

*freemond*

**OUTPUT PROBLEMS—See page 185**

# Practical and Amateur Wireless

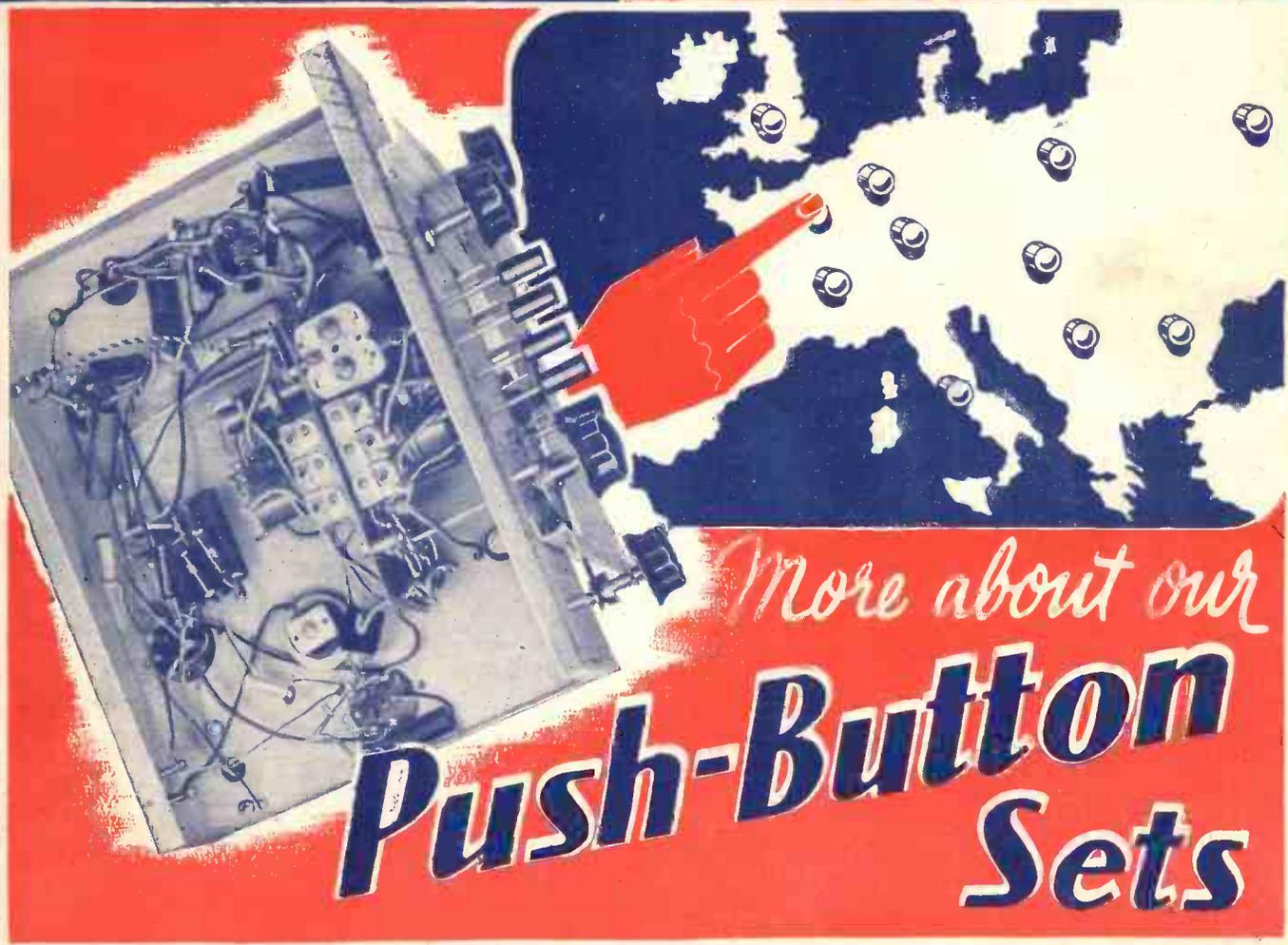
**3<sup>d</sup>**  
EVERY  
WEDNESDAY

Edited by F.J. CAMM

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Publication

Vol. 13. No. 320.  
November 5th, 1938.

