety measures do not always work. Lightning will sometimes ignore safety 'gaps' and prefer to jump through space for a distance of four or five feet. Only a colossal pressure of many millions of volts makes that possible.

"We have modified circuits so that surges get the best paths to earth, and lightning causes far fewer breakdowns than it did only a few years ago. Valve failures were once a frequent cause of trouble. Every station uses a large number of valves; there are about 30 in one transmitter at Brookmans Park. And they are all bound to 'die' eventually.

"Some of the valves we use are as small as those in ordinary receiving apparatus, and the biggest, at Droitwich, are the

of between 3,000 and 4,000 hours. At our more modern stations a valve failure does not cause the transmission to cease for more than a few seconds. Isolating switches make it simple to cut any particular valve from the circuit and continue the programme by slightly overrunning the others, replacing the faulty one at the end of a transmission.

"It is very unusual, by the way, for an aerial to break; it has happened only once or twice since broadcasting began. But we always take the precaution of having sufficient spare wire at every station to replace an aerial within a few hours. Perhaps the time will come when aerials will be completely obsolete. Even now the B.B.C.'s newest stations—Lisnagarvey, Burghhead and Stagshaw—do not use aerials in the old sense at all. The mast itself, sitting on a huge insulating pedestal, is the radiating element; a convenient arrangement, the main value of which, apart from obvious mechanical advantages, is that it reduces fading.

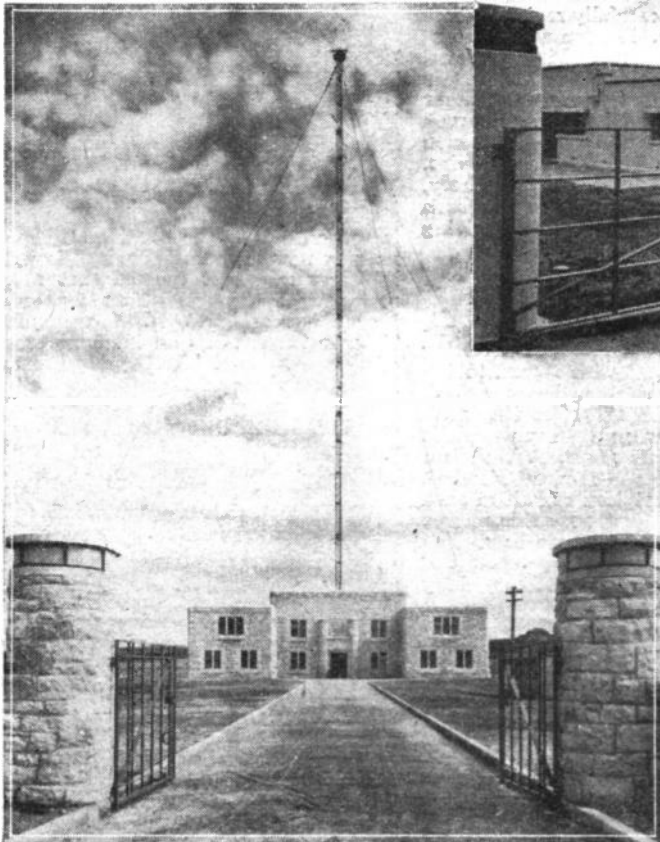
"Because enough wavelengths are not available a number of our transmitters are synchronised. The bare statement that the three National transmitters—London, North and Scottish—work on the same wavelength does not mean much to the ordinary listener. But it matters an enormous amount to broadcasting engineers.

Tuning Forks
 "Each of those three stations has a tuning fork vibrating at the same speed in an oven kept strictly to a constant temperature. One of the three stations is a 'master'; it takes the output of its tuning fork, amplifies it, and puts it on a telephone line to the two others. They, in turn, multiply it to the correct radio frequency and drive their transmitters with the tone. This ensures that all three stations are perfectly synchronised. If anything goes wrong with the telephone line or with the equipment supplying those vital vibrations—we call them oscillations—the tuning forks at the two other stations automatically switch themselves in and continue to drive the transmitter, until the line interruption has been cleared.

"An immense amount of work has to be done at all transmitters every day, sometimes in the early hours of the morning. There are many things to be checked before transmitters begin, and everything must be scrupulously clean.



(Above) A general view of the Penmon transmitting station and mast-aerial. (Left) A front view of the Transmitting Hall at Burghhead, showing the single mast aerial.



'C.A.T.14' type. They are about five feet in length, water cooled, far too heavy for one man alone to lift, and cost hundreds of pounds each. The normal life of these big valves is about 8,000 hours; the smaller types have a useful existence

A New 40-Page Booklet—Free



This booklet gives particulars of the many opportunities open to trained men engaged in the Radio industry. It also gives full information about the specialized instruction offered by the I.C.S. This instruction includes American broadcasting as well as British wireless practice, and provides ambitious men with a thoroughly sound training.

Here are the I.C.S. Courses :

Complete Radio Engineering
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SEND FOR OUR "RADIO" BOOKLET

And, if you wish, ask for our free advice.



**Dept. 94, International Buildings,
 Kingway, London, W.C.2.**

AUTUMN OUTSIDE BROADCASTS

The Provisional B.B.C. Programme of this Autumn's Outside Broadcasts will Introduce to Listeners Some New Ideas While Many Old Favourites Remain

The Lord Mayor's Banquet

The Lord Mayor's Banquet will again be a high spot of this autumn, and here the Outside Broadcast Director is investigating the possibility of introducing a new broadcasting procedure at this important function. As a rule, listeners have been transferred from the studio to the Mansion House just in time to hear the toastmaster proposing the Prime Minister's health. This year it is proposed to switch over to the Mansion House a few minutes before the speeches begin, to enable the observer to describe the rich setting and pageantry of this great civic function. It is here, in the person of the commentator, that a new idea will be introduced. It is hoped to find an "average listener" able to describe the brilliant scene and the appearance of the distinguished people doing honour to the Lord Mayor. The possibility of a woman commentator has not been ruled out.

Darts

As a change from the more serious outside broadcasts, it is proposed that the microphone shall visit, during the autumn, an Islington Dart Derby. The teams are drawn from well-known hostels whose clients annually challenge each other. The enthusiasm and skill is of a high order, and the Outside Broadcast Department are trying to find two colourful commentators to do justice to what invariably proves an amusing occasion.

Boxing

Boxing has been carefully reviewed from the broadcast angle. London will see some big matches this autumn, and it is proposed to cover these whenever possible. It is felt that it might encourage amateur boxing if broadcast time were reserved for the more outstanding contests such as those between the Police and the Service, and Oxford and Cambridge. Similarly, the Outside Broadcast Director has been assisting county cricket this season by giving added publicity to the game.

Rugby

While dealing with this matter of commentators and observers, a very interesting suggestion is in hand with regard to the University Rugby matches. It is proposed to select a date shortly before the inter-university match when both universities are engaged. Captain H. B. T. Wakelam will visit one venue and Howard Marshall another, and a description of half of each match will be broadcast. By this means, the form of each university can be studied in the same afternoon, while listeners will have the added amusement of comparing the two styles of observers.

Skating

Ice Hockey has now a definite place in the radio programmes. It is a fast game which lends itself to radio description, and for it the B.B.C. has built up a small team of expert commentators who will again be in attendance. Besides the matches of the Ice Hockey League, the Outside Broadcast Director feels that there

is the making of some excellent entertainment in the figure skating championships.

Military Spectacle

London is rich in military spectacles; that of the summer being the more familiar. Less known are the regimental tattoos which occur throughout the year at barracks and depôts. The Brigade of Guards, at all their barracks and at Windsor, carry out "Tattoo" with a splendid ceremony. It is proposed to listen to some of these with a view to introducing a short period into the radio schedule. The words of command, and the martial music drawn from such spectacles, have ever been popular with listeners.

Another great annual function, that of the British Legion Armistice celebration at the Albert Hall, is to receive a careful review to see how much it is possible to broadcast. This is a great national festival, occurring at a time when many are thinking of the first Armistice. It has a universal appeal, and as the Army springs from the people, a more careful study of the possibilities of this annual celebration is to be made.

The London Scene

The Outside Broadcast Department's offices contain many suggestions for utilising various happenings occurring in London's streets and parks. Many of these occasions are of sectional interest, but the majority have considerable entertainment value. Hyde Park, for instance, has several gatherings unknown to the general public, which have considerable charm. Some of these are unofficial meetings of musical people for the purpose of singing national songs. It is proposed to investigate these to see if, with the aid of an observer and commentator and the spontaneous singing, a broadcast of considerable colour could not be obtained.

One of the endeavours of the enthusiastic staff of the Outside Broadcast Department is to prove that the old tag, "There is nothing new in entertainment," is wrong. Listeners may rest assured that a large majority of the suggestions for outside broadcasts reaching the B.B.C. are explored. This, in itself, takes an immense amount of time and effort. The Outside Broadcast Department has to investigate possibility and availability before even a suggestion can be submitted. Quite frequently, after some weeks of work involving countless journeys and conferences, promising ideas have to be abandoned.

With regard to this autumn, it is safe to predict a most interesting and effective programme of broadcasts from outside the studios.

EVERYMAN'S WIRELESS

BOOK

By F. J. Camm

Wireless Principles and Fault
 Tracking simply explained.

3/6 or 4/- by post from Geo. Neumes, Ltd., Tower
 House, Southampton Street, Strand, London, W.C.2.

Ultra-short-wave Reception

Some Notes on Stations that are Well Received Below 10 Metres.

THE long-awaited moment when stations below 10 metres would once again entertain us has arrived. The dials of a 10-metre set are alive with stations, amateur, police, and broadcast.

Some idea of what to expect "down here" may be gauged by the fact that the following amateur stations have been coming in well upon the 10-metre amateur band: W4EIL, W5GGX, W6OIS, W6HKM, W6NDC, W6ERT, W6NTH, W6OAC, W7EMP, W9PWU, W9DRQ, W9KZN, VE2KX; a batch of stations including Colorado and Dakotan stations, a sure proof that ultra short-wave reception is thrilling.

Broadcasters

Numerous broadcasters are also being heard, and the following schedules and wavelength details will add much to your enjoyment.

On 9.494 metres many stations operate, the best heard being W3XKA at Philadelphia. Search for him between 2 and 4 p.m.

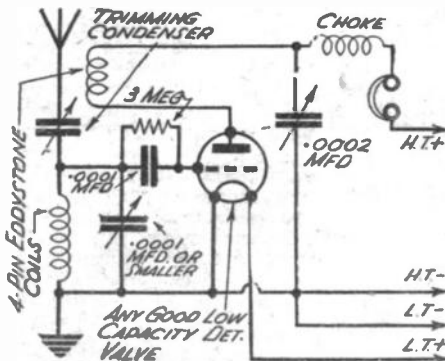
W1XKB, Springfield, relays WBZA from 11.30 a.m. to 6 p.m. daily on the same wavelength, whilst W3XEY, Baltimore, may be heard relaying WFBR around 3 p.m.

Other interesting stations are W4XCH, which relays WMC, Memphis, during the afternoons; W8XAI, Rochester—often a good signal between 3 p.m. and 8 p.m.; and W8XWJ, relay station of WWJ, Detroit. The schedule of this station is as follows: Sundays from 7.30 p.m. to 12.30 a.m., and from 11.55 a.m. to 5.30 p.m., and daily from 7 to 10 p.m.

W9XHW, Minneapolis, relays WCCO on Mondays to Fridays from 12.15 p.m. to 3 p.m., and on Saturdays from 7.30 p.m. to 5 a.m. Sunday transmissions are made between 2 and 3 p.m.

On 5 Metres

Although less lively, the 5-metre amateur band is well worth attention. In the London area G5WW, North London; G5RD, Watford, and G5KH, Wandsworth, are coming in well.



A simple circuit for use on 5 metres.

Occasionally a DX station will be heard, and in this connection it is well to remember that G8YQ and G6OK are transmitting regularly from the top of Snowdon. These stations have been heard over considerable distances, and careful searching may well add them to the Londoner's log.



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for the CORONA ALL-WAVE 4

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B.T.S. POTENTIOMETER
(On left) 50,000 ohms. 4/6
With 3 pt. switch.



B.T.S. REACTION CONDENSER
Differential. (On right) 2/6
Capacity .0003 mfd.

★ ALWAYS BUILD with B.T.S. COMPONENTS ★

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Highly efficient coils wound on a former of low loss material and supplied with 4- or 6-pin bases having two and three windings respectively. Short Wave coils wound with hard-drawn copper wire spaced to prevent turns touching; remaining coils wound side by side with enamelled wire.

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6-PIN TYPE "S" Waveranges from 9-2,000 metres, prices from 3/3 to 5/- each.

B.T.S. TUNING CONDENSERS
Single end-plate type. Extended spindle for gauging. Rigidity, compactness, and high efficiency ensure a high degree of accuracy in tuning with minimum losses. Solidly constructed with brass vanes and special low-loss material end plate.

Type No.	STG 425	0.000025 mfd.	3/3
"	STG 445	0.000045 mfd.	3/6
"	STG 316	0.00016 mfd.	4/6

B.T.S. ULTRA-SHORT-WAVE CHOKES With natural wavelength occurring at much lower frequency than used for high-definition television transmissions. 3-30 metres. Type UHF2 1/-

FREE!
Write for Free Folder containing fully descriptive leaflets on B.T.S. Components, High Fidelity Speakers, Chassis and Amplifiers.

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CORONA ALL-WAVE 4

Be safe . . . use the components specified by the designer . . . For a good job well done

- Two Terminal Strips
A. E. and L.S. @ 9d... 1 6
- Eight Wander Plugs,
"Midget" Type:
H.T.—, H.T.1, H.T.2,
H.T.3., G.B.—, G.B.—1,
G.B.—2, G.B.—3, @ 2d. 1 4
- Two Spade Terminals,
L.T.—, L.T.—, @ 2d... 0 4

"MIDGET" WANDER PLUG



Cap has hexagon Bakelite top to facilitate tightening and to prevent rolling if dropped. No fear of stripped threads. Prongs of cold drawn wire: 3 point contact.

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Lead-plated spring prongs clip on to a terminal stem and stay put. Connecting up becomes a one-hand job

Is lettered and employs "Belling-Lee" loading. Standard indications.

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TERMINAL STRIPS

Bakelite moulding with 1" sockets, bushed. Sensible terminals, eliminate soldering. Complete with two lettered wander plugs.

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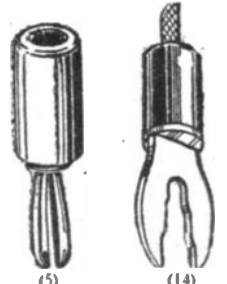
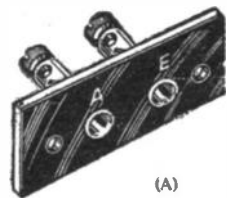
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Pr.W.0-10-37

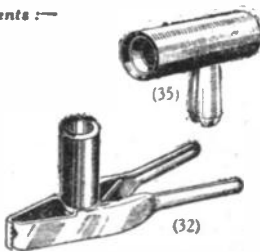
ALL-WAVE RADIO

The higher the frequencies, the more important it becomes to use low-loss contacts, or in other words "CLIX," the contact components which, because of their proved high efficiency, are used by the leading set designers, experimenters and home constructors.

In the limited space at our disposal we illustrate a few of the 36 which are included in our latest Components Folder. Why not send a post-card request for a Free copy of this and the Clix Folder "N." on Valveholders and Connection Strips?



- A selection of Clix perfect-contact components:—
- V.1. **STANDARD VALVEHOLDERS.** Specified for the "CORONA ALL-WAVE 4" 4-pin 6d.
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 - 5. **MASTER PLUGS.** Long or Short types for H.T. and G.B. Needed for the "CORONA" 1½d.
 - 14. **SPADE TERMINALS.** Engraved L.T.+, L.T.—. Needed for the "CORONA" (Large) 2d. (Small) 1½d.
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- Obtainable through all Radio dealers



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"CORONA"
 All-wave 4"

BRITISH MECHANICAL PRODUCTIONS LIMITED
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RADIO CLUBS AND SOCIETIES

Club Reports should not exceed 200 words in length and should be received First Post each Monday morning for publication in the following week's issue.

The Croydon Radio Society

THIS society's 1937-38 session having opened on Tuesday, October 5th, in St. Peter's Hall, Ledbury Road, South Croydon, members are now looking forward to some interesting programmes. All the old favourites are on the bill, but the society is increasing in intensity its campaign for realistic reproduction of broadcast music. Much has to be done in educating the great British public as to what is and what is not correct reproduction, and far too many wireless set owners are content with sounds from their loudspeakers which to the expert are distinctly distorted.

In this respect, the loudspeaker night on November 23rd is a date to be remembered, and an ever-popular pick-up night on October 19th is likely to be an instructive evening. Experts on loudspeaker design appear on October 26th and November 9th. Nor is television neglected, and a talk on "Cathode-ray Tubes for Television" is merely one evening devoted to this topic.

Above all, however, the society is as anxious as ever to welcome PRACTICAL AND AMATEUR WIRELESS readers to its ranks. Both have the same ideals, namely a better understanding of the science of radio, and fixture cards will gladly be sent to interested readers, together with full particulars of the society. Hon. Pub. Sec.: E. L. Cumbers, Maycourt, Campden Road, S. Croydon.

Exeter and District Wireless Society

THE above society held their first meeting for the season on Monday, September 20th, and the balance sheet for the year was presented by the treasurer, showing the society to be on a sound financial footing. Mr. A. T. Batten gave a talk on the Radiolympia show, and also demonstrated the Murphy all-wave radio set. The society proposes building a high-quality amplifier for test and demonstration purposes, and members submitted designs for this piece of apparatus at the meeting held on Monday, September 27th. Further particulars can be obtained from the Secretary, Mr. W. J. Ching, 9, Sivel Place, Heavitree.

Bradford Short-wave Club

THE above club has great pleasure in issuing a permanent invitation to all enthusiasts to attend the meetings this session. The lectures arranged will undoubtedly be interesting and instructive, and one of these in the near future is that of Radio G6AZ, who will deal with "Aerials," both for receiving and transmitting.