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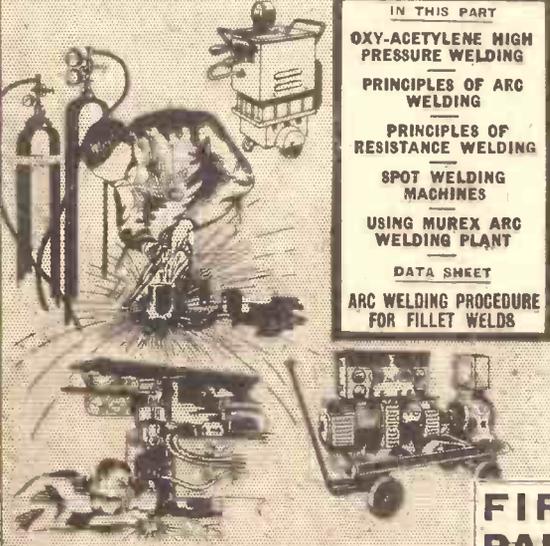
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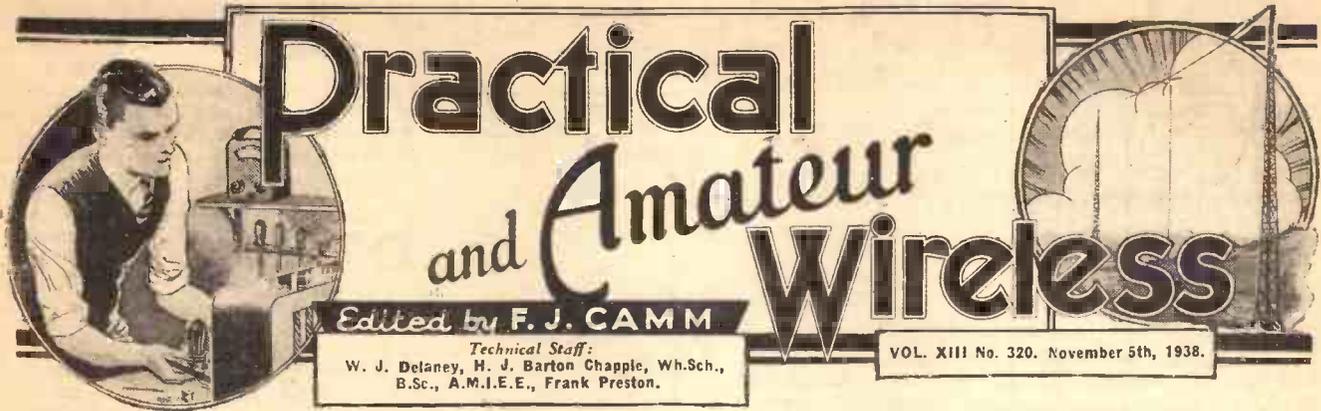
This week's Specially Enlarged CYCLIST is a complete and lavishly illustrated guide to the cycling exhibits at the Earls Court Show. Everything new—machines and accessories—is described and explained by experts. There are, too, many Special Features contributed by famous cyclist writers.

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# THE LIST OF COMPONENTS!—See Page 193



**Practical  
and Amateur  
Wireless**

Edited by **F. J. CAMM**

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

VOL. XIII No. 320. November 5th, 1938.

## ROUND *the* WORLD of WIRELESS

### Solus Specifications

**A** PRINCIPLE which has been rigidly adhered to in this journal since its inception has been the specifying of one component only for each part of the designs published under the title of Practical Wireless Guaranteed Receivers. It was customary at one time to give a list of alternatives in the specification, but when this paper was first placed on the market we departed from this procedure and when we published a receiver design we gave in our list of parts the names of only those components which had been included in the original receiver. Accordingly, we were able to guarantee the performance of the receiver. When alternatives are employed many things can happen. The outward appearance of a component often gives no indication as to its internal arrangement, and although a simple part such as a fixed condenser may seem of little consequence, when an alternative is employed it might easily upset the performance of a receiver, simply because the specified component was non-inductive and the substituted part is inductive. Other components are, of course, much more critical, and when building one of our receivers, therefore, the specified parts only should be obtained. We can then guarantee the performance, and if it fails to come up to our standard, the receiver will be serviced by us free of charge. All that we ask is that the constructor writes to us and explains his difficulties before sending off the receiver for test.

### Orkney Transmitter

**T**HE first amateur transmitting station to be authorised in the Orkney Islands is that owned by Mr. J. C. Graham, the Air Ministry's air traffic control officer at Kirkwall Airport. His call-sign is GM3TR.

### International Broadcasts

**M**ANY listeners switch off when broadcasts are given in foreign languages, owing to the difficulty of following what is being said. Translations are often given after such a speech, but recently the French Premier broadcast to America his acceptance of the invitation to attend the Four-Power Conference, and during his speech a sentence-by-sentence translation was interpolated by an N.B.C. announcer.

### Confiscated Set

**W**E recently mentioned a case where the Postal Authorities had ordered the confiscation of a radio-gram upon which licence had not been paid. We now understand that by order of the local Bench the receiver is to be sold and the money realised is to be paid to the Exchequer.

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### Earthquake Precautions

**T**HE importance of radio during and after an earthquake can well be visualised, and in order to ensure that the C.B.S. station at Torrance, California, will not suffer damage during such occasions the transmitter house has been built of reinforced concrete in two units. Telephone lines between the transmitter and the studio have also been laid in duplicate to avoid interruption of the service.

### "Paul Temple" Thriller

**T**HE second of the eight episodes of Francis Durbridge's serial thriller, "Paul Temple and the Front Page Men," will be broadcast in the Midland programme on November 9th, and repeated on November

12th. This episode is entitled "The Glass Bowl," and Martin C. Webster will be the producer.

### Sunday "Jazz"

**P**ETER YORKE, well known to radio listeners as a band leader, solo pianist and orchestrator of the "You Shall Have Music" programmes, is to broadcast with his "Sweet and Lovely" Orchestra for the first time on a Sunday on November 6th. This is another of the Sunday programmes which is causing controversy on the grounds that it introduces jazz on the Sabbath.

### Drama of the Coal Pit

**O**N November 9th a play entitled "Flood," specially written for the microphone by W. Evan Williams, a North Wales journalist, will be broadcast in the Welsh programme. This play was previously broadcast in November, 1936, and is based on an accident which took place in Tynewydd Pit, Porth, in the latter part of the last century, when a party of men and a boy were trapped by water in a pit for ten days, their only food being tallow candles.

### Armistice Service

**O**N Sunday, an Armistice Day service will be broadcast from the Chapel of the Dalry Boys Club, Edinburgh, for Scottish listeners. The address will be given by the Rev. William Malcolm, Chaplain to the Club.

### A.R.P. Talk

**T**HE third of the Midland series entitled "A.R.P. and You" will be heard on November 7th. Geoffrey Bounphrey will interview Dr. W. M. Ash, Director of Medical Services for Derbyshire, on first-aid, ambulance, and the organisation of hospital services in the event of an air raid. Dr. Ash served throughout the War in the Navy, and for a time after demobilisation was Resident Medical Officer of the two-thousand-bed hospital for returned Prisoners of War at Waterloo Bridge.

### "Swing" from Paris

**S**WING music from France will be broadcast by the B.B.C. on the National wavelength on November 4th. It will be played by Alix Combelle and his Band, and will be relayed from Paris.

# ROUND the WORLD of WIRELESS (Continued)

## Germany "Wins" New Transmitter

THE Moravska-Ostrava (Czechoslovakia) station erected at Schoenbrunn, and thus within the area handed over to the Reich, has now become a German transmitter. As *Reichssender Schoenbrunn* it relays, at present, the Breslau programmes on 249.2 m. (1,204 kc/s).

As, however, the studio is installed in the town of Moravska-Ostrava, which has remained Czech territory, that Government will immediately construct a new station to serve this area.