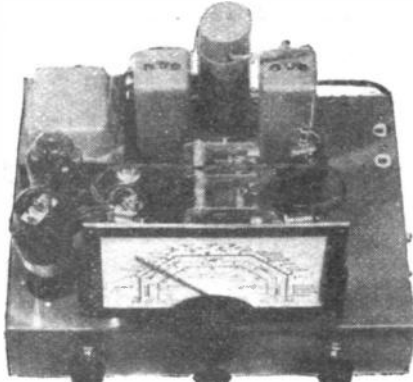
A new philosophy has grown in the club. Members are unanimously agreed that even if no gear were available at the club, they would not miss the chance of conversation with fellow members every Friday evening. Come along and share the famous world-wide radio friendship. Hon. Sec.: G. Walker, 33, Napier Road, Thornbury, Bradford, Yorks.

Tottenham Short-wave Club

THE extensions of this club's shack will be very soon completed, and with the extra room available experiments can be carried out on a much larger scale. The club is still open for a few applications from those interested in short-wave work. These should be sent to the Hon. Sec., Edwin Jones, 60, Walmer Terrace, Palmers Green, N.13.

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Chassis with
8" LOUD SPEAKER



THIS chassis supersedes our very popular 3BP/T Model and incorporates many additional features, viz.: Iron cored coils and iron-cored I.F. transformers, latest Yaxley type switching, B.V.A. Octal base valves. Output from gramophone reproduction increased 25%. The new 51 watt Tetrode output gives both increased volume and quality of reproduction. Short wave band is arranged to cover both English and American Amateur Bands as well as the usual short wave broadcasts. The best features of the 1937 3BP/T model have been retained including progressive volume and tone controls working on both radio and gramophone, also switching which completely separates the radio from the gramophone side. The price includes radiogram chassis complete with 6 B.V.A. valves, full size 8" moving coil speaker, mains lead, earphone and pilot lamps, ready for immediate use. Packing and carriage free.

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"From my first
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That's to wire-up
with FLUXITE
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See that FLUXITE is always by you—in the house—garage—workshop—wherever speedy soldering is needed. Used for 30 years in government works and by leading engineers and manufacturers. Of Ironmongers—in tins, 4d., 6d., 1/4 and 2/8.

Ask to see the FLUXITE SMALL-SPACE SOLDERING SET—compact but substantial—complete with full instructions, 7/6. Write for Free Book on the art of "soft" soldering and ask for Leaflet on CASE-HARDENING STEEL and TEMPERING TOOLS with FLUXITE.

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is always ready to put Fluxite on the soldering job instantly. A little pressure places the right quantity on the right spot and one charging lasts for ages. Price 1/6.



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THE BRITISH LONG DISTANCE LISTENERS' CLUB


Stationery for Members

MEMBERS should remember that we can supply pads of forms upon which reports of reception may be entered for submission to transmitters in order to obtain Q.S.L. cards. These pads contain 50 such forms upon which columns are provided for the entry of all the essential details of a transmission, and the price is 1s. 6d. Even if you do not wish to send out reports, it is worth while keeping a careful log of all signals received, and

printed on these together with a space for the member's number, and you should always use this paper when writing for component parts to other members, or to stations regarding transmissions. A white manilla folder in which the log sheets may be kept costs 7½d., and badges are available for 1s. each.

As we have previously stated, we have had to discontinue the practice of forwarding on members' reports to various stations, owing to the difficulty which has been


RADIO STATION		LISTENER'S NAME	
ADDRESS		ADDRESS	
COUNTRY		COUNTRY	



Dear Sirs

I am very glad to confirm the reception of your station on a wave length of ... m (... kc.s)

The following details of my reception will doubtless be of interest to you :

Date	Time (G.M.T. or E.S.T.)	Items and Announcements	Volume (R)	Fading	Stations	Inter-ferences	REMARKS
							

I should be grateful for your confirmation of the above report.

Date _____ Signature _____
 Member of the BRITISH LONG DISTANCE LISTENER'S CLUB

This is a reproduction of one of the verification sheets which we supply. The full sheet is 8in. by 10in.

although an ordinary notebook can be ruled up for this purpose, it is much better to use a ready-printed log sheet, and a pad containing 50 sheets for this purpose may also be obtained from us for 1s. 6d. In addition to these two items, we can also supply printed writing paper at 1s. 3d. per packet of 50 sheets. The B.L.D.L.C. badge is

experienced in obtaining replies in many cases. New readers who are anxious to join the Club, for which no membership fee is required, should complete the form on this page and address it to The British Long-Distance Listeners' Club, Geo. Newnes Ltd., Tower House, Southampton Street, London, W.C.2.

BRITISH LONG-DISTANCE LISTENERS' CLUB ENROLMENT FORM.

I wish to enrol my name as member of the British Long-distance Listeners' Club, it being clearly understood that no financial obligation is thus incurred. I am interested in long-distance listening and have a short-wave receiver at present in use. I am especially interested in {medium wave* / short-wave / ultra short-wave} listening.

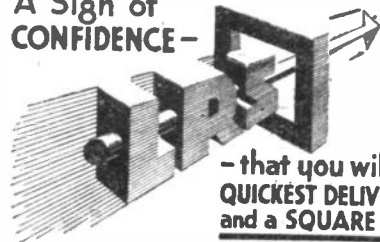
Full Name (Block letters)

Address

Optional. *Strike out words not needed.

Please forward me pads of 50 log-book sheets price 1s. 6d.
 badge price 1/- each
 pads of 50 verification forms price 1s. 6d.
 for which I enclose cheque / postal order for £.....

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An inexpensive receiver, giving large, pure output from B.B.C. and Continental transmissions, and excellent volume from the World's shortwave stations. Illuminated colour coded dial with station names for all wavelengths (in- with order and clubbing short 12 monthly payments of 14/2, range 16 to 51. Cash price 200 to 550, and 48 8/0. 400 to 2,000 mts.



14/-

The W.B. SENIOR STENTORIAN

A model of unusually high performance. Ideal as principal or extension speaker for any set.



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Comprising silent running, enclosed, economical induction motor for A.C., 100-230 volts, 50-60 cycles. Unit plate with pick-up, needle cups, etc.



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GARRARD A.C. 6 MOTOR only


Similar to above but with fully automatic start and stop, and without pick-up, needle cups, etc. Complete with 12in. plush covered turntable.



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AVOMINOR TEST METER

The equivalent of thirteen testing instruments in one. Measures Current, Voltage and Resistance with ease and accuracy. In handsome case with leads, interchangeable crocodile clips and testing prods.



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Unsurpassed for wide frequency response and amazingly high output. Extends lightness, reduces record wear and tear to practically nil.



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3 Minutes from St.Pauls

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NOTE THESE BARGAINS

RELAYS. For tiny currents from light coils or for tinned circuit calls. Moving Coil pivoted, work on 50 micro amps. Half usual price. 60/- Also mov. iron telephone type high or low res. coils 8 6. 26-way Auto Selector 6-gang relays 10/- Heavier current relays for Transmitters. American 7/6. Boulder type 18/- (Cred. polarised 2-way 30/-). 8-ship magnetic 18/-.

GRAMO MOTORS. Garrard with Automatic Record Changer, 85/7.6. BTH Type VM with turntable and auto stop. 45/- Garrard 230 v. A.C. ditto, 83/10a. BTH OD ditto, 37/6. HMV, 110 volts, 25/-, 230 volts, 37/6. Garrard Shop Window 10in. Electric Turntable, 220 v. A.C., 85/-.



WESTONS. Genuine Weston model 554. Central zero 1 to 15 amps, pol. mag. dead beat. Flush panel, 2 1/2 in. dial, nickel or black. Sale price 7/6. Mounted in solid mahog. 1 in. sq., 9 - Hoyt CZ mov. coil milliammeters, 25-0-25 m.a., 10/- Weston 0 to 30 m.a. mov. coil milliammeters, 17/6. 0-100 m.a., 17/6. Switchboard Meters all sizes.

MICRO-AMMETERS for Vairo Voltmeters, etc., 0 to 50 microamps, full scale, 50 mV. moving coil, 1,000 ohms, flush panel, 2 1/2 in. dial, 40/-, 2,000 Meters. All sizes in stock.

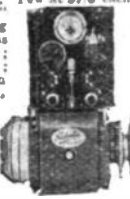
TESTERS FOR RADIO SERVICE. THE SUPREME PORTABLE VALVE ANALYZER, as illustrated. M.C. Meter with rectifier for A.C. All ranges. Adapter on cable and prods. A 512 set. See Leaflet "S." Bargain. 85.



THE DIX-IMPANTA. Supplies have been held up owing to Govt. requirements but prompt delivery can now be given. This is a wonderfully versatile, high-grade moving-iron multi-range meter for service on A.C. or D.C. jobs. No projecting terminals. THREE ranges of volts: 0-7.5, 0-150, 0-300. Used for MILLIAMPS reads: 0-12 m.a. and 0-75 m.a. In black bakelite case. Only 2 1/2 in. by 2 1/2 in. 19/6.

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Maxine Type Switchboard with Ammeter, maximum and minimum Auto Cutout, Mains Switch and Fuses, Field Regulator, 25/-.

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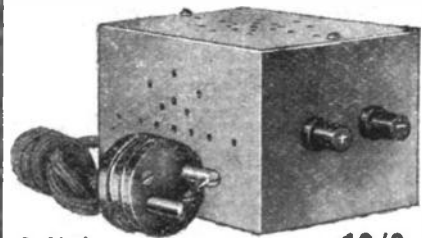
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The Editor does not necessarily agree with the opinions expressed by his correspondents. All letters must be accompanied by the name and address of the sender (not necessarily for publication).

Progressive Superhet Construction

SIR,—Regarding M. H. Walters' letter, published in a recent issue, I should also like to see some articles on progressive superhet construction. Although I vaguely understand the superhet, I have never passed the H.F.-Det.-L.F. stage!

I think these articles should begin with the principle of the frequency-changer, then the I.F. transformers, and amplifier, following with constructional details of the oscillator coil.

As Mr. Walters suggests, a simple superhet using headphones would be preferable to begin with, expanding later to a 5 or 6-valver.—J. F. HIRCHCOCK (Fetcham Park, Surrey).

Station COCM

SIR,—In your issue of September 25th, under the heading "New Cuban Stations," you publish details of the station COCM. Actually this is not a new station, as it was received here every morning during the week beginning October 22nd, 1936. It appears, however, to have altered its schedule, as when heard on that date, it closed down at 05.30 G.M.T. The receiver used was 0-v-0. A report was despatched but no reply has yet been received. In conclusion, let me adjure those listeners who expect cards by return of post to be patient. I sent several reports a year ago, and the replies are just beginning to roll in.—E. PARSONS (Luton).

A 20 and 40-metre Log from Wisbech

SIR,—I am enclosing a log of amateur phone transmitters on 7 mc's and 14 mc/s in the hope that this will prove of some interest to other S.W.L.s.

This list was compiled on September 19th to 21st inclusive, and the receiver is a single-valver using a Mazda L2 two-volt triode detector with plug-in coils and capacity-coupled to an outdoor circular frame antenna, 30ft. high and 80ft. long, with lead-in.

On 20 metres: WIHKK, IFD, DHT, IED, DAY, BVS, BLO, DET, BCP, JFG; W2IXY, HCE, TY, DH, AWL, HFS, AD, HNA, JKQ, GIZ, EPD, ASA, HS, JRR, W3ASG, EKU, FIL, FMY, FDS, EFS, PC, FAO. W4IS, EAV, CDG, HX, EHG, W5ASG, JC, EHM, BJO, W6BFC, NNR, MWD, ANU. W7FQK, DVY. W8MJT, FOD, NYP, NUB, GLC, RL, OAR, KQ, CNA, MDU. W9IPX, BBU, UOP.

Also on 20 metres: K6NZQ (R6), K6BNR (R4), K7FBE (R4), VK2XU (R6), NY2AE, HH5PA, YV5AA, CO6OM, 2OK, T12AV, XE1LK, VO2Z, CNSAM, MB, VE1GP, SM501, ON4VK, CT1QG, HA4A, IIMX, MG, KS, SUIKG, etc.

On 40 metres: 57 G stations, including GW, GI, GM, ON4DZ, JN, KW, IS, ABA, WX, JC, CC, OM, TVS. F8XR, SD, GM, WF, QP, CG, BA, NB; F3DI, OS, NO, AI, EA, OM, EI9G, 8L, 9D, 8J, 2J, PAOJS, JA, DK, AU.

This brings my total for the three days to 195 hams, and I should like to compare results with any other reader using a similar receiver. All reception is, of course, on 'phone.—L. SINGLETARY (Wisbech).

A 10-metre Log from Swindon

SIR,—I enclose a log of 10-metre amateur stations received here between the 12th and the 22nd of September, and hope it may interest fellow readers:

W1	W2	W3	W4	W8	W9
GMT	TP	FYO	CVU	AAB	CPT
ADI	FGB	EET	DRZ	CLF	COO
ATC	JQS	FRH	GJ	HSP	FAA
AAK	BHY	GZN	GXC	CHR	VE2QXY,
JZS	FGV	CBT		HVY	and
ADR	FWJ	GTG		EHS	VE2KX
DLJ	ADR	GTN		GUL	
IAS	ETI			1.G.O	
HVS	KHR			CFU	
IAO					
COO					
KSA					

My receiver is an 0-v-1 (D. and L.F.) battery operated. The coils are home-made from 14 gauge copper, and fixed direct on the condensers. Tuning is carried out on a band-spread in conjunction with a .00004 mfd. main tuner. The antenna is an indoor one, 15ft. in length, and all stations were heard on 'phones.

May I take this opportunity to thank (Continued on opposite page)

CUT THIS OUT EACH WEEK.



- THAT the selectivity of an I.F. transformer may be modified by opening the coupling and connecting a few turns in series with the secondary, tightly coupled to the primary.
- THAT when the above modification is carried out the additional winding may be short-circuited as required for higher selectivity.
- THAT instability can be caused by screening which may link two circuits together.
- THAT in close proximity to a powerful station direct signal pick-up on the inter-circuit wiring may provide difficulty in cutting out the station.
- THAT when a D.C. set is operated on short waves it may be found desirable to connect all screening direct to a separate earth.
- THAT for the reception of the present B.B.C. television transmissions a di-pole aerial should be arranged vertically, not horizontally.

The Editor will be pleased to consider articles of a practical nature suitable for publication in PRACTICAL AND AMATEUR WIRELESS. Such articles should be written on one side of the paper only, and should contain the name and address of the sender. Whilst the Editor does not hold himself responsible for manuscripts, every effort will be made to return them if a stamped and addressed envelope is enclosed. All correspondence intended for the Editor should be addressed: The Editor, PRACTICAL AND AMATEUR WIRELESS, George Newman, Ltd., Tower House, Southampton Street, Strand, W.C.2. Owing to the rapid progress in the design of wireless apparatus and to our efforts to keep our readers in touch with the latest developments, we give no warranty that apparatus described in our columns is not the subject of letters patent.

you for such an interesting and instructive weekly.—F. L. ROBINSON (Swindon).

A Valve Tester

SIR,—May I make a few suggestions about the valve tester that has been proposed for the subject of an article in the pages in your weekly.

There are three things that are desirable in the way of types of tests: (1) to determine the emission of the valve in question, if a triode-hexode or other dual valve, the emission of each section independently from the other; (2) to determine the amount of leakage between elements, and (3) to determine whether or not any of the elements are open-circuited. Of these three the first two are necessary, and the third a desirable feature which would only be incorporated in an expensive instrument.

About the tester in general—it should be flexible and designed with an eye to the future, and it should be able to accommodate additions for future varieties. Above all, it should be able to take care of American as well as English valves. This brings up the question of the octal base, and in the majority of these the filament is brought out to pins numbered 2 and 7, but quite a few have been released using pins 2 and 8 for this purpose; later a 6P7 was brought out using pins 2 and 3, and several of the octal base valves have been brought out since using pins 8 and 7 for filament connections. The proposed valve tester should operate from the mains, and incorporate a rectifier so that D.C. can be used instead of the A.C. that is used in so many commercial models. A push-button arrangement would take care of whether a negative or positive voltage should be applied to the various elements, and thus it would enable the emission of both diodes and the triode of a double-diode-triode to be checked separately.—**JOHN B. POLLOCK** (Orpington).

“The Exide Mystery”

SIR,—The article in the September 18th issue of PRACTICAL AND AMATEUR WIRELESS, entitled “The Exide Mystery,” has cleared up a mystery for which I have long sought the solution. Some time ago I had to overhaul a private lighting plant which was out of order. Instead of the full output of 100 volts, only 40 volts was registered. I at once suspected the storage batteries, and proceeded to test each cell individually. After testing four and getting the usual 2-volt reading from each, you can imagine my surprise when on testing the fifth cell the voltmeter read 10 volts! Something wrong here, I thought, and gave the meter a sharp tap; it still insisted on registering ten volts, however, and I began to wonder. Further examination of the cell (which incidentally was the one causing the trouble), showed that there had been leakage of electrolyte through a crack, the plates being uncovered about an inch at the top. There was some sulphation, and on trying to remove this, several of the plates parted from the positive lug.

I have often puzzled over the phenomenon, and when I have asked some of my learned electrical friends if they can explain it, I have been met with sceptical smiles and advised to take more water with it. Thanks to your article, I am now vindicated.—**A. H. OLIVER** (Hitchin).

Logged at Mill Hill

SIR,—As I have not seen a 20-metre log from my district lately, I enclose mine. All stations were received between August 15th and September 16th on an 0-v-2,

REPLIES IN BRIEF

The following replies to queries are given in abbreviated form either because of non-compliance with our rules, or because the point raised is not of general interest.

R. W. (Dudley). We will hear your request in mind and if sufficient interest is displayed by other readers will describe a set of the type mentioned. We do not think, however, that it would be very popular with the majority owing to the cost of maintenance.

F. W. G. (Dunlavin). We cannot recommend a modern set to be constructed from the old parts mentioned. The condenser is not suitable for modern tuning owing to the crowding of the frequencies at the lower end of the dial, and the best plan is to dispose of the complete receiver and obtain modern parts with which to build a modern set.

J. B. (Edington). For short-wave work we think the best plan would be to obtain a good pair of Brown “A” type phones.

C. E. V. (Hall Green, Birmingham). We are unable to give details for rewinding the motor for your purpose.

A. C. (Stoneway). Messrs. Peto-Scott can supply the coil ready-made or in parts for home-construction.

P. J. A. (Sidcup). Probably one of the sets described in our Show numbers would prove more useful to you than the set mentioned in your communication.

G. B. P. (Ewell). There is no easy way of measuring the details you require to know, and the best plan is to obtain a good modern output-transformer of the multi-ratio type and replace the transformer fitted to your speaker. You can then make tests to find the best ratio and thus obtain maximum results.

R. I. (Dublin). We cannot supply a blueprint of the receiver in question, and the makers are no longer in business.

J. B. M. (Brighton). There were no tuning dials fitted to this portable, the condensers being controlled merely by ordinary knobs of the type having a small projecting pointer to provide an indicating point. You could, of course, fit small engraved dials if you desired, but they would have to be 2in. in diameter or less.

E. G. C. (Smethwick). The makers are Regentone Products, Ltd., Worton Road, Isleworth, Middlesex.

W. C. (Hull). We regret that we have no blueprints of a portable gramophone of the type mentioned in your letter.

H. G. S. (Hillingdon). You do not state whether you require battery or mains apparatus, but we have described three 2-valve A.C. mains sets which would meet your requirements. These will be found in our Blueprint list in this issue.

C. F. H. (Woolwich-on-Sea). The arrangement mentioned would be very unsatisfactory. Apart from the inefficiency of the arrangement, you would be wasting the remaining valves and these could well be utilised by connecting a short-wave converter to the input of the receiver. Any good superhet S.W. converter should work satisfactorily with the set.

D. G. (Glasgow, N.). The component is the H.F. choke, not a condenser. The runners are not metal covered. You can dispense with the component brackets. Foil could be used but we advise a thicker material.

E. W. (Rotherham). An ordinary 6-volt low-consumption bulb could be used, of the type generally employed for a dial light. Write to Messrs. Colvern, Mawneys Road, Romford, Essex, regarding the resistances.

G. H. G. (Boshey). The sodium silicate is added to ordinary acid as found in the accumulator, and the amount required will depend upon the size of the cell. It is simply dropped in at the vent until jellyfication is complete.

T. B. (Felkinstowe). You could build a simple D.C. mains H.T. battery eliminator, to deliver the voltages required for the receiver and this would entail no alterations to the receiver.

receiver with an aerial 30ft. high and 40ft. long.

CE1AO, CO2EG, CO2JG, CO2JJ, CO2LY, CO2MT, CO2RH, CO2XF, CO7CX, CI8EC, CO8KJ, CO8YB, HC1FG, HC1JB, HC1JW, HH2B, HH5PA, K6NZQ, LU5BB, LU5FG, NY2AE, OA4AI, PK3WI, PY2ET, PY2FF, PY5AQ, TI1AS, TI1AZ, TI2AV, TI2KP, TI2RC, TI2RT, VE5EF, VE5JK, VK2RJ, VK2VB, VK2VV, VK2XS, VK2XU (25 watts), VK2ZZ, VK3AL, VK3KX, VK3PE, VK3XJ, VK4WV, VK5AI, VK5AW, VP3BG, VP5PZ, W5DYM, W5FDI, W5GIB, W5ZC, W6AL, W7FQK, XE1Y, XE2FC, YV5ABE, YV5AK, and also about 100 other W stations, and many Europeans.

Some of the best broadcasting stations which I have logged lately are XEWW, COCM, COJK, KZRM, COBC, COBZ and HJ1ABP.—**DOUGLAS L. PELHAM** (Mill Hill).

Quaint IDEAS
YOU ACCEPT WITHOUT
QUESTION

NUMBER FOUR



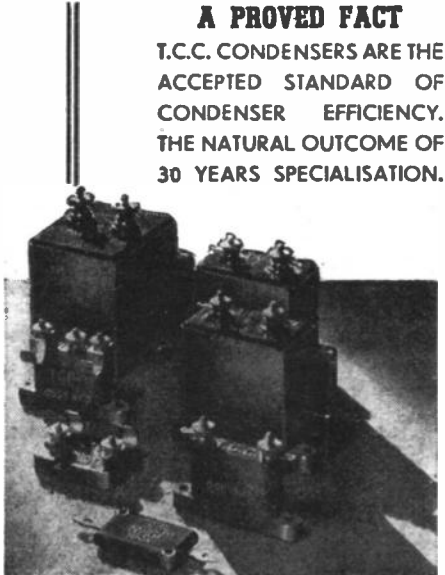
that
A BARKING DOG
doesn't bite.....

To prove your point would mean running certain risks—and it wouldn't be worth it.

When buying condensers, to hold the mistaken idea that all makes are alike, means taking risks too. It's far more simple and certainly safer to insist on condensers that the whole industry unreservedly accepts as being beyond reproach—T.C.C. Condensers. Dependable because they are specialist built, because years of intimate experience in the design and manufacture of condensers stands behind every type. Don't experiment with condensers; be guided by this—

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CRYSTAL SETS.		Date of Issue, Blueprint.		
CRYSTAL SETS.				
Blueprint, 6d.				
1937 Crystal Receiver	9.1.37	PW71	A.C. £5 Superhet (Three-valve)	1.12.34 PW43
STRAIGHT SETS. Battery Operated.				
One-valve : Blueprints, 1s. each.			D.C. £5 Superhet (Three-valve)	PW42
All-wave Unipen (Pentode)	—	PW31A	Universal £5 Superhet (Three-valve)	PW44
Two-valve : Blueprints, 1s. each.			F. J. Camm's A.C. £4 Superhet 4	31.7.37 PW59
Four-range Super Mag Two (D, Pen)	11.8.34	PW36B	F. J. Camm's Universal £4 Superhet 4	— PW60
The Signet Two	29.8.36	PW76	"Qualitone" Universal Four	16.1.37 PW73
Three-valve : Blueprints, 1s. each.			SHORT-WAVE SETS.	
The Long-Range Express Three (SG, D, Pen)	24.4.37	PW2	Two-valve : Blueprint, 1s.	
Selectone Battery Three (D, 2 LF Trans)	—	PW10	Midnet Short-wave Two (D, Pen)	— PW38A
Sixty Shilling Three (D, 2 LF RC & Trans)	—	PW34A	Three-valve : Blueprints, 1s. each.	
Leader Three (SG, D, Pow)	22.5.37	PW35	Experimenter's Short-Wave Three (SG, D, Pow)	— PW30A
Summit Three (HF Pen, D, Pen)	8.8.34	PW37	The Perfect 3 (D, 2LF RC and Trans)	7.8.37 PW63
All Pentode Three (HF Pen, D, Pen)	29.5.37	PW30	The Bandsread S.W. Three (HF Pen, D, Pen)	29.8.36 PW68
Hall-mark Three (SG, D, Pow)	12.6.37	PW41	"Tele-Cent" S.W.3 (SG, D, SG, Pen)	30.1.37 PW74
Hall-mark Cadet (D, LF, Pen, RC)	16.3.35	PW48	F. J. Camm's Oracle All-wave Three (H.F., Det., Pen.)	28.8.37 PW78
F. J. Camm's Silver Souvenir (HF Pen, D, Pen)	13.4.35	PW40	PORTABLES.	
Genet Midget (D, 2 LF Trans)	June '35	PM1	Three-valve : Blueprints, 1s. each.	
Cameo Midget Three (D, 2 LF Trans)	8.6.35	PW51	F. J. Camm's ELF Three-valve Portable (HF Pen, D, Pen)	— PW65
1936 Sonotone Three-Four (HF Pen, HF Pen, Westector, Pen)	17.8.35	PW53	Farvo Flyweight Midget Portable (SG, D, Pen)	19.6.37 PW77
Battery All-Wave Three (D, 2 LF RC)	—	PW55	Four-valve : Blueprint, 1s.	
The Monitor (HF Pen, D, Pen)	—	PW61	Featherlight Portable Four (SG, D, LF, Cl. B)	15.5.37 PW12
The Tutor Three (HF Pen, D, Pen)	21.3.36	PW62	MISCELLANEOUS.	
The Centaur Three (SG, D, P)	—	PW64	S.W. Converter-Adapter (1 valve)	— PW48A
The Gladiator All-Wave Three (HF Pen, D, Pen)	29.8.36	PW66	AMATEUR WIRELESS AND WIRELESS MAGAZINE	
F. J. Camm's Record All-Wave Three (HF Pen, D, Pen)	31.10.36	PW69	CRYSTAL SETS.	
The "Colt" All-Wave Three (D, 2 LF RC & Trans)	5.12.36	PW72	Blueprints, 6d. each.	
Four-valve : Blueprints, 1s. each.			Four-station Crystal Set	12.12.36 AW427
Sonotone Four (SG, D, LF, P)	1.5.37	PW4	1934 Crystal Set	— AW444
Fury Four (2 SG, D, Pen)	8.5.37	PW11	150-mile Crystal Set	— AW450
Beta Universal Four (SG, D, LF, Cl. B)	—	PW17	STRAIGHT SETS. Battery Operated.	
Nucleon Class B Four (SG, D, SG, LF, Cl. B)	6.1.34	PW34B	One-valve : Blueprints, 1s. each.	
Fury Four Super (SG, SG, D, Pen)	—	PW34C	B.B.C. Special One-valver	— AW387
Battery Hall-Mark 4 (HF Pen, D, Push-Pull)	—	PW46	Twenty-station Loudspeaker One-valver (Class B)	— AW449
F. J. Camm's "Limit" All-Wave Four (HF Pen, D, LF, P)	26.9.30	PW67	Two-valve : Blueprints, 1s. each.	
Mains Operated.				
Two-valve : Blueprints, 1s. each.			Melody Ranger Two (D, Trans)	— AW388
A.C. Twin (D, Pen)	—	PW18	Full-volume Two (SG det., Pen.)	— AW592
A.C.-D.C. Two (SG, Pow)	—	PW31	B.B.C. National Two with Lucerne Coll (D, Trans)	— AW377A
Selectone A.C. Radiogram Two (D, Pow)	—	PW19	Big-power Melody Two with Lucerne Coll (SG, Trans)	— AW338A
Three-valve : Blueprints, 1s. each.			Lucerne Minor (D, Pen)	— AW426
Double-Diode-Triode Three (HF Pen, DDT, Pen)	—	PW23	A Modern Two-valver	— WM409
D.C. Ace (SG, D, Pen)	—	PW25	Three-valve : Blueprints, 1s. each.	
A.C. Three (SG, D, Pen)	—	PW29	Class B Three (D, Trans, Class B)	— AW386
A.C. Leader (HF Pen, D, Pow)	7.4.34	PW35C	New Britain's Favourite Three (D, Trans, Class B)	15.7.33 AW394
D.C. Premier (HF Pen, D, Pen)	8.1.34	PW35B	Home-built Coll Three (SG, D, Trans)	— AW404
Ubiqua (HF Pen, D, Pen)	28.7.34	PW36A	Fan and Family Three (D, Trans, Class B)	25.11.33 AW410
Armada Mains Three (HF Pen, D, Pen)	—	PW38	£5 5s. S.G.3 (SG, D, Trans)	2.12.33 AW412
F. J. Camm's A.C. All-Wave Silver Souvenir Three (HF Pen, D, Pen)	11.5.35	PW50	1934 Ether Searcher; Baseboard Model (SG, D, Pen)	— AW417
"All-Wave" A.C. Three (D, 2LF RC)	17.8.35	PW54	1934 Ether Searcher; Chassis Model (SG, D, Pen)	— AW419
A.C. 1936 Sonotone (HF Pen, H.F. Pen, Westector, Pen)	—	PW56	Lucerne Ranger (SG, D, Trans)	— AW422
Mains Record All-Wave 3 (HF Pen, D, Pen)	5.12.36	PW70	Cosor Melody Maker with Lucerne Colls	— AW423
Four-valve : Blueprints, 1s. each.			Mullard Master Three with Lucerne Colls	— AW424
A.C. Fury Four (SG, SG, D, Pen)	—	PW20	£5 5s. Three: De Luxe Version (SG, D, Trans)	19.5.34 AW435
A.C. Fury Four Super (SG, SG, D, Pen)	—	PW34D	Lucerne Straight Three (D, RC, Trans)	— AW437
A.C. Hall-Mark (HF Pen, D, Push-Pull)	24.7.37	PW45	All-Britain Three (HF Pen, D, Pen) "Wireless League" Three (HF Pen, D, Pen)	— AW448
Universal Hall-Mark (HF Pen, D, Push-Pull)	9.2.35	PW47	Transportable Three (SG, D, Pen)	3.11.34 AW451
SUPERHETS.				
Battery Sets : Blueprints, 1s. each.			£6 Gs. Radiogram (D, RC, Trans)	— WM318
£5 Superhet (Three-valve)	5.6.37	PW40	Simple-tune Three (SG, D, Pen)	June '33 WM327
F. J. Camm's 2-valve Superhet Two-valve	18.7.35	PW52	Economy-Pentode Three (SG, D, Pen)	Oct. '33 WM337
F. J. Camm's £4 Superhet	—	PW58	"W.M." 1934 Standard Three (SG, D, Pen)	— WM351
F. J. Camm's "Vitesse" All-Waver (5-valver)	27.2.37	PW75	£3 3s. Three (SG, D, Trans)	Mar. '34 WM354
			Iron-core Band-pass Three (SG, D, QP21)	— WM362
			1935 £6 Gs. Battery Three (SG, D, Pen)	— WM371
			PTP Three (Pen, D, Pen)	June '35 WM380
			Certainty Three (SG, D, Pen)	— WM393
			Mintube Three (SG, D, Trans)	Oct. '35 WM400
			All-wave Winning Three (SG, D, Pen)	Dec. '35 WM396

These Blueprints are drawn full size. Copies of appropriate issues containing descriptions of these sets can in some cases be supplied at the following prices, which are additional to the cost of the blueprint. A dash before the Blueprint Number indicates that the issue is out of print.

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Amateur Wireless	.. 4d.	.. "
Practical Mechanics	.. 7d.	.. "
Wireless Magazine	.. 1/3	.. "

The index letters which precede the Blueprint Number indicate the periodical in which the description appears; thus PW refers to PRACTICAL WIRELESS, AW to Amateur Wireless, PM to Practical Mechanics, WM to Wireless Magazine.

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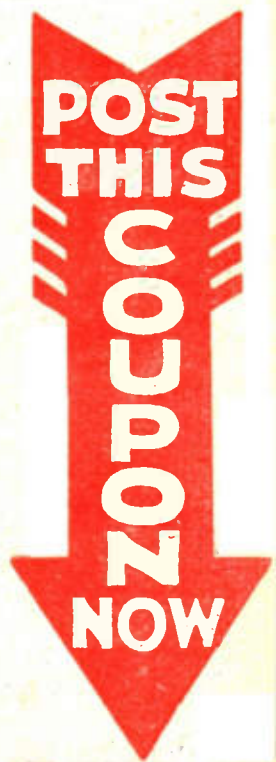
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Simple Formulæ for Beginners— See page 86.



Practical and Amateur Wireless

Edited by F. J. C.A.M.M.

Technical Staff:
W. J. Delaney, H. J. Barton Chapple, Wh.Sch.,
B.Sc., A.M.I.E.E., Frank Preston.

VOL. XI. No. 264. October 9th, 1937.

ROUND *the* WORLD of WIRELESS

The Corona All-wave Four

THE success of the all-wave receivers described in our Show numbers has led to a demand for a more powerful receiver for battery use, designed on somewhat similar lines. In the past we have described several receivers of this type, but it has been necessary to utilise standard broadcast coils for tuning on the medium and long-wave bands, with special short-wave coils for the short wavelengths, and this has necessitated special switching. Such an arrangement is quite satisfactory provided that the switches are well designed and that the wiring from coils to switches is efficiently carried out. Many constructors who have tried to build a receiver on these lines have found that the short-wave performance has been poor, and in the majority of cases this has been definitely traced to the use of a wrong type of switch, or bad wiring between the various components. The introduction of the modern three-range coils has removed these difficulties, and it is thus now just as simple to build an all-wave receiver as a standard broadcast set. The receiver described in this issue is a four-valver, having a single H.F. stage and two L.F. stages, and thus may be relied upon to provide not only a wide range of reception, but also a really good volume which will enable many short-wave stations to be received at worth-while strength on the loudspeaker. In addition, the performance on the broadcast bands will also be such that the receiver may be regarded as a standard for domestic purposes.

Short Waves Again

TO add to the already numerous applications of the short waves in normal commercial undertakings, it is now reported that the rate of growth of seeds may be measured by ultra-short wavelengths. It is stated that a Californian farmer measures the hidden capacity for growth in his lettuce seeds by means of a special ultra-short-wave receiver, and is thus able to sort his seeds into groups which will mature at definite periods. He believes that in a short time all seeds will be thus tested by radio.

Nottingham B.B.C. Studio

IT is stated that the B.B.C. have not given up hopes of eventually finding a site in Nottingham for a broadcast studio. Difficulty has been found in obtaining a site which will provide the necessary

amenities of a broadcast studio, but the Midland Regional director states that a further inspection is shortly to be undertaken with a view to obtaining a suitable site.

Stagshaw Transmitter

THE Stagshaw transmitting station, designed to improve listening conditions in Northumberland, Durham, Cumberland, Westmorland and North York-

shire, is to be opened by Her Grace the Duchess of Northumberland on Tuesday, October 19th.

new programme, which has been arranged in conjunction with the Columbia Broadcasting System. Listeners will, on October 18th, and on each subsequent Monday at 8.30, hear a programme of American variety, broadcast by the Columbia System.

Mr. Felix Greene, the B.B.C. representative in America, is arranging that this programme shall contain each week a first-class band and some of Columbia's star variety artists. It is yet too early to announce the names of the artists taking part in the first programme, but these will be available from week to week. English listeners are familiar with the names of American favourite radio artists, but except on gramophone records, have not, in many cases, had the opportunity of hearing them first hand.