## Melons in the Studio

THE Sound Effects department of the U.S.A. broadcasting stations have found a quaint use for the common water-



During the Territorial Recruiting week at Cardiff recently, members of the public were able to see the work of the various technical branches at the exhibition in the Drill Hall. Visitors could also try their hand at wireless communication with the Drill Hall at Swansea. Our illustration shows a visitor to the Cardiff Drill Hall in wireless communication with Swansea.

melon. In gangster films where, say, a G-man knocks out the villain by hitting him on the head with the butt of a revolver, this sound is reproduced by striking a melon with a wooden mallet. Where the body is supposed to fall with "a sickening thud" the same melon is dropped to the ground from the top rung of a ladder, and if the villain is thrown down the staircase the ladder is slanted and that useful melon made to strike each rung successively in its fall to the ground. So much for illusion!

## Alter Your Lists

NAPLES (1), formerly on 271.7 m. (1,104 kc/s) is now working on 230.2 m. (1,308 kc/s), and Naples (2), until recently on 222.6 m. (1,348 kc/s) operates on 209.9 m. (1,429 kc/s).

Radio Méditerranée (Nice-Juan-les-Pins, France) in order to avoid interference with the French State transmitter Nice-Côte-d'Azur, has reduced its wavelength from 235.1 m. (1,276 kc/s) to 209.9 m. (1,429 kc/s), which it now shares with Kaiserslautern (Germany), Milan (Italy), Naples (Italy), and others.

## INTERESTING and TOPICAL NEWS and NOTES

### Australian Short-wave Transmission Schedules (November, 1938)

VK2ME (Sydney), 31.28 m.: Sundays (Sydney time): 4 p.m.-6 p.m. (06.00-08.00 G.M.T.); 7.30 p.m.-11.30 p.m. (09.30-13.30 G.M.T.). Mondays (Sydney time): Midnight-2 a.m. (14.00-16.00 G.M.T.).

VK3ME (Melbourne), 31.5 m.: Nightly, Monday to Saturday, inclusive (Melbourne time): 7 p.m.-10 p.m. (09.00-12.00 G.M.T.).

VK6ME (Perth), 31.28 m.: Nightly,

Monday to Saturday, inclusive (Perth time): 7 p.m.-9 p.m. (11.00-13.00 G.M.T.).

### Cincinnati Business Women's Broadcasts

OUTSTANDING business and professional women will be presented by the Cincinnati Business and Professional Women's Club in a series of broadcasts over WLW (Cincinnati), which began on Saturday, October 29th, at 12.00 noon, E.S.T. Clara McBreen, insurance executive, was the speaker in the opening programme, her subject being "Why Women Work." Following the first broadcast, the programme will be heard regularly the second Saturday of each month, 12 to 12.15 p.m., E.S.T.

### Musical Comedy

CARL BRISSON, who is visiting Birmingham, will sing some of the songs he made famous. This is the principal feature of a musical comedy programme, compered by Martyn C. Webster, on November 6th. Reginald Burston will conduct the Midland Revue Orchestra.

### Organ Recitals

ORGAN recitals will be given by G. D. Cunningham, the City of Birmingham organist, in the Concert Hall, Broadcasting House, on November 10th (Regional), and by Guy Eldridge, from the Chelsea Parish Church of St. Luke in the "Round the London Organs" series on November 7th (National).

### "On the Dot"

"ON the Dot," another dashing revue, will be produced by Leslie Bridgmont on November 7th from the Western Regional. The artists will include Albert Grant, comedian; Diana Clare, the popular singer; Kenway and Young, entertainers; Cyril Fletcher, in more odd odes; and the Western Revue Chorus and Orchestra.

### Another Hallé Broadcast

WHEN the Hallé Society's concert is broadcast to the North from Manchester's Free Trade Hall on November 10th, listeners will hear part one of Bach's Mass in B minor. Sir Henry Wood will conduct the Hallé Orchestra and the Hallé Chorus (chorus master, Herman Brearley). The soloists will be Stiles Allen, Muriel Brunskill, Heddle Nash and Keith Falkner.

### Television Progress in Italy

TELEVISION development is provided for in the plans for Italy's new Broadcasting Headquarters in the Corso Sempione, Milan. In addition to sixty rooms, which will be occupied by the programme control staff and apparatus, there will be three groups of studios, and space set apart for visual broadcasts.