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For Housewives

AN important series of discussions will commence in the Midland programme on October 15th, under the title "How to Get Your Money's Worth." Margot Smith, speaking for the housewife, will interview J. C. Tranter, President of the Birmingham and District Retail Beef and Pork Butchers' Association, with a view to providing guidance for shoppers on points about quality and value to look for when buying meat.

"Crying the Neck"

LISTENERS who are interested in surviving ancient customs should listen to the West of England programme on October 12th. A commentary on the ceremony of "Crying the Neck," at Trelowarren, Cornwall, will be broadcast by Peter Sandry. This ceremony marks the conclusion of the harvest, but there are only a few places where it has survived. The "Neck" is a sheaf of corn—it may be either the last sheaf cut on the estate, or it may be composed of the finest ears selected from the various fields. In the olden days, after the last sheaf had been cut, all the labourers on the estate gathered round while one of their number would raise the sheaf three times in the air, the rest bowing or kneeling. In some places it is given to the best horse on the estate, in others it is hung up in the farm kitchen until the next harvest. At Trelowarren the ceremony is held in front of the house of the landlord and concludes with an old Cornish harvest hymn, before everyone goes in to the harvest supper.

Quality and Superhets

IT is interesting to note that this season several firms are introducing all-wave receivers in which the circuit has been designed to perform a dual function. For long-range work the circuit performs as a superhet, but a switch cuts out certain stages or makes circuit changes so that when the local or quality reception is desired, a straight T.R.F. circuit is employed. This is no doubt a beginning of the general return to straight circuits.

Variety from America

AN interesting sample of American variety will be heard each week by English listeners through the medium of a

ROUND the WORLD of WIRELESS (Continued)

Here's To the Next Time!

WHEN Henry Hall and his Dance Orchestra finished the late dance music programme a fortnight ago it marked the severance of the official connection Henry has had with the B.B.C. for the last five years. Although the B.B.C. Dance Orchestra was disbanded some months ago, Henry has been under contract to the B.B.C., but this is now terminated. He has begun a music-hall career with his new orchestra.

Applications for Auditions

THE B.B.C. recently announced that, owing to an already overlong waiting list, no new applications for general drama auditions can be considered before the end of March, 1938. As yet there has been no chance to give parts to many applicants who were successful at auditions last autumn and winter. During the summer months auditions were suspended and hundreds of would-be broadcasters who have since applied must be heard before a new list can be formed.

Meanwhile, drama auditions will be given at regular intervals to those who have already applied. In turn each gets a summons to Broadcasting House for an individual microphone test. This process takes time, but only in this way can the B.B.C. be sure that no type of talent is overlooked.

"In Town To-night"

HERALDED once again by the "Knights-bridge March," its well-known signature tune, "In Town To-night" will be revived by the B.B.C. on October 30th. It will be the same "In Town To-night"

INTERESTING and TOPICAL NEWS and NOTES

that listeners have always known, bringing to the microphone each Saturday night the personalities, celebrities and colourful

the best known broadcasters in the North, is to be broadcast on October 14th. This promises to be a show full of bright burlesque. David Porter, who is the producer, has written the lyrics, and the music is by Henry Reed. The artists will include Marjorie Westbury, who is best known to listeners in the Midland region. The



Judy Shirley, well known radio favourite, as she appears in "Thunder in the City," with Maurice Winnick's Band. Conducting the band can be seen the star of the picture, Edward G. Robinson. The picture was produced at the Denham Studios.

characters visiting, or working in, the Metropolis.

A. W. ("Bill") Hanson will again regularly produce the programmes, which will be reintroduced

Columio Male Voice Choir will also be heard. Some of the sketches of this show are side-lights on life in a big department store.

"How To Get Your Money's Worth"

A SERIES entitled "How To Get Your Money's Worth," which will run weekly—probably on Fridays—will be introduced on October 8th by F. C. Hooper, a director of a multiple departmental store. In subsequent broadcasts, to be given from the Midland Regional, Miss Margot Smith, of Birmingham, will interview trade experts with a view to finding out the difference between goods sold at different price levels.

A Manchester "Tuesday Concert"

THE second broadcast concert of the Manchester Tuesday Midday Society's weekly programme will be heard from the Houldsworth Hall, Manchester, by Northern and London Regional listeners on October 12th. The soloists will be Carmen del Rio (soprano) and Muriel Taylor (violin-cello). Albert Hardie will be at the pianoforte.

A New Radio Revue

"YOU Never Know," a new revue by Muriel Levy, who is one of



A new picture of Henry Hall at the piano. He has delighted thousands with his solos which have sometimes been included in the dance-orchestra programmes.

SOLVE THIS!

PROBLEM No. 264.

When King's home-designed A.C. receiver was first switched on the quality of reproduction was poor. Voltage tests were made and it was found that the heater voltage was 3.5 volts instead of the required 4 volts. What was the fault? Three books will be awarded for the first three correct solutions opened. Address your solutions to the Editor, PRACTICAL AND AMATEUR WIRELESS, George Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. Envelopes must be marked Problem No. 264 in the top left-hand corner and must be posted to reach this office not later than the first post on Monday, October 11th, 1937.

Solution to Problem No. 263.

The field winding was short-circuiting to the speaker chassis and this was directly connected to the set chassis.

The following three readers successfully solved Problem No. 262, and books are accordingly being forwarded to them: A. B. Tollerton, 1, Nevill Rd., Crowborough, Sussex; R. R. P. Lee, 22, Heathfield Rd., Acton, W.3; J. de Moraes, 4c, Grosvenor Terr., Liverpool, 8.

The Amateur Set Designer

Further Notes on Resistance-Capacity Coupling, and Transformer L.F. Coupling are Given in this Fifth Article of the Series

(Continued from page 58, October 2nd issue).

THERE is no peculiar virtue arising from the fact that a transformer winding is involved. Similar phase splitting could be done with the aid of a centre-tapped resistance, provided that the centre point is held constant in potential and connected to cathodes.

Thus, if there is a signal voltage developed by a valve across the whole of R, Fig. 18, then the points A, E and B of Fig. 17 could be connected to those similarly marked in Fig. 18. The main practical problem arises in connection with the getting of R into the circuit of one valve. Obviously R of Fig. 18 could not be connected between the anode of a triode or pentode and H.T.+ because of the centre earth. It could not be placed between cathode and negative H.T. because the negative H.T. line will itself be at constant potential, and we want the middle of R to be constant, not the end of R. One could, however, split R into two equal parts and place one half on the anode side of the valve, and the other on the cathode side.

Fig. 19 shows a workable arrangement with a diode detector (H.F. filtering omitted). Note that a direct earth connection cannot be taken to the input tuned circuit.

A very useful method of phase splitting, although it involves an extra valve, takes

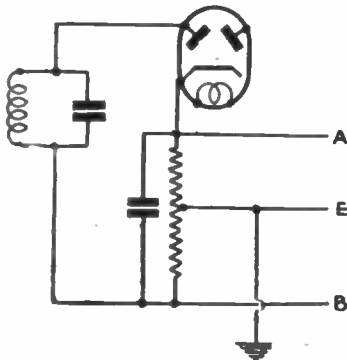


Fig. 19.—Obtaining a split output from a single valve for an R.C. push-pull stage.

advantage of the fact that, with a resistance load in the anode circuit of a triode valve there is 180 degrees phase difference between the grid and anode signal potentials. One of the first push-pull valves is fed direct while the other receives its input via an extra valve which is provided to give the necessary phase reversal. Fig. 20 shows the idea schematically. V is the extra valve mentioned and points A, E and B could be joined to those of Fig. 17.

The reader is bound to see at once the possibility that the amplification of V might upset the equality of grid signal voltages at A and B, i.e., might upset the balance of the two push-pull valves. The

prevention of this is simply that of sufficiently reducing the input to V by potentiometer control. (See Fig. 21.)

Fig. 22 shows two push-pull output valves, V3 and V4. V3 is fed direct from V1, while V4 receives its input via the phase-reversing valve V2.

An alternative to the way in which V2 picks up its input voltage as shown in Fig. 22 would be to connect the grid of V2 to a suitable tapping on R1, the grid leak resistance of V3. (See point X in Fig. 22.) In this case the grid leak and condenser CR (Fig. 22) would be omitted.

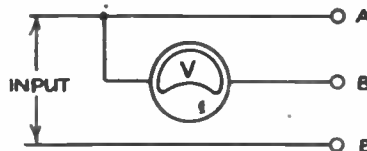


Fig. 20.—Diagram illustrating one method of phase-splitting.

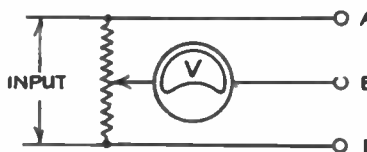


Fig. 21.—Reducing input by potentiometer control.

With R.C.C. push-pull systems very great care must be taken in connection with the matter of electrical balance between the two sides of the system.

Transformer L.F. Coupling

Fig. 23 shows the simplest method of employing an L.F. transformer for inter-valve coupling.

The fact that the output voltage of V1 goes through the voltage step up action of the transformer before operating V2 indicates that here we have the type of coupling to be used when comparatively high stage gain is necessary.

It is important for the receiver designer to be familiar with certain basic facts about inter-valve L.F. transformers. Ratio is not everything where the transformer is concerned, and any idea of obtaining a colossal stage gain by using a transformer with an exceedingly high turns ratio is foredoomed to failure. The transformer can step up only the voltage that is operating directly in its primary, and a vital point is that in series with the primary (see Fig. 23) we have the valve impedance (anode A.C. resistance, if you prefer that term). If the primary reactance is low the proportion of the effective signal e.m.f. that will be available at the primary will be small. This means that a comparatively large primary inductance is required, particularly where the lower frequencies are concerned. Ignoring the resistance of the primary

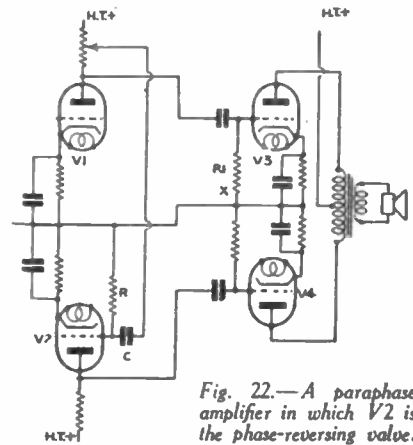


Fig. 22.—A paraphase amplifier in which V2 is the phase-reversing valve.

winding, the ratio of voltage across the primary to the total signal c.m.f. acting in the anode circuit is at the lower end of the frequency scale:

$$\frac{X}{\sqrt{R^2 + X^2}}$$

where R = valve impedance

X = reactance of the primary

It is easy to see that if the reactance of the transformer primary is made equal to the valve impedance the above ratio

resolves to $\frac{1}{\sqrt{2}}$, i.e., the primary gets

70.7 per cent. of the total e.m.f. This would be reasonably satisfactory but it is going to mean a primary with a large number of turns. How about the secondary winding? Obviously, a very high turns ratio would mean a transformer with an enormous secondary which would lead to difficulties in connection with the magnetic leakage on the one hand and a self-capacity on the other. An alternative way of getting the high ratio would be to use a very small primary winding, but that is just what we do not want to see in the transformer. It will be appreciated, therefore, that there are very good reasons for the common use of inter-valve transformer ratios of the comparatively low values of 1:2, 1:3, and 1:4.

The frequency response of the transformer is a very important consideration. A transformer of poor design might show a bad falling off in the lower register, due to insufficient primary inductance, or it might, due to effects concerned with the self capacity and leakage inductance, have a nasty resonant peak followed by a severe falling away in response at the upper frequencies.

Makers of good quality transformers are generally pleased to supply the frequency

(Continued on next page)

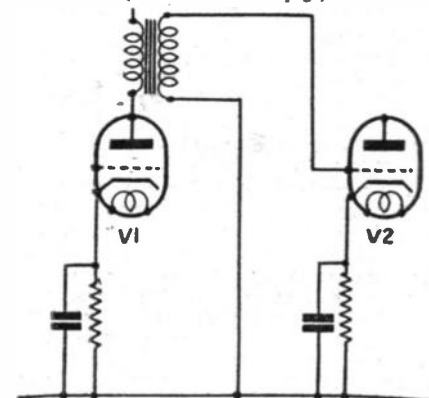


Fig. 23.—A simple method of employing an L.F. transformer for inter-valve coupling.

THE AMATEUR SET DESIGNER

(Continued from previous page)

response curves and it is advisable when studying the curve of any particular transformer to note all details given as to the operating conditions under which the specified response will be obtained.

With the transformer connected as in Fig. 23 the D.C. component of anode current must necessarily pass through the primary winding of the transformer. Any given transformer will only take up to a certain value of direct current before distortion will be caused by core saturation. It is therefore useful to know the maximum permissible D.C. value for the transformer, and extremely important to see that the D.C. component of anode current does not exceed this value.

The shunt feed method of using a transformer will, of course, overcome all difficulties in connection with D.C. in the primary.

Shunt Feed Transformer Coupling

By keeping the primary of the transformer out of the series anode circuit and feeding it *via* resistance-capacity coupling as shown in Fig. 24, there is gained the considerable advantage that no D.C. passes through the primary, the primary inductance is consequently at its maximum and there is no possibility of trouble due to D.C. core saturation. The stage gain will not be quite so high as with direct transformer connections, assuming that the transformer is used in the manner shown in Fig. 24.

It will be observed that both the secondary and the primary winding run to earth on one side. In the battery operated receiver the secondary will generally go to earth *via* the G.B. battery. Auto-transformer connections, therefore, become possible, and Fig. 25 shows the transformer of Fig. 24 connected up as an auto transformer. Note that although the primary winding still acts as such, the secondary now consists of the two windings in series, since both windings come between grid and earth. Thus the effective ratio of the transformer has been raised. Alternatively, by reversing the connections of one of the windings the resulting voltage opposition would have the effect of bringing down the working ratio. As a matter of fact, with a 1:4 transformer having separate primary and secondary terminals there would be a choice of effective ratios of 1:3, 1:4, and 1:5.

The possibility of using auto connections with the shunt feed system has, of course, led to the introduction of transformers definitely built as autos, and having three terminals only.

The anode resistance, R (Fig. 24), will have a bearing upon the stage gain. There should be no need, however, to make it unduly high, in view of the step-up action of the transformer, and thus difficulties due to severe loss of anode volts at V1 should not arise. If V1 is a triode, a value for R of about two or three times the specified valve impedance will meet the average case.

As regards the coupling condenser there will be no risk of grid blocking effects so the way is clear to use a large capacity. If so desired, however, it is possible, by a careful choice of capacity for the coupling condenser, to exert some control upon the audio-frequency response characteristic of the stage. By making the capacity of such a value that it resonates with the primary inductance near the lower end of the frequency range, it is possible to lift up an otherwise drooping bass response. There will be no irritating resonant peak in normal

circumstances, the damping of R will see to that. Makers of transformers have their own ideas as to the best feed arrangements for their particular products, and the amateur designer will be well advised to note and to follow makers' instructions. A fairly wide range of values are used for coupling condensers in different cases, and

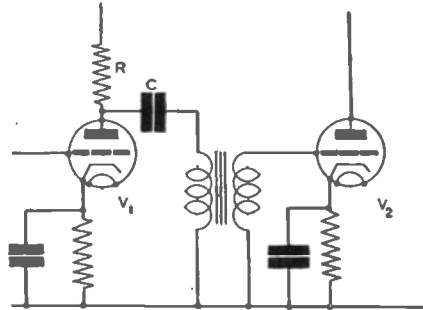


Fig. 24.—Shunt or parallel-fed transformer coupling.

anything from 0.1 mfd. to 1 mfd. may be suitable.

High Permeability Cores

The progress of transformer design has brought us the high permeability alloy cores, and the use of high permeability core material has enabled reduction of wire turns and of core size to be made. It is important to know that the high permeability cores are more easily saturated than ordinary transformer cores, although this does not mean that there are no high permeability transformers which can be used with direct primary connection into a valve anode circuit. Certain transformers are specified as being suitable either for direct or for shunt feed connections, but if direct connections are to be used it is extremely important to ascertain the maximum permissible value of primary D.C., and to take care that this is not exceeded. Incidentally,

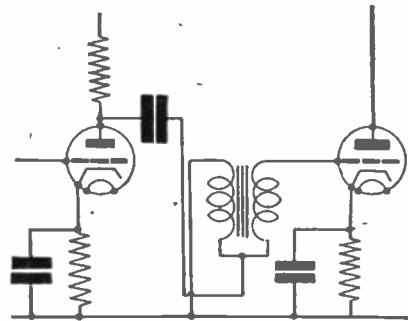


Fig. 25.—Auto-transformer coupling.

since the effective primary inductance will fall with decrease of permeability it is always wise (with direct transformer connections) to make sure that with the primary carrying the anode current of the valve the effective inductance will not be less than the minimum value to be tolerated in the design.

Certain high permeability transformers are definitely intended for shunt feed operation only, and some of these are of remarkably small dimensions. The amateur should not allow himself to be prejudiced against these transformers just because they are midgets and may perhaps appear to be too small to be useful. Actually, the use of a high permeability core gives the

transformer manufacturer the opportunity of making considerable compression of dimensions and still provide us with a useful article.

On no account should a transformer specifically designed for shunt feed be used with direct connections.

The stage gain with shunt fed transformer coupling can be taken as approximately equal to:—

$$\mu \frac{R}{R_a + R} - N$$

where μ = amplification factor of valve.

R_a = valve impedance.

R = anode coupling resistance.

N = transformer ratio.

The above does not take into account the fact that the anode load is actually made up of R in parallel with the joint impedance of the transformer primary and the coupling condenser in series, but it is a simple formula, useful when making rough estimate of gain.

A very commonly used arrangement is that of the H.F. battery-operated pentode grid detector coupled by a shunt fed transformer to the output valve.

A coupling resistance of 50,000 ohms is normally satisfactory. This can be looked upon as a resistance of comparatively moderate value, and the fact that it is not necessary to use a very high value is particularly welcome in view of the precious nature of anode volts with the battery-operated detector.

The Anode-bend Detector

Not much is heard of the anode-bend detector at the present time for the reason that the greater sensitivity of the grid detector on the one hand and the freedom from distortion and overloading of the diode detector on the other hand has made the latter two the popular detectors of today.

The anode-bend detector has one point in its favour and that is that it imposes upon the preceding tuned circuit a damping load which is comparatively small in value. A grid load resistance is not required and the valve is biased back to an operating point on the lower bend of the anode current—grid volts characteristic. The detection action arises by virtue of the asymmetry of the characteristic about this operating point.

The biasing back of the valve necessarily makes the working value of valve impedance much higher than the value appropriate to amplifying conditions and, as a consequence, resistance-capacity coupling to the next valve is generally the most suitable form of coupling to use.

One big disadvantage of the anode-bend detector, although it must be observed that the grid detector gives the same trouble in a different way, is represented by the fact that it overloads easily. The grid voltage swings, during reception, are centred on the negative bias voltage, and as soon as the grid alternating component of voltage has a peak value equal to the bias voltage, pulses of grid current start. Grid current introduces bad distortion and limits the output, so the maximum permissible input signal voltage must be kept short of the value that causes grid current to be set up. For the sake of sensitivity it is out of the question to use a valve that requires a big negative bias at a reasonable anode voltage, but it will pay to use as much H.T. voltage as conveniently possible, as will be understood when it is remembered that the greater the anode voltage the greater will be the negative bias which is required.

(To be continued)

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New GEC Sets

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New GEC Sets



On Your Wavelength



By Thermion

Those Free Components

I PUBLISHED the details of a generous offer by one of my readers who had some wireless components to dispose of. I received a large number of applications, and I have forwarded those on to the donor who by this time has disposed of them to what he considers to be the most deserving case. I mention this to indicate that the offer is now closed and I cannot entertain further applications.

Offers of Back Issues

VERY often a reader who for reasons of space has to dispose of his back issues asks me to publish a paragraph indicating that he would be glad to dispose of them for a reasonable sum. I am unable to do this, for such readers are likely to be put to such considerable expense if a demand for one issue exceeds the supply. The reader would be compelled to return the money. If you have issues for sale they must be advertised in the Miscellaneous columns. If you have issues to dispose of free, such parcels should be sent carriage forward, otherwise dozens of readers will send remittances for carriage which will have to be returned.

Important Dates

DO you know the date on which Marconi was born, or when the first patent was granted for wireless telegraphy, or when the first signal was transmitted across the Atlantic, or when wireless was first used for life saving at sea? There are a lot of important dates in wireless which you should note in your diary, and I give a list of them herewith. As I have been to considerable trouble to dig out these dates, they are worth setting on record, and so that I may make the list more complete if there are any

which occur to you, I shall be glad if you will drop me a card.

- January 1st, 1894, Professor Hertz died.
- January 20th, 1904, First Press message across the Atlantic.
- January 31st, 1926, Rugby Telegraph Station opened.
- February 2nd, 1896, Marconi came to England.
- February 11th, 1847, Thomas Alva Edison born.
- February 14th, 1922, Writtle (2MT) Transmitter opened.
- February 19th, 1745, Alessandro Volta born.
- February 22nd, 1857, Professor H. R. Hertz born.
- March 3rd, 1899, First use of wireless in life saving at sea.
- March 3rd, 1847, Dr. Alexander Graham Bell born.
- March 5th, 1827, Alessandro Volta died.
- March 9th, 1930, First dual transmission from Brookmans Park.
- March 16th, 1787, Georg Simon Ohm born.
- March 20th, 1727, Sir Isaac Newton died.
- March 30th, 1930, B.B.C. commence television broadcast.
- April 27th, 1791, Samuel F. B. Morse born.
- May 30th, 1927, Baird Television by wire between London and Glasgow.
- June 2nd, 1896, Marconi's first British Patent granted, No. 12039.
- June 12th, 1851, Sir Oliver Lodge born.
- July 20th, 1937, Marchese Marconi G.C.V.O., died.
- August 1st, 1922, Dr. A. Graham Bell died.
- September 9th, 1737, Luigi Galvani born.
- September 22nd, 1918, First messages transmitted by wireless to Australia.
- September 16th, 1929, First Regional Station, Brookmans Park, opened.
- September 30th, 1922, First Radio Exhibition at Horticultural Hall.

October 18th, 1931, T. A. Edison died.

November 16th, 1904, First Fleming Valve Patent granted.

November 25th, 1642, Sir Isaac Newton born.

December 12th, 1901, Marconi succeeded in transmitting and receiving signals across the Atlantic Ocean from Poldhu, Cornwall, to St. John's, Newfoundland.

December 15th, 1922, British Broadcasting Company, Ltd., registered.

November 14th, 1922, London (2LO) First British Broadcasting Station commenced.

I observe that many of the wireless diaries do not include these important dates, although I understand that one to be produced this year will do so.

Component Shortage

ALTHOUGH matters are improving, I am still receiving complaints from readers who find difficulty in obtaining components. They seem to think that I can wave a magic wand, for quite a number of them are expecting me to do their shopping for them. A number of others dash off a letter written in vitriol, and when I come to investigate the matter I find that their complaints are not justified. The facts are usually on the side of the manufacturers in those cases of complaint regarding delivery or overcharging for repairs. You will remember that in a recent case a reader complained that he had been charged heavily for the repair of an earpiece. When I investigated the matter with the makers I found that two earpieces had been repaired. Also, that the invoice shown to me by the makers differed by 1s. from the amount which the reader said he had been charged. It was less by 1s. Before writing letters of complaint to me, don't allow your annoyance to colour your statements. Where I find them inaccurate I can do nothing further.

Televising the Cenotaph Ceremony

I AM informed that the Home Secretary has given permission for the televising of the Cenotaph service on Armistice Day. It is hoped

to begin transmission at 10.30 to enable viewers to see the waiting crowds and to watch the assembly of troops and the arrival of members of the Cabinet and His Majesty the King. Three cameras will be used, two of which will be mounted at first-floor level in Richmond Terrace to give scenes near the Cenotaph, and it is probable that telephoto lenses will be used. The third camera will give comprehensive views of Whitehall and, if lighting permits, a distant view of Big Ben.

Experiments in Science

THE cycle bell of an ice-cream vendor which seemed to be ringing itself attracted the attention of Professor Mary Waller, of the London School of Medicine for Women. She investigated on the spot and discovered that the "trick" was due to the action of the solid carbon dioxide used as a freezing mixture. Experiments with solid carbon dioxide are to be televised in the first of a series of "Experimental Science" transmissions in the afternoon programme on October 7th. Professor Waller will show how this substance can be used to test the genuineness of diamonds and pearls, which give ringing tones of varying quality when touched by solid carbon dioxide. Perhaps the most spectacular experiment in front of the television camera will be the making of patterns in silver sand. Beautiful shapes are made simply by waving the solid carbon dioxide over the sand.

"Padded Cells"

IUNDERSTAND that the "padded cells" in the Philco Radio factory at Perivale might spin tales as romantic as any ever created by Aladdin and his magic lamp. There are four of these "silent" rooms, and each has its own use in the tests performed on wireless receiver components and finished sets.

The incoming inspection room is one "padded cell" in which all radiogram motors are tested for quietness of operation. In the "Sales Acceptance" room finished sets are tested from every angle to be sure there is nothing the matter with them which will prevent satisfaction for the owner after it is sold. Every speaker is tested in another "padded cell" and the fourth "silence chamber" is located in the research laboratories, where new designs are tested for acoustical properties and general performance. The silence achieved in the speaker test-room is typical of the others. It is



Microphone Howl

READERS using a microphone for the first time generally experience instability in the form of a howl. This can be due to the use of an unsuitable amplifier—lack of decoupling in the diode circuits can cause instability. When the decoupling is inadequate the howl is set up on radio as well as on gram., however, and therefore if the howl occurs only on gram. it will be due to the close proximity of the microphone and loudspeaker. The microphone is actuated by the speaker's voice as well as by the output from the loudspeaker. The cure for this is to screen the microphone from the loudspeaker.

Pick-up Hum

ANOTHER trouble commonly experienced is excessive hum when a pick-up is connected to a receiver of the mains-operated type. In most cases this is due to the pick-up leads being unshielded, and if the leads are passed through a screening cover the hum will be eliminated. The metal screening should, of course, be connected to the chassis. Hum can also be due to interaction between the gram. motor windings and the pick-up winding, but this can generally be eliminated by earthing the motor casing.

H.T. Supply from 110 Volts

WE often receive inquiries from readers living in country districts or aboard ship concerning a suitable unit for supplying H.T. to their sets from 110 volts D.C. mains. The normal type of D.C. mains unit, such as the one described in the issue of PRACTICAL AND AMATEUR WIRELESS dated 23rd November, 1935, may be used for this purpose, but as the voltage is 110 volts instead of the normal 220-250 volts the main dropping resistance will not be required. The smoothing choke resistance should also be kept as low as possible in order to keep the voltage as high as possible. Optimum results cannot be obtained even from battery type valves with a voltage of 100 volts, but as this voltage is steady it is preferable to a dry battery, as most listeners allow their dry batteries to drop well below 100 volts before renewing them. It is a simple matter to increase the mains voltage to the permissible maximum by the addition of a low voltage dry battery, of course, but if a push-pull output stage is used this should not be found necessary.

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so perfectly silenced that the quietness actually "hurts" the ears.

The insulation and construction of this, and other "padded cells," prevent reflection of any sound, whether of 30 or 20,000 oscillations a second, although speakers usually are geared and tested for top range of something like only 10,000 vibrations a second. Many persons are unable to hear sounds in such high frequencies as 20,000 to the second. While that is the limit, Philco Radio has a sound pressure measuring instrument capable of measuring frequencies considerably higher than can be detected by the most sensitive human ear. In fact, the apparatus can detect sounds audible only to insects.

The New Transmitter at Stagshaw

THE afternoon of October 19th brings an event of major importance in the history of broadcasting in the North of England; a day specially to be noted and remembered by listeners in the North-East. As mentioned elsewhere in this issue, the new station is to be opened by the Duchess of Northumberland.

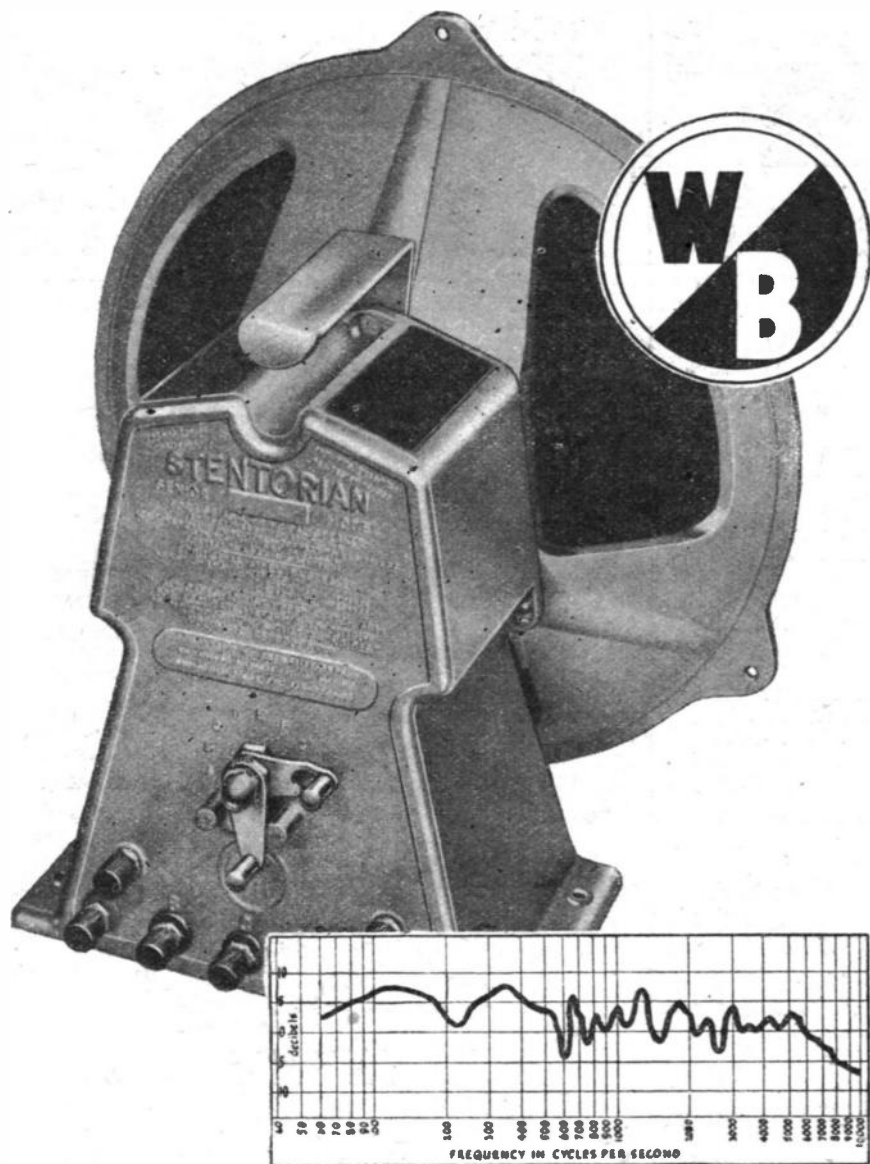
This giant transmitter, whose one huge mast (towering skywards for 480 feet on a hill which stands 700 feet above the sea) is itself the aerial, is to improve listening conditions in Northumberland, Durham, Cumberland, Westmorland and the North of Yorkshire. The station, situated in a lonely but lovely district, which many Northumbrians know as Bewclay, is almost on the line of Hadrian's Wall, and the grand views which it commands include a fine prospect to the Cheviots in the North, and an outlook over the Tyne valley to the South.

Hawaii Listens-in to Insects

WITH the proper sensitivity in microphone construction, the Hawaiians find it possible to detect the presence of insects in growing crops.

Sound Systems, Inc., of Cleveland, recently received an order from Honolulu for sound equipment to serve this purpose. The specifications called for a contact microphone and amplification of at least 100db. The unit is portable and battery operated. It includes a small high gain amplifier operated by dry cell batteries. It is built in a compact and durable carrying case, and among the accessories are a contact microphone and the highly sensitive crystal headphones.

With the low signal input produced by insects, it is not advisable to use a loudspeaker. With the highly sensitive crystal contact microphone, crystal headphones and the high gain amplifiers, the faintest sounds are audible.



PRACTICAL WIRELESS (25/9/37) SAYS:—

“Better on the score of sensitivity
better tone-characteristic smoother
thousands will be highly pleased with the
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A handwritten signature in cursive script that reads "F. J. Camm".

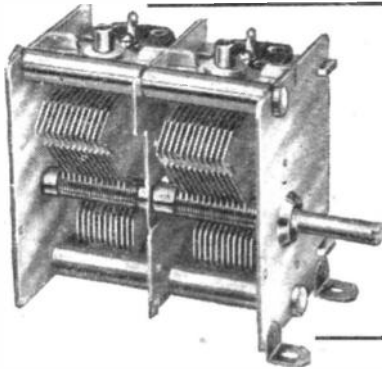
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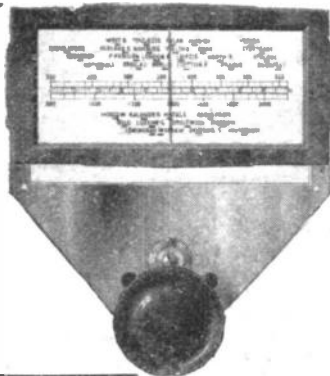
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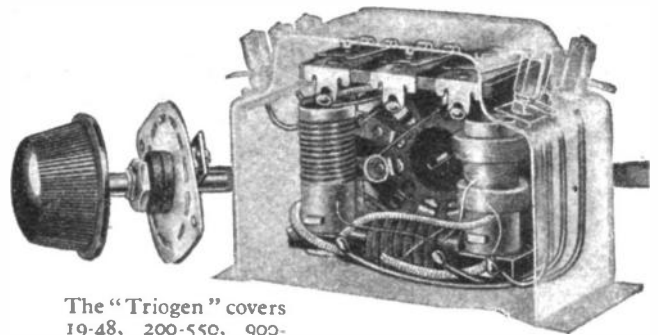
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Practical Television

October 9th 1937. Vol. 3. No. 69.

TELEVISION CONSTRUCTOR AIDS

Details of Some of the Main Television Constructor Accessories which may Now be Obtained.
By W. J. DELANEY.

Now that more amateurs are becoming interested in the television transmissions it is worth while discussing the various accessories which are available for experimental purposes. The modern television receiver may be divided up into four separate sections—the Mains unit, the Time-base Generator, and the two Radio units, one for Sound and the other for Vision. Into each of these sections components and valves such as are normally used for broadcast apparatus may be incorporated, but there are many special parts and valves which must be utilised. The radio section for sound may be dis-

ifferences existing between them. When mounting the sockets on the chassis adequate spacing must be allowed between the sockets and the chassis if this is of the metal pattern, although with a metal-surfaced wooden chassis this difficulty will not arise.

Mains Unit

On the mains unit special transformers will have to be employed for the tube supply voltages and there are several of these now obtainable from B.T.H., Sound Sales, Haynes Radio, Heayberd, and other firms. Although ordinary valveholders

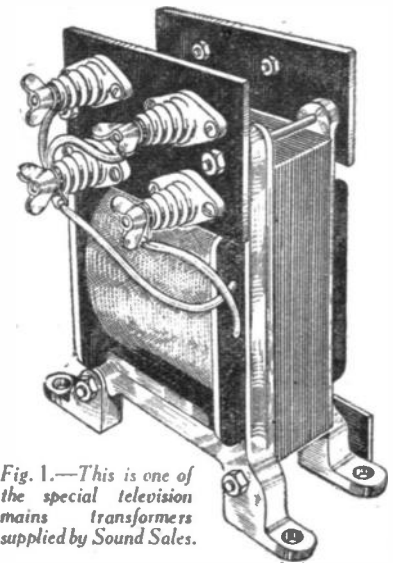


Fig. 1.—This is one of the special television mains transformers supplied by Sound Sales.

and are preferred by some experimenters. There are several advantages in the use of this type of rectifier for the very high voltage-low current supply which is required.