### Broadcasts from Bolton

A RECITAL of popular music by Reginald Liversidge at the organ of the Lido Cinema, Bolton, will be heard by Northern listeners on November 8th. On November 10th a variety programme will be broadcast from the Bolton Grand Theatre.

## SOLVE THIS!

### PROBLEM No. 320

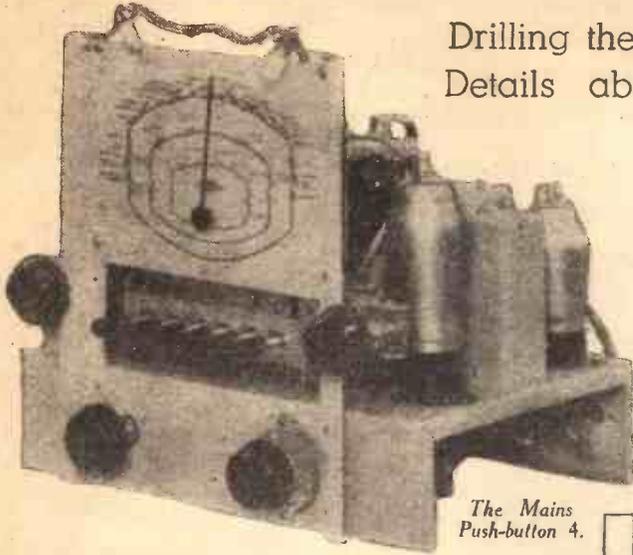
After building a three-valve (detector and 2 L.F. stages) Robinson found that results on the medium waves were fairly good but on the long waves were very poor. He cut out the L.F. stages without any modification in the results, and accordingly he tested the coil, which was home-made. He found that the two windings were in order and no breaks existed in them, and they were true to specification. What was the most likely cause of the trouble? Three books will be awarded for the first three correct solutions opened. Envelopes should be addressed to The Editor, PRACTICAL AND AMATEUR WIRELESS, Geo. Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. Envelopes must be marked Problem No. 320 in the top left-hand corner and must be posted to reach this office not later than the first post on Monday, November 7th, 1938.

### Solution to Problem No. 319

When Martin wired his detector stage he confused the screen and anode connections and was using the screen as the anode. The following three readers successfully solved Problem No. 318 and books have accordingly been forwarded to them:—  
R. S. Pemble, 110, All Souls Avenue, Harlesden, N.W.10.  
E. Murphy, "Kenora," 51, Byrne Drive, Prittlewell, Essex.  
J. Meredith, 0, Devon Avenue, Fleetwood, Lancs.

# THE PUSH-BUTTON 4

Drilling the Panel, Fitting a Pick-up and Other Details about this Amazing New 4-valver



The Mains Push-button 4.

THE receiver should have been completed by now, and no snags or problems should have been experienced in building either model of this new set. When completed and tested, the receiver will have to be housed in a cabinet, and a ready drilled and fitted cabinet may be obtained from Messrs. Peto-Scott for 25s. In the battery model a shelf in the centre of the cabinet provides an upper compartment upon which the batteries may be housed, but the same design of cabinet may be used for both models, as the panel layout is identical. For those who wish to make their own cabinet or who wish to use an ebonite or similar panel for an existing cabinet we give on the right the marking-out details. For the four controls a  $\frac{5}{8}$  in. hole is needed, but it should be noted that in the case of the top right-hand control (for tuning) the hole should be off-set by  $\frac{1}{4}$  in. from the spindle centre. This will then allow the control spindle to be pushed