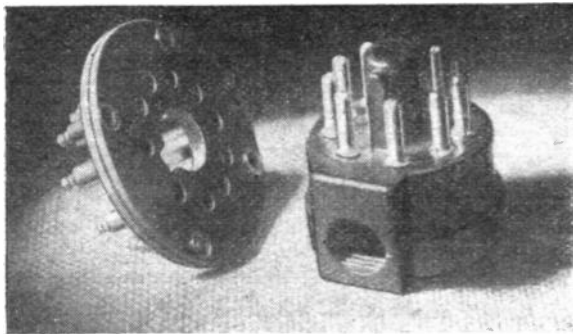
Special Valves

For the vision-radio chassis certain special valves are now on the market, amongst these being special diodes for the second-detector stage. Special I.F. transformers to provide the requisite band-width, or special chokes where choke-coupling is employed, are also now available from such firms as B.T.S., Eddystone, Bulgin, etc. Very elaborate screening is needed in this particular section of the receiver, and it is almost impossible to avoid the use of metal for the construction of the screens and chassis. Remember that aluminium is the best material for these, not only on account of the ease of working the soft metal, but on account of its low H.F. resistance. Standard resistors and condensers may be employed in the normal circuit wiring, but a special output transformer may be required, according to the type of circuit which is adopted.

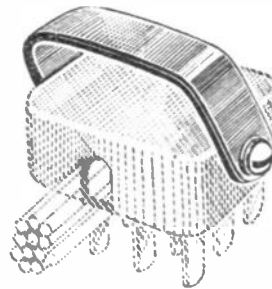
Fixed Condensers

A special point which should receive attention is in the selection of the fixed

(Continued overleaf)



Figs. 2 and 3.—On the left is the Belling-Lee 10-point socket and plug, which is ideal for television purposes, and on the right is the 12-point Bulgin plug in its new form, with a leather strap for easy removal.



missed, as this follows normal ultra-short-wave practice, whilst the time-base generator will also employ only standard components and valves except where a special gas-discharge tube is employed. This may be considered, however, as a valve and presents nothing out of the ordinary in its connection or mounting. The first consideration among the unusual or special parts required for the complete apparatus is the connection between the various chassis. The mains unit may be built to develop all of the voltages required in every section, and thus multi-cables will have to be employed for inter-connection. Apart from the fact that some-interaction may be experienced if all of these cables are run in a single "bunch," there will also be difficulty in providing adequate insulation. The supplies for the cathode-ray tube will, therefore, be kept separate, and for the various leads high-quality flex or rubber-covered V.I.R. cables should be used.

Connectors

Multi-contact connectors will be needed on each chassis, and for these the Bulgin or the Belling-Lee components illustrated on this page may be used. Large diameter insulated sleeving may be slipped over certain leads to provide increased insulation, or rubber tubing such as is used in player pianos may be employed. Care will have to be taken to keep the various leads separated according to the voltage

may be used for the rectifiers, if the H.T. is obtained from valves for the tube, special top-cap connectors of the insulated cowl type should be employed to avoid the risk of shocks. Special metal rectifiers are, however, now available for this purpose

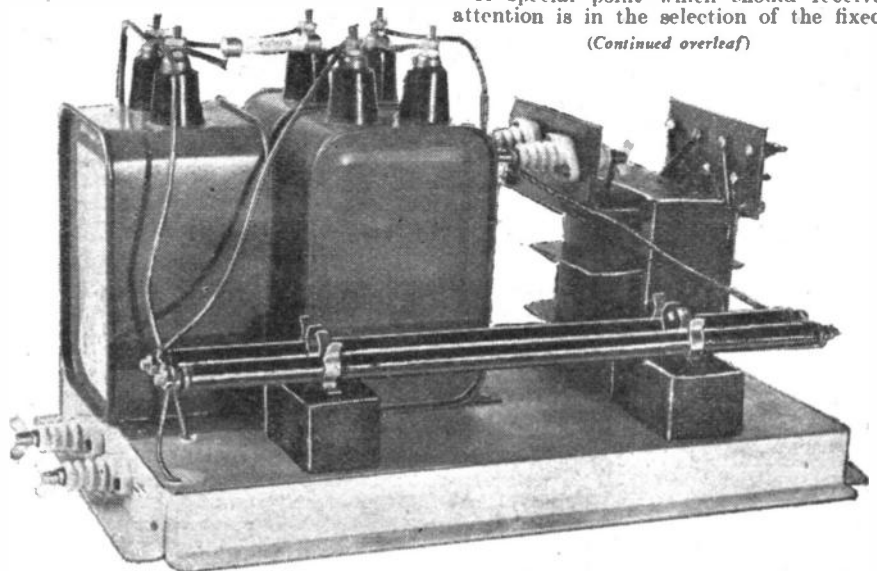


Fig. 4.—This complete television power pack shows the special high-voltage metal rectifier, and special high-insulation fixed condensers.

PRACTICAL TELEVISION

(Continued from previous page)

condensers. On the radio units the highest insulation from an H.F. point of view is needed and where possible mica dielectric should be adopted. For the high-voltage circuits, the special oil or petroleum jelly condensers should be used and the peak voltages must be carefully calculated in

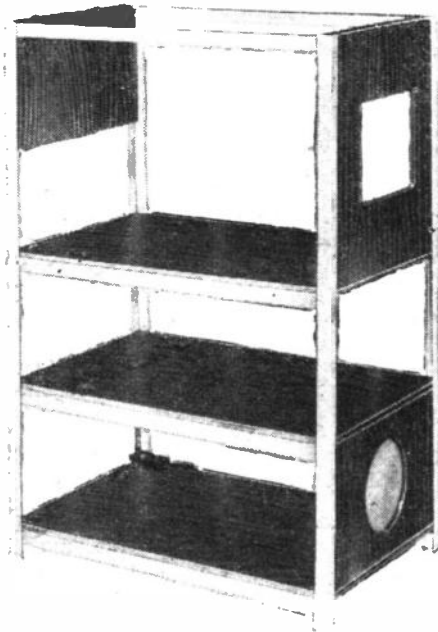


Fig. 5.—The complete television equipment may be housed in this "rack" type cabinet as supplied by Messrs. Peto-Scott.

order to avoid damage to these. The problem of insulation is probably one of the most important items met with in the general constructional design and thus no risks should be taken in the wiring, or in the mounting of the individual parts. Thick wire should be employed for connection, and insulated sleeving should be used over every lead, with additional sleeving of larger diameter (or the rubber tubing previously mentioned) where leads pass through holes in a metal chassis. In certain cases it may even be found necessary to drill a very large hole—say, $\frac{1}{2}$ in.—in the chassis so that the lead passing through it may be given sufficient spacing to avoid arcing to earth.

Ventilation

Owing to the large number of valves employed in the complete equipment a considerable amount of heat may be expected, and thus each chassis should be well spaced from its neighbour and adequate air circulation should be provided. The mains unit should be kept clear, for instance, of the underside of a radio unit so that no damage can arise to insulation on leads or components.

Many experimenters may prefer to obtain ready assembled units for certain parts of a television receiver, and in this connection it should be remembered that Messrs. Peto-Scott can now supply a complete television receiver in kit form in a series of separate units. Where any doubt exists as to a suitable layout or suitable components one of these units may be obtained, thus leaving the experimenter a smaller field in which to work and avoiding considerable experimental work. These kits are available as follows:

Sound and Vision Receiver Unit, £6 17s. 6d. (less valves).

Time-base Generator, £7 15s. (less valves and cathode-ray tube). This unit utilises a gas-discharge triode and a pair of paraphase amplifiers for each set of deflector plates, and is of the electrostatic type.

Receiver Power Pack, £3 10s. (less valve). This delivers 250 volts at 120 mA, 4 volts at 8 amps, and 4 volts at 4 amps.

Time-base Power Pack, £3 15s. This is also less valve and it delivers 1,000 volts at 20 mA, 4 volts at 6 amps, and 250 volts at 5 mA.

Tube Exciter Unit, £4 17s. 6d. This is for the high tension and heater supplies



Fig. 6.—The high-voltage rectifying valves should be fitted with insulated connectors of this type to avoid risks.

for the cathode-ray tube and provides an output of 3,000 volts H.T. and 2 volts 1.5 amps for the heaters. Metal rectification is employed.

In addition, a large metal framework is obtainable for £1 7s. 6d., which enables each unit to be mounted rigidly, and which will fit into a large radiogram type of cabinet. It is complete with shelves, tube mask and panel, speaker panel, control panel, and foot blocks with domed castors. It may thus be used, if desired, without any external cabinet.

The Telephone Linked with Television

AS far back as 1929 when the first television exhibition was staged in Berlin in conjunction with the annual radio exhibition, the German Post Office demonstrated two-way vision and sound between two booths over a short length of line. A large spiral apertured disc was used at each end, the scanning section for transmitting operating on the spot-light principle and being located at the top section of the disc with simple photo-electric cells picking up the reflected light to generate the television signals. The bottom section of the disc acted as reproducer, giving a small and rather indistinct low-definition picture with the aid of a flat plate neon lamp. While admitting quite freely that the results obtained were crude, it showed a special form of development as far as the telephone associated with television is concerned, and this German appreciation of the ultimate domestic, commercial and political future for such a scheme has never been allowed to lapse. Nearly three years later two-way vision and telephony was demonstrated to a higher degree of perfection in Paris between a studio in the Galleries Lafayette and the offices of the French newspaper *Le Matin*. The pictures seen by the persons talking were much clearer and brighter, the head and shoulders appearing as a back projected picture on a

translucent screen 10in. by 5in. A crater type neon lamp functioned as the source of light modulated by the television signals with a mirror drum as the scanner. The transmitter still worked on the light-spot principle, but for the first time infra red rays were used to scan the sitter's face, and in consequence not the slightest trace of discomfort was experienced by those using the telephone in this way. The equipment for this French installation was designed and built by the Baird Company.

Later Developments

LITTLE more was heard until March, 1936, when the Germans brought into service a well-designed installation to operate between Berlin and Leipzig. The standard of definition employed was 180 lines per picture and 25 pictures per second, and this service has functioned continuously and become quite a profitable "side issue" of the German Post Office activities. Still not content with this, the co-axial cable has been extended to Nuremberg, a distance of approximately 300 miles, and very shortly an additional section between Nuremberg and Munich will be opened for public use. Apart from regular television telephone calls, the direct relay of Nazi Party rallies will be undertaken over the public lines, and these later pictures will be shown in

the public viewing rooms in some of the German cities. At the moment the repeater stations associated with the co-axial cable are positioned at approximately 21-mile intervals. This limits the signal frequency fed over the line to a figure capable of reproducing with the minimum of distortion the 180 line picture standard.

Steps are now being taken, however, to double the number of repeater stations and so enable the cable to pass the picture frequencies involved in Germany's new television standard of 441 lines, interlaced, 50 frames per second. The 180 line scanner for transmitting the head and shoulders of the person telephoning is a highly efficient mechanical one employing a lens drum in lieu of the more simple apertured disc. To increase the peripheral spacing of the highly corrected lenses in the drum a double spiral is employed with a cam operated shutter and in this way a complete picture frame is scanned in two revolutions. This was the arrangement used in the light-spot scanner installed at Alexandra Palace prior to the decision to employ electron cameras only. The picture of the person telephoning from the other end of the line is reproduced on a cathode-ray tube receiver so positioned that it can be watched in comfort by the person making the call. With all the modern developments of television which are now taking place so rapidly there is surely ample scope for the British Post Office to give careful consideration to a television-telephone in this country. It would bring Britain abreast of Germany in this particular sphere, while maintaining the leadership now enjoyed by this country in the realm of a public broadcast television service.

TelevIEWS

Improved Make-up Technique

READERS who saw pictures of the artists taking part in television transmissions twelve to fifteen months ago were amazed at the amount of make-up required. Blue was a very predominant colour, red lip stick was barred, while the extent of the powder and paint gave each individual a very grotesque

progress made in twelve months is a happy augury for the future.

A Range Extension

THE extension of the B.B.C. television service area well beyond the original predicted range is now an established fact, but many have conjectured as to the results that could be obtained if the Alexandra Palace Station power was increased and the aerial raised higher than at present. Answers to these questions will no doubt be forthcoming when the French station at the

Eiffel Tower is in full swing. At the moment it is working at half its 30 kilowatt rating, while the aerial is about 60 per cent. higher than the mast at Alexandra Palace. It is not beyond the realm of possibility that the Paris station may be seen and heard on the South Coast of England. If so, viewers in that region will have an alternative programme, while if the French adopt the British picture standard the B.B.C. could relay by cable or directional micro-wave links of any of these programmes so that they could be re-broadcast from the London station. A directional aerial system with beamed reflectors may be essential at first, and experiments for reception are already in hand.



Miss Beryl Orde, the famous broadcasting star, amused while watching a television performance on the General Electric Company's table vision set, which can be plugged into any existing radio set on A.C. mains. Priced at 35 gns. it will bring television within the means of tens of thousands of listeners within 30 miles radius of Alexandra Palace and from other stations when they are established.

appearance. This was necessary, however, owing to the colour responses of the photoelectric surfaces then employed either in the photocells or camera electrodes, coupled with the relatively low degree of sensitivity. The maximum degree of contrast was essential if the resultant television picture reproduced on the cathode-ray tube receiver was to embody sufficient depth of light and shade to give pictorial value. Then again, studio lighting was very intense, with the result that artists felt very uncomfortable when endeavouring to lose any degree of nervousness on the occasion of initial broadcasts. Technical improvements have now removed this "terror," however, and the conditions under which studio televising is carried out have changed considerably. Vivid colouring is no longer necessary, only delicate shading. Men are given a healthy tan with a liberal sprinkling of powder to reduce any beard effects. A careful study of lighting both from the standpoint of candle power and distribution, coupled with improvements in the design of the cameras, particularly in connection with mosaic sensitivity, has been instrumental in bringing about these welcome changes. In many cases people have been televised without any make-up on at all, a step which becomes essential when well-known public personalities are persuaded to appear before the television camera either inside the studio or in the open air. Much remains to be done, however, but the

Cinema Television

DURING the last few weeks much has been said concerning the installation of large-size television screens in cinemas. This is a certain indication that big pictures, comparable in detail and brightness to that seen in any modern cinema, are making satisfactory progress. At present two widely different schemes of development are being made. One is electro optical, and the other is mechanical optical, and the absence of a side by side demonstration prevents any direct comparison between the results so far achieved. Another scheme about which little has been said of late is the intermediate-film receiver. For some reasons this appears to be a really sound idea, for it merely means the installation of a piece of equipment next to the standard film projector. This receiver would develop, wash, fix and dry standard 35 mm. film on which television pictures and the accompanying sound had been recorded, so that it could be fed straight into the projector head. The fact that there is a delay of some seconds between the televised event taking place and its subsequent portrayal on the cinema screen is negligible, and all the problems of picture brilliance and size would be solved at once. The main problem as far as cinema television is concerned at the moment does not appear to be a technical one, but is associated with the source of transmitted signals.



An experiment unique in the history of television and of football was made at the Arsenal ground recently when one half of the team watched by television the other members undertaking their routine training. From the mobile television unit in the Stadium, the pictures were transmitted to the Alexandra Palace, and from there were re-radiated on the normal television wavelength and picked up on a Marconiophone television receiver in the Directors' room in the East Stand.

Our Radiolympia Competition Result

What are the Most Important Features of the Modern Receiver?

In the Competition which was published in our issue dated August 28th last only 15 readers successfully forecast the order of the popular features of modern receivers as shown by the entries on the coupons submitted. Fourteen readers had one mistake each, and thus we have decided to add four more speakers to the 25 originally intended as prizes, and the following 29 readers will therefore each receive one of the latest W.B. Stentorian speakers in due course.

The following readers gave all-correct results:

F. Chilton, 37, Ewart Street, Saltney Ferry, Chester.
H. Cramp, 63, Arragon Gardens, Streatham, S.W.16.
G. H. Gresswell, 35, Silver Street, Bradford, Yorks.
A. M. Hawkins, 11, Claverdale Road, Brixton, S.W.2.
S. Holden, 12, Lulworth Avenue, Marton, Blackpool.
A. S. Hughes, 3, Pelham Square, Brighton, 1, Sussex.
C. Laphorn, 3, Brampton Road, Harringay, N.15.
Basil New, 12, Eastholm, Golders Green, N.W.11.
F. Ogden, 22a, Coronation Street, South Reddish, Stockport.
G. Renton, 3, Dunlop Terrace, Penicuik, Midlothian, Scotland.



G. Randall, Royal Horse Guards, Windsor, Berks.
H. A. Smith, Cambridge House, Stanley, Perthshire.
R. A. Turner, 21, Stewardstone Road, South Chingford, Essex.
J. Wann, Balmullo Leuchars, Fife, Scotland.
V. J. C. White, Primrose Cottage, Llangrove, Herefordshire.

The following readers had one mistake each:

O. Adams, 34, Dollis Hill Avenue, Cricklewood, N.W.2.
R. Boyd, 77, Knutsford Drive, Cliftonville, Belfast.
C. S. Brown, 31, Whitestile Road, Brentford, Middx.
L. Burman, 35, Green Lane, Lofthouse, Yorks.
R. Chamberlain, 2, Cardigan Street, Canton, Cardiff.
F. Helm, 3, Swan Road, Harrogate.
J. F. Hitchcock, "Brierley," Farm Close, Fetcham, Leatherhead, Surrey.
R. F. Jones, 26, Pagefield Road, Liverpool, 15.
J. Little, 26, Wilson Avenue, Kilmarnock, Scotland.
C. Raines, "Faith Haven," Newton Road, Tankerton, Whitstable, Kent.
V. Neil Taylor, 13, Spring Gardens Terrace, Cardiff, Glam.
W. R. Taylor, "Glenlivet," Spot Lane, Ashford Road, nr. Maidstone.
L. J. Tearney, 23, Oakfield Lane, Dartford, Kent.
A. S. Woodley, 18, Duke Street, High Wycombe, Bucks.

NATIONAL (261.1 m. and 1,500 m.)

Wednesday, Oct. 6.—*Princess Flavia*, musical comedy programme.

Thursday, Oct. 7.—*Death at Newtown-stewart*, a reconstruction of a famous Ulster crime in the 'Seventies, by Denis Johnston.