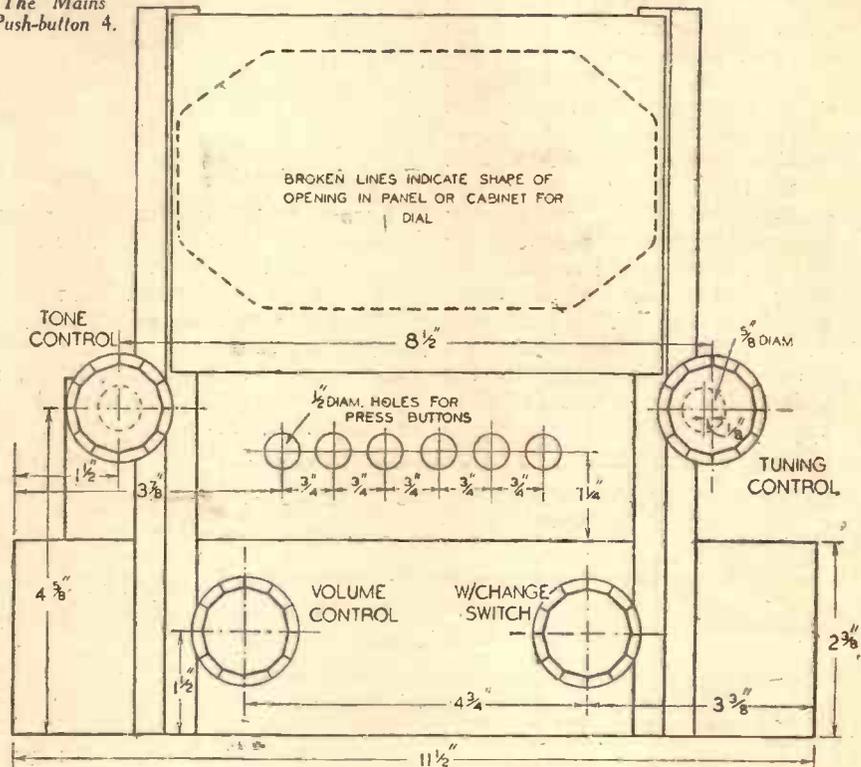
over to the left times and leave a neat appearance when push-button operation is desired.

By using the  $\frac{5}{8}$  in. hole and off-setting it in this manner you are saved the trouble of cutting a slot to accommodate the movement of the rod, and the control knobs will cover the hole at all

times and leave a neat appearance to the receiver.

## Using a Pick-up

As the majority of listeners will require pick-up connections, it may be pointed out right away that both receivers may be used for record reproduction, but the mains model is not so satisfactory in this connection as the battery model. Although a high-efficiency mains pentode is employed in the output stage, this will not deliver sufficient volume for



Dimensions for drilling panel or cabinet front.

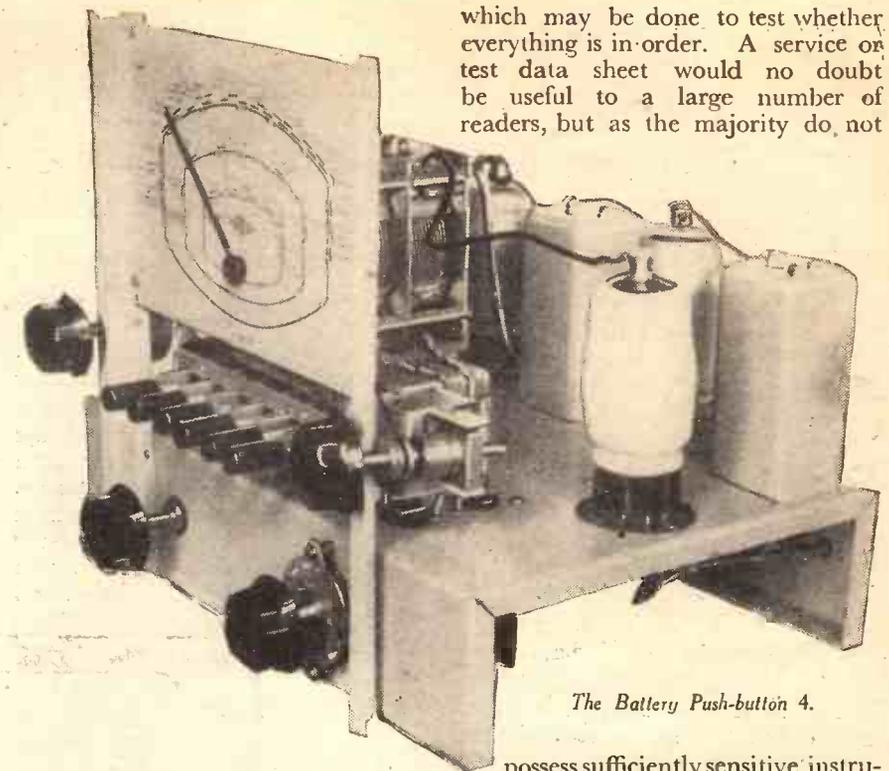
## DETAILED LIST OF COMPONENTS FOR BATTERY MODEL.