Friday, Oct. 8.—*Contemporary Music Concert*.

Saturday, October 9.—*Music Hall programme*.

REGIONAL (342.1 m.)

Wednesday, Oct. 6.—*Instrumental programme*.

Thursday, Oct. 7.—*Princess Flavia*, musical comedy programme.

Friday, Oct. 8.—*A Farewell Flight over Blackpool*: Organ recital from the Tower Ballroom; excerpts from concert parties from Feldman's Theatre and the South Pier; Dance music from the Tower Ballroom and a variety act from the Palace Theatre and Pleasure Beach.

Saturday, Oct. 9.—*Death at Newtown-stewart*, a reconstruction of a famous Ulster crime in the 'Seventies, by Denis Johnston.

MIDLAND (296.2 m.)

Wednesday, Oct. 6.—*The Brass Band Movement in the Midlands—1, The*

Important Broadcasts of the Week

Leicester Imperial Band, preceded by a short account of the history of the Band.

Thursday, Oct. 7.—*A Symphony Concert from the Town Hall, Birmingham.*

Friday, Oct. 8.—*Mary Webb, a programme based upon her life and work.*

Saturday, Oct. 9.—*The Musician at the Gramophone: A. Brent-Smith.*

WELSH (373.1 m.)

Wednesday, Oct. 6.—*A Choral and organ recital from St. Asaph Cathedral, St. Asaph.*

Thursday, Oct. 7.—*Nothing is New—1, Music.*

Friday, Oct. 8.—*Blodwen, a dramatic cantata by Joseph Parry, from Tabernacle Chapel, Cardiff.*

Saturday, Oct. 9.—*Labour Management and its Problems, a talk.*

WEST OF ENGLAND (285.7 m.)

Wednesday, Oct. 6.—*Variety programme, from the Empire Theatre, Swindon.*

Thursday, Oct. 7.—*Song recital.*

Friday, Oct. 8.—*Concert in Camera—first rehearsal for a performance to be given in the year 1897.*

Saturday, Oct. 9.—*Orchestral programme from the Pump Room, Bath.*

NORTHERN (449.1 m.)

Wednesday, Oct. 6.—*Orchestral programme.*

Thursday, Oct. 7.—*Variety programme from the Alexandra Theatre, Hull.*

Friday, Oct. 8.—*Farewell Flight over Blackpool*: Organ recital from the Tower Ballroom; excerpts from concert parties from Feldman's Theatre and the South Pier; dance music from the Tower Ballroom and a variety act from the Palace Theatre and Pleasure Beach.

Saturday, Oct. 9.—*Running commentary on the second half of the Rugby League match, Salford v. St. Helens Recs., from the Salford Football Ground.*

SCOTTISH (391.1 m.)

Wednesday, Oct. 6.—*Scottish Dance Music.*

Thursday, Oct. 7.—*Dance Music programme.*

Friday, Oct. 8.—*Meal and Ale, a By-Ordinar' Nicht at Braeside, a play.*

Saturday, Oct. 9.—*Recital of Scots Songs.*

NORTHERN IRELAND (307.1 m.)

Wednesday, Oct. 6.—*Dance music.*

Thursday, Oct. 7.—*Song recital.*

Friday, Oct. 8.—*Organ recital from the Ritz Cinema, Belfast.*

Saturday, October 9.—*Death at Newtown-stewart, a reconstruction of a famous Ulster crime in the 'Seventies, by Denis Johnston.*

A PAGE OF PRACTICAL HINTS

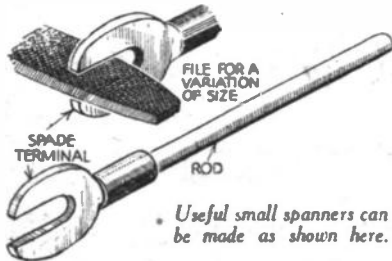
SUBMIT YOUR IDEA

READERS WRINKLES

THE HALF-GUINEA PAGE

Making Small Spanners

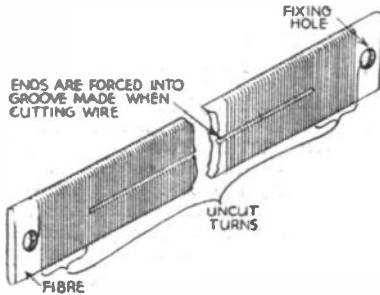
THE constructor is often in need of one or two small spanners, and very useful ones can easily be made as shown in the accompanying sketch. An ordinary spade terminal is taken, and the insulation re-



moved, after which a metal rod of suitable length is fitted tightly into the terminal stem. The opening in the spanner can be widened to the required width by means of a file.—M. TIFON (Middlesbrough).

Home-made Potentiometers and Resistances

EFFICIENT variable potentiometers and resistances of high value can easily be made from the wire-wound, five and four hundred ohm types, which were



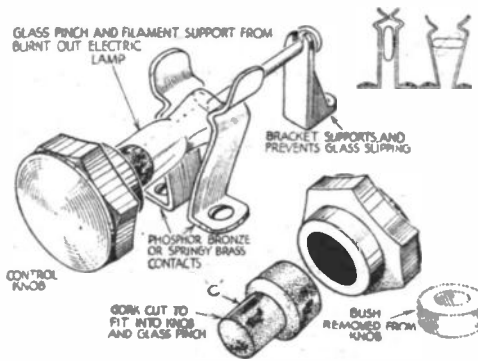
A method of making neat resistances.

much used some years ago. After taking the resistance strip from the circular holder, straighten it out on a flat metal surface. Then, with a not too sharp chisel, cut the turns of wire along the centre, leaving about 1/16 in. uncut at each end. The wire, after cutting, will not loosen, but will hold fast to the groove made in the fibre when cutting the turns. Fix one end of the strip to its holder—groove inside—then, as the strip is bent round, fill the groove with powdered black-lead or graphite. When the other end of the strip is fixed in position, the powder will be forced into the groove to make good contact with the ends of the cut wires. By experimenting with the amount of powder used, various values can be obtained. Also, a "graded track" potentiometer can be made by suitable distribution of the powder along the groove.—ALEC DAVID (Edmonton).

THAT DODGE OF YOURS!
Every Reader of "PRACTICAL AND AMATEUR WIRELESS" must have originated some little dodge which would interest other readers. Why not pass it on to us? We pay £1-10-0 for the best wrinkle submitted, and for every other item published on this page we will pay half-a-guinea. Turn that idea of yours to account by sending it in to us addressed to the Editor, "PRACTICAL AND AMATEUR WIRELESS," George Newnes, Ltd., Tower House, Southampton Street, Strand, W.C.2. Put your name and address on every item. Please note that every notion sent in must be original. Mark envelopes "Radio Wrinkles." DO NOT enclose Queries with your wrinkles.

Low-loss Switching

THE efficient switch, shown in the accompanying sketch, can easily be made with a control knob and a cork, together with the filament support and glass pinch from a burnt-out electric lamp. A few screws, and a brass strip will also be required, and as these parts are usually found in the junk box, the switch can be made in a very short time. By carefully breaking away the glass globe the pinch can be removed quite easily and the rest of the job is just a case of fitting together and screwing the parts into position.—A. CARR (High Wycombe).

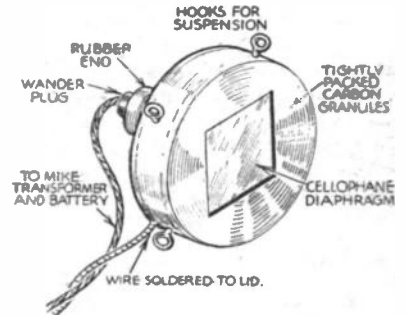


Details of a simple low-loss switch.

A Small Microphone

THE accompanying illustration shows a simple and efficient microphone which I have constructed. It is made from an empty dentifrice tin, a rubber end used for gas tubing, and a cellophane jam cover, together with some carbon granules, and a wander plug. The tin should be thoroughly cleaned and a 1/16 in. hole drilled in the centre of the lid. In the base a hole 1 1/2 in. square can be cut, and this can easily be done with an old wood chisel. Take the rubber end and cut it about 1/2 in. from one end; push this piece of tubing through the 1/16 in. hole in the lid. Damp the cellophane cover

slightly, place it between the lid and base, and allow it to set for an hour or so; the cellophane will by then have stretched tightly, forming an excellent diaphragm. The carbon granules can be poured through the rubber end in the lid, until they are packed tightly against the diaphragm. Insert a wander plug in the rubber end, so

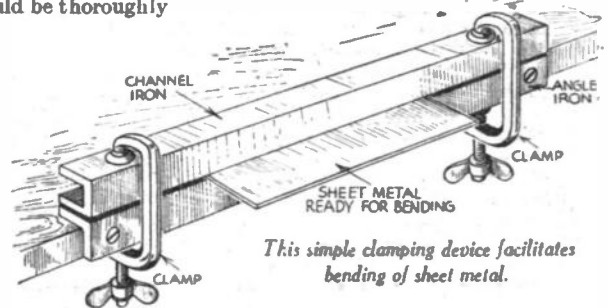


This small microphone can easily be made from odds and ends.

that it touches the carbon granules, and solder a wire to the lid. Take a wire from the wander-plug and connect the two wires, via battery and transformer, in the usual way to the p.u. terminals on the receiver. Lastly, four hooks can be soldered on the lid so that the microphone can be slung on a stand.—W. E. CAUGHEY (Belfast).

A Novel Sheet-metal Bender

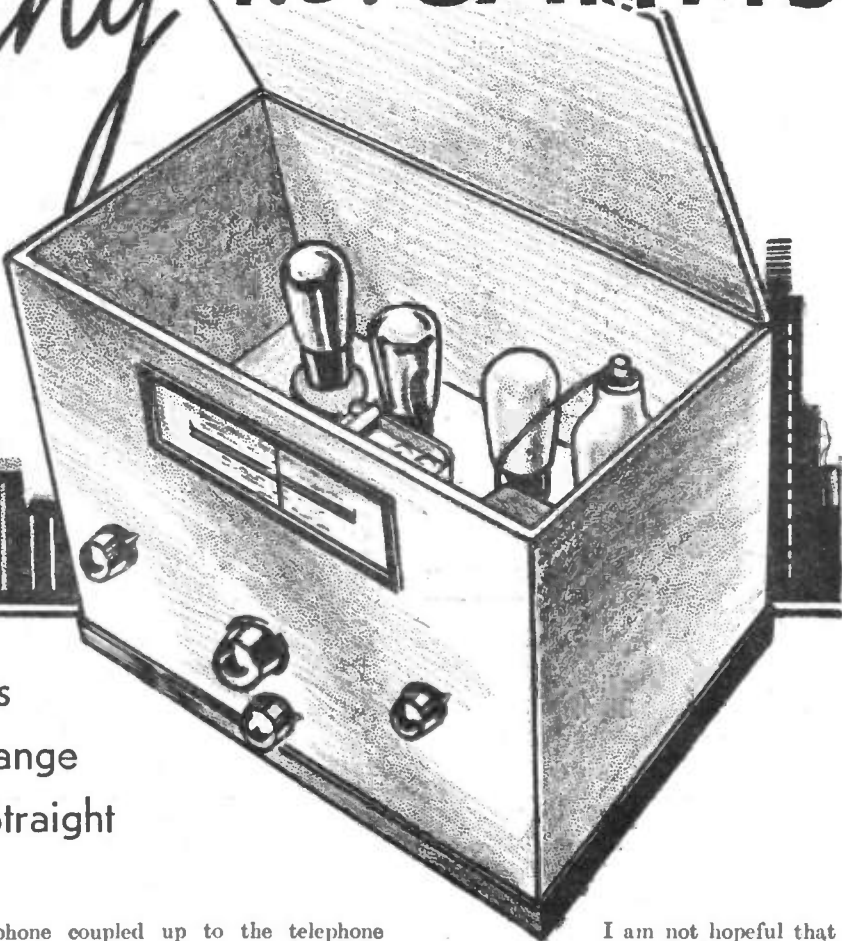
THE accompanying sketches show how a novel sheet metal bender can be contrived. The materials needed are 1 length of 1/2 in. channel iron, 1/2 in. thick; 1 length of 1/2 in. angle iron, 1/2 in. thick, 2 small clamps, 1 1/2 in. inside measurement, and two screws, to hold the angle iron to the bench. The two holes should be drilled near the ends of the angle iron to avoid having to bend the metal sheet over screw heads. Note that the ends of the screws for the clamps should not be pointed. By this means you have a convenient and inexpensive method of completing what might have been a difficult job.—J. S. TAYLOR (Lincoln).



This simple clamping device facilitates bending of sheet metal.



F.J. CAMM'S



Full Constructional Details of the Latest Three - range 4-Valve Battery-operated Straight Receiver

I HAVE been connected with wireless for so many years that I have grown tolerant of those whose job it is to write a few odd notes in the daily papers on wireless, and who sign themselves "The Radio Experts."

There was a time when their outpourings were the cause of a rise in temperature beneath that band of linen which encircles that portion of my anatomy in which are located the larynx, the epiglottis, the uvula, and the odontoid peg. If the readers of daily papers are so critical, and so helpfully critical, as the readers of my journal, those journalists have heard all about their peccadilloes, and I hope that with such multitudes of counsellors, these experts eventually obtain wisdom. Time and experience mellow the outlook, and ultimately—sooner or later—we learn to tolerate fools gladly. A statement I read in the paper the other day, however, both irritated and amused me. It irritated me because no one with a grain of grey matter within their cranium could possibly have thought of anything so fantastic. Experts seem to rush in where designers fear to tread, and I can only presume that the main qualifications of some experts is that they know nothing of the subject upon which they claim to be experts. It amused me because it is just possible that the expert was pulling his readers' legs. His suggestion was that no one should require to listen to more than three stations, and that every listener should be satisfied with a receiver with a dial similar to an automatic

telephone coupled up to the telephone wires. When you wish to tune in one of the three stations you should tune in to No. 1, 2 or 3, as the case may be.

In the same issue of this paper a letter to the Editor was published suggesting that radio would be far more enjoyable, now that all-wave receivers were bringing the voices and the dialects of every race in the world into our homes, if a universal language such as Esperanto were taught and that all programmes were broadcast in Esperanto. These two impossible suggestions, or suggestions impossible of fulfilment, cause me to reflect upon the vast number of requests I receive for a design incorporating some specific feature not to be found in previous designs I have sponsored. I know

:: Single Knob Tuning ::

that every design I publish will not please every one of my readers. I try to please the majority of them. I also know that there will still be requests for a particular circuit not yet published when Gabriel sounds his last rally at the crack of doom. Yes! And I expect that when I am ascending—descending!—to greet St. Peter I shall be confronted with an enormous volume of complaints he has received from readers whose requests have been unsatisfied. Or, maybe, I shall be in the goodly company of those who have built my portable, and who may wish to tune into a transmission from the Styx or the refrains from Paradise.

I am not hopeful that even at that time listeners will be satisfied with one programme!

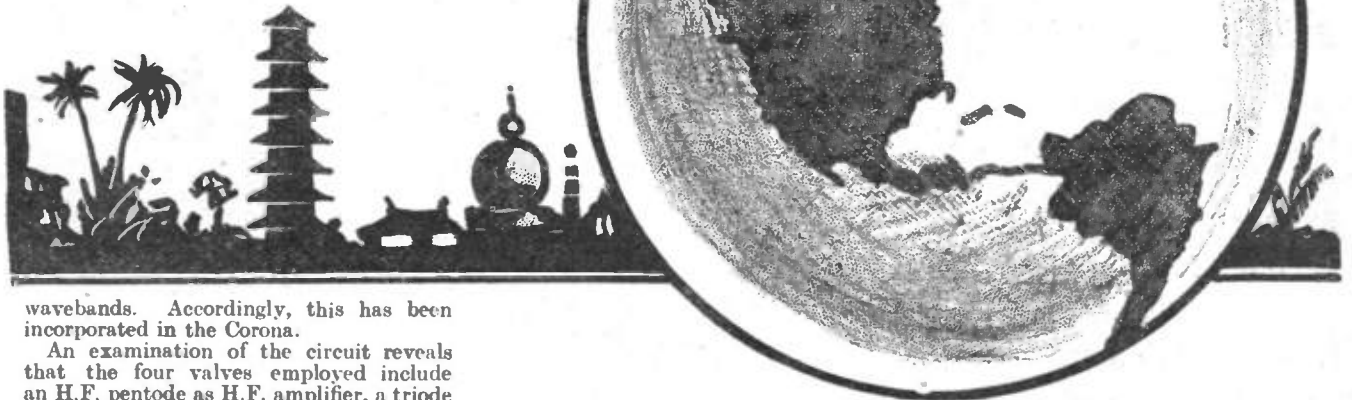
These thoughts are engendered by the fact that when I publish a three-valve circuit I receive many requests for a four-valve design, and when I publish the latter many readers require a three or a six. It is quite right that they should express their wishes, for they are filed and when they reach sufficient volume the design is produced. One such design which has been accumulating a steady demand during the past six months is the receiver which for want of a better name I have termed the Corona All-Wave Four.

Among the Romans a Corona was a crown bestowed for distinguished services,

and it is my hope that you will award it your praise for the excellent service it will render to you. I do not subscribe to the belief that it is more difficult to christen a

set than it is to design one, and sets are given titles more for convenience of reference than to epitomise their design or performance. The Corona Four is a receiver, which, as I have said, has been designed at the express request of many readers. It is a great improvement on the very successful Limit Four produced last year. This bowing to popular demand had only one-tuned circuit on the short-wave band, and publication of the design was followed immediately by a request for a four-valver covering the three wavebands, but having two tuned circuits on the three

All-Wave "CORONA" Four



wavebands. Accordingly, this has been incorporated in the Corona.

An examination of the circuit reveals that the four valves employed include an H.F. pentode as H.F. amplifier, a triode as detector, and triodes as L.F. amplifier and output valve respectively. There are two tuned circuits with H.F. transformer coupling between H.F. valve and the detector to ensure a high degree of selectivity. The receiver covers three wavebands—19 to 48 metres, 200 to 550 metres, and 900 to 2,100 metres. Two tuned circuits on the three wavebands are employed as stated, whilst resistance-capacity coupling between the detector and L.F. valve is employed to ensure high quality. You will observe that the detector anode circuit is adequately decoupled to avoid L.F. instability, whilst a Ferranti transformer couples the L.F. and output valves. The output feeds a permanent-magnet speaker which may be instantaneously and accurately matched to the impedance of the output valve. The coil unit has the wave-change switch incorporated, a further improvement on the Limit Four.

Construction

It will be noted in the list of components that the metal-surfaced chassis is supplied with the holes ready drilled for the valve-holders. This removes the most difficult part of the preliminary constructional work, and the remaining holes required (for the inter-connecting wires) may easily be drilled with an $\frac{1}{16}$ in. twist drill. There is only one small point which requires to be mentioned when dealing with the construction of this receiver, and that is concerning the holding-down screws for the condenser, coils, transformer, etc. The metal surface of the chassis is of fairly thick aluminium, and unless a clearance hole is first drilled to accommodate the plain shank of the screws it will be found that the screw head will be twisted off. Therefore, mark out the positions of the screws carefully by pricking through the

lugs on the various parts, and then with an $\frac{1}{16}$ in. drill cut through the aluminium only. As soon as the wood appears, cease drilling and an ordinary awl may then be used to start the screws into the wood.

Before mounting the coils, transformer, variable condenser and component brackets some of the wiring can be completed and, therefore, the most comfortable plan in building this set is to mount the valve-holders, fuseholder, and terminal strips in that order first, when the chassis may be inverted and will rest comfortably on the workbench whilst the various sub-chassis components are wired into position. Where leads pass through the chassis they may be cut off to sufficient length and led through the relative hole, and afterwards cut off accurately. Another plan, and one which is favoured by many constructors, is to mount every component first and then carry out the wiring. In this case, to enable the chassis easily to be inverted from time to time during wiring, two lengths of wood should be screwed to the side runners, of sufficient length to clear the condenser,

lengths of insulated sleeving may be slipped over the wires of such a diameter that they wedge into the hole and thus prevent the wire from touching the edge of the metal. A simpler plan is to remove the metal round the hole, either with a countersink bit, or by scraping round with a pen-knife. The insulated sleeving is the most business-like method and lends a finished appearance to the set. The points marked M.C. on the blueprint indicate that the wires at that point are in contact with the metal chassis. The method of doing this is to take a long bolt and two fairly large washers which may then be used to hold in place the wires referred to. On the coil units the two M.C. points will be served by the screws used to hold down the coil screens. Remember, in all of these cases, that the ends of the wires should be turned in a clock-wise direction so that when the screws are tightened up the wires will not be pushed out. If the ends are turned in an anti-clockwise direction, as the screws are tightened the ends of the wires will be pushed out from between the washers or screw-head.

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and the set will rest on these when inverted and thus stand firm.

Wiring

The wiring should be carried out with a fairly heavy gauge wire—say 18 or 20 bare tinned copper. Make certain that all leads are fairly rigid and stretch them from point to point to avoid difficulties on the short-wave band which might be introduced by wires which move when subjected to vibration. Where the leads pass through the chassis it may be advisable to take some precaution to avoid short-circuits and there are two methods of doing this. Firstly,

which come up through holes 4 and 6 are joined to the tags in contact with the fixed sets of plates. There are two contacts on the underside of the condenser chassis for this purpose, and they are in the same electrical relationship as the tags on top of the condenser, to which the leads from terminals S on the two coil units are joined. By making use of the lower tags you avoid the necessity of running long leads up from the chassis to the top of the condenser. It is also necessary, if this is your first attempt at receiver construction, to be on your guard when wiring the five leads to the combined volume control and on-off switch

An Important Point

In the case of the ganged condenser, it is important to note that the two leads

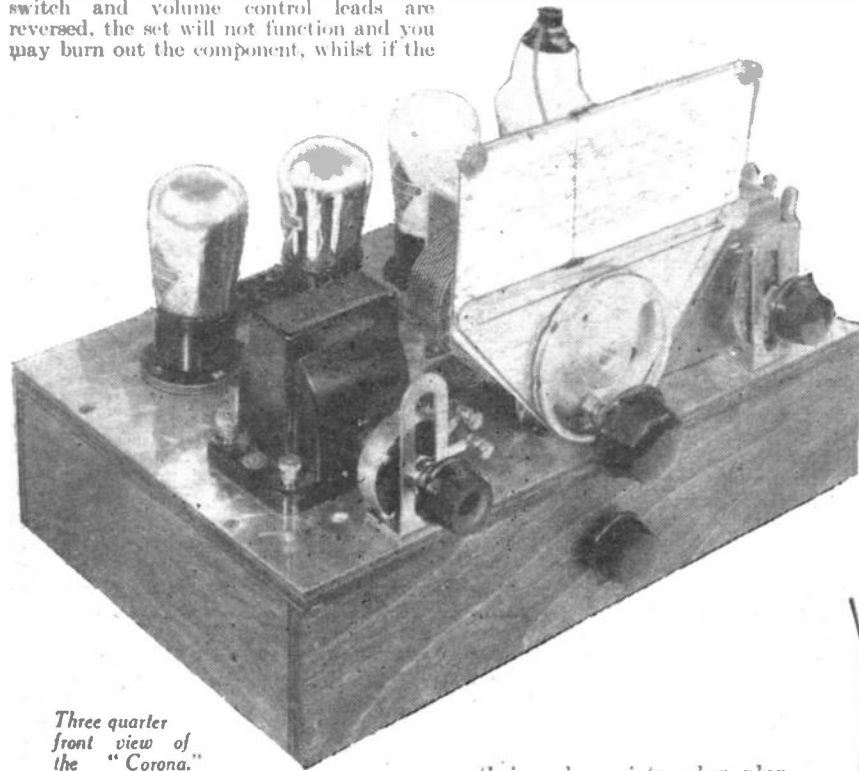
FREE BLUE PRINT IN THIS ISSUE!

It will be noted on the blueprint that three connections are made to the top and three to a lower part, and the leads from holes 7 and 8 and from the chassis (M.C.) are joined to the switch contacts. These appear on the raised ebonite portion attached to the centre of the component. Round the edge of the larger part of the component are three further lugs and these are joined to the volume control, and to them leads from holes 9 and 10 are joined, whilst the right-hand contact (viewing the component from the panel) is connected to the centre switch terminal and thus to the chassis. If this method of connection is not strictly adopted the control will either work backwards, or may not function at all. If the switch and volume control leads are reversed, the set will not function and you may burn out the component, whilst if the

precaution is necessary, and that is to make certain that resistance R8, across the G and G.B. terminals of the L.F. transformer, is kept sufficiently high above the metal surface of the chassis to avoid the metal ends coming into contact with the metal. Cut off the ends of the resistance wires so that it is held quite tightly across the bakelite casing of the transformer.

Battery Leads

The battery leads are indicated on the under-chassis view by lines with arrow-heads, and these are passed through a hole in the rear chassis strip. To avoid the possibility of these wires being pulled from



Three quarter front view of the "Corona."

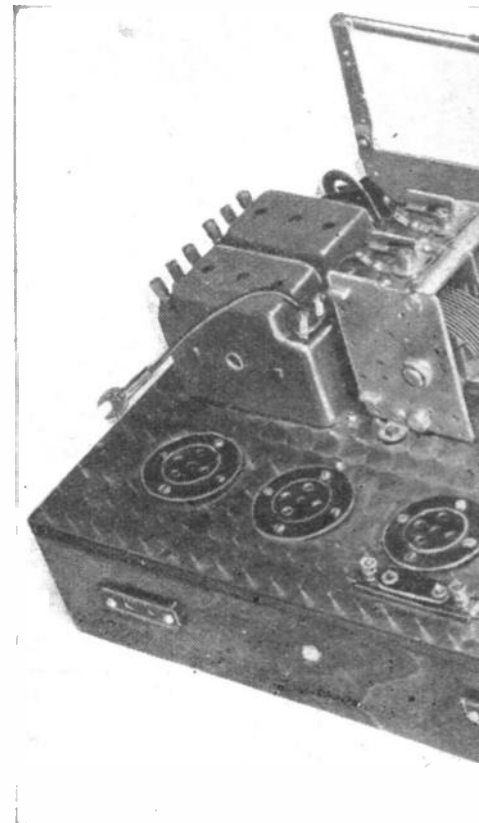
leads to the volume control only are reversed, the set will be at full volume the moment it is switched on. When correctly wired, the first part of the movement of the knob in a clockwise direction turns the set on, and probably no signals will be heard. Then, as the knob is advanced further the volume will gradually build up and will

reach maximum when in its maximum clockwise position. When mounting the two coils make certain that they are both the right way round before placing the switch control rod through them. The blueprint shows the position quite clearly, by the marking on the top of the cases. One further word of

**FULL LIST OF COMPONENTS
ON PAGE 100**

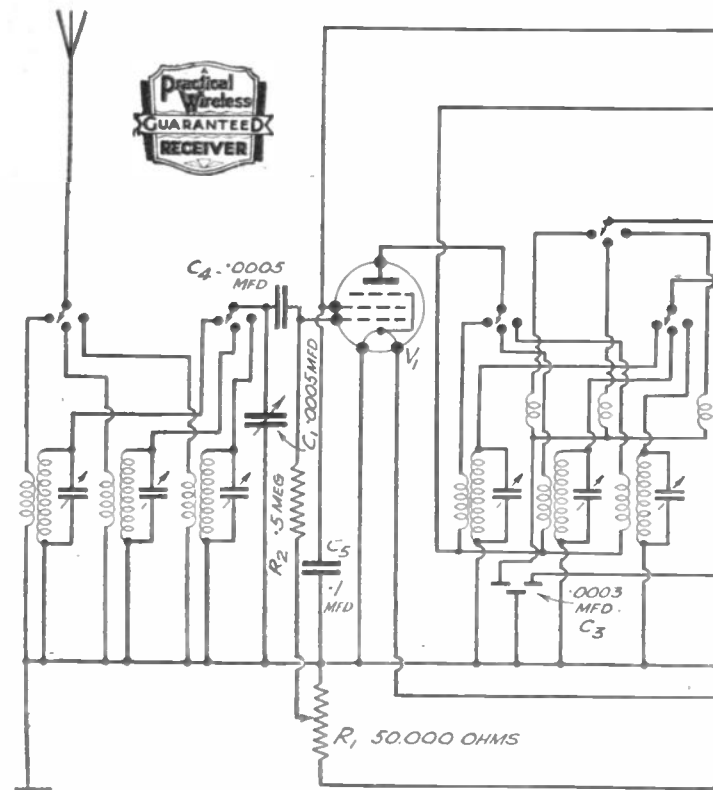
tance in the case of the lead for G.B. negative 1, as a resistor is joined to it and may be broken away. In this particular case you may, if you are at all doubtful concerning the strength of your connection, drive a short screw into the under-

side of the chassis and solder the end of the resistor (R6) and of the G.B.—1 lead to the screw head. Obviously the screw should be so short that the point does not



Another view of the completed

side of the chassis and solder the end of the resistor (R6) and of the G.B.—1 lead to the screw head. Obviously the screw should be so short that the point does not



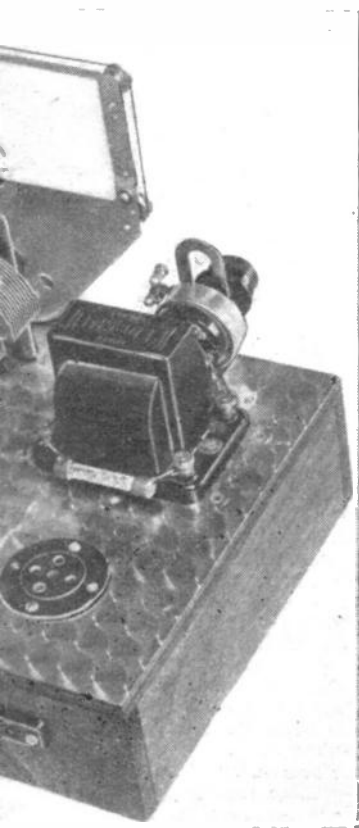
Theoretical circuit employed in the

THE WORLD AT YOUR FINGER-TIPS!

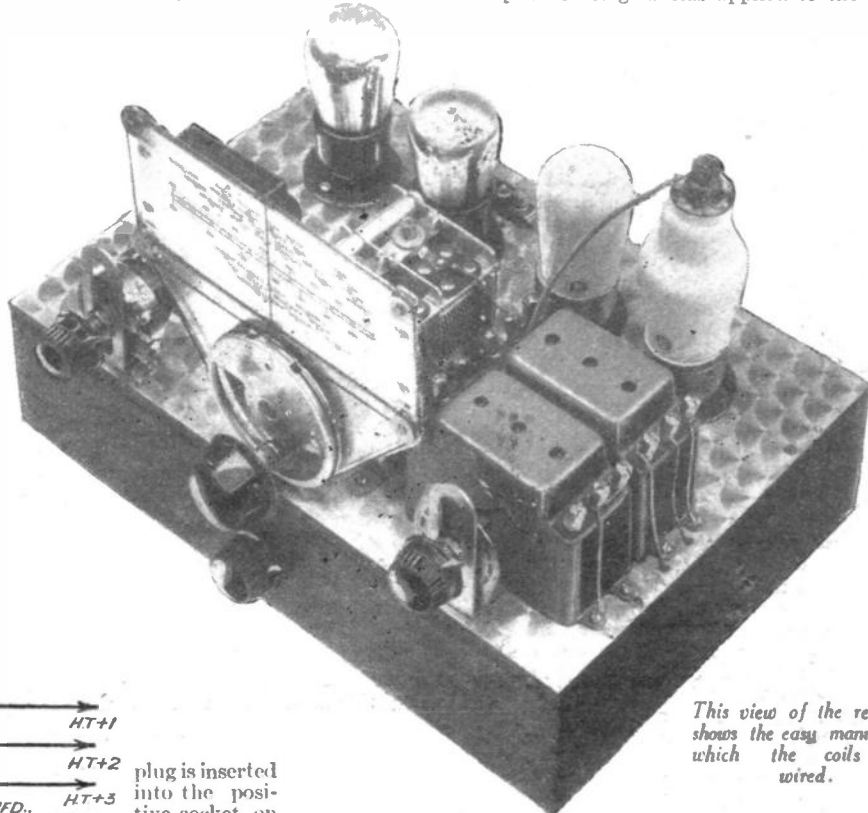
Operating Notes

The batteries required for this receiver are one L.T. accumulator of 2 volts for the filaments, one 120-volt H.T. battery for the supply of high-tension and a 9-volt grid-bias battery. The leads are clearly indicated on the blueprint and are inserted into the appropriate sockets in the batteries. Spade ends are fitted to the L.T. leads and these are joined to the positive and negative terminals on the accumulator. Remember that the black terminal is negative and the red terminal is positive. The G.B. positive

120-volt socket on the battery, whilst H.T.1 is the lowest voltage and should be inserted into a point somewhere between 60 and 80 volts. This position may be found critical and therefore experiments should be undertaken when the receiver has been found to function satisfactorily, with a view to finding the best working voltage for the screen of the H.F. valve. More will be said about this later. H.T.2 is the voltage applied to the first L.F. valve and this may be at a point round about 100 volts. This voltage will be bound up with the grid bias applied to the valve

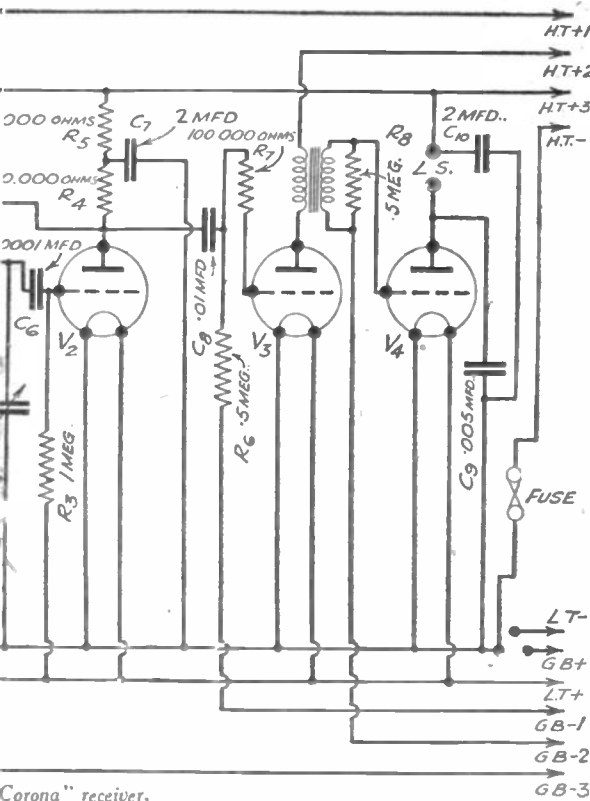


Corona" receiver.



This view of the receiver shows the easy manner in which the coils are wired.

come into contact with the metal surface on the other side of the chassis, as this will result in the grid-bias for the first valve being short-circuited.



Corona" receiver.

plug is inserted into the positive socket on the G.B. battery, and the G.B.—3 plug is inserted into the 9-volt socket at the other end of the battery. G.B.—1 should be plugged into the 3-volt socket and the G.B.—2 plug into the 6-volt socket for the time being, although at a later date you might find that these can be modified to produce better working results. The consumption of H.T. depends upon

and thus the maker's data sheet, or published curves should be studied to make certain that the correct bias is employed with the H.T.

Tuning

So much for the application of the various working voltages and the receiver may now be tested out. Remember, however, that all preliminary tests will subsequently form a basis for the adjustment of such items as

A SELF-CONTAINED ALL-WAVE BATTERY RECEIVER OF MERIT

the grid-biasing voltage which is employed and thus it is wise to use the highest value of bias consistent with good signal strength. The H.T. plugs are inserted in the following order: H.T.3 is the maximum voltage and should be connected to the

H.T. and G.B. and therefore do not expect at the first trial to pick up stations from every part of the world. To make certain that all wiring is correct, you can adopt the procedure of going over the blueprint with a pencil, marking out the wires as they are put in, or can check each wire individually when the receiver is ready for