One enamelled steel chassis, 11 1/2 in. by 8 1/2 in. by 2 1/2 in., with aerial-earth strip fitted, 4s. 6d. (Peto-Scott).  
 One special all-wave tuning unit with switches, filter unit, etc., type P.B.4, 18s. 6d. (Peto-Scott).  
 One 6-pt. push-button mechanism with station plate, knob, buttons and escutcheon, 20s. (Peto-Scott).  
 One two-gang bar-type condenser, .00043 mfd. each section, with special mounting bracket, 4s. 6d. (Peto-Scott).  
 One station-named scale and drive, brackets, driving drum, pointer and cord, 4s. (Peto-Scott).  
 One special potentiometer mounting bracket, 4d. (Peto-Scott).  
 Two I.F. transformers, types B.P.122 and B.P.123, 7s. 9d. each (Varley).  
 One volume control, 500,000 ohms, with on-off switch (Lab. Type), 3s. 6d. (Erie).  
 One volume control, 100,000 ohms (Lab. type), 3s. (Erie).  
 One fuse-holder, type S.E.S.38, 4 1/2 d. (Bulgin).  
 One fuse bulb, 9d. (Bulgin).  
 Four valveholders, type V1 and V2, two 5-pin and two 7-pin, 3s. 6d. (Clix).  
 Fixed condensers:  
 Four at .0001 mfd., type 690 W, 8d. each (Dubilier).  
 One at .002 mfd., type 4601/S, 1s. (Dubilier).  
 One at .01, type 4601/S, 1s. (Dubilier).

Two at .05 mfd., type 4602/S, 1s. 3d. each (Dubilier).  
 Five at .1 mfd., type 4603/S, 1s. 4d. each (Dubilier).  
 One at 2 mfd., type 3016 (Electrolytic), 1s. 6d. each (Dubilier).  
 Fixed resistors:  
 Three at 5,000 ohms, 1/2-watt type, 1s. each (Erie).  
 One at 10,000 ohms, 1/2-watt type, 1s. (Erie).  
 Two at 30,000 ohms, 1/2-watt type, 1s. each (Erie).  
 Two at 50,000 ohms, 1/2-watt type, 1s. each (Erie).  
 One at 100,000 ohms, 1/2-watt type, 1s. (Erie).  
 One at 250,000 ohms, 1/2-watt type, 1s. (Erie).  
 Five at 500,000 ohms, 1/2-watt type, 1s. each (Erie).  
 One at 1 megohm, 1/2-watt type, 1s. (Erie).  
 Three top-cap connectors, type P.41, 2d. (Bulgin).  
 Length of flex, wire for connection, length of screened braid, screws, etc., 3s. 6d. (Peto-Scott).  
 Four valves:  
 One TP23 (Mazda).  
 One 210 VPT (Cossor).  
 One 210 DDT (Cossor).  
 One 220 HPT (Cossor).  
 One Stentorian Junior speaker (W.B.).

comfortable loudspeaker results unless a highly-sensitive pick-up is employed. If this point is borne in mind, however, results will be quite satisfactory. In both receivers the simplest method of using the pick-up is to connect it across the L.F. volume control. This alone is sufficient, but in most cases it will be found that when radio reception is desired, if the pick-up is in circuit, instability may set in. Furthermore, radio signals may break through unless the tuning control is set to a point where no signals are obtained. Therefore, a change-over switch may be fitted, or alternatively a simple on-off switch may be connected in series with the pick-up so that it may be cut out on gramophone. Then, if the set is detuned no radio break-through will be obtained. If desired, a double-pole change-over switch may be used so that the volume control is disconnected from the radio section and taken over to the pick-up, but it must be remembered that any lengthening of leads may give rise to forms of instability due to interaction between certain parts of the wiring.

A pick-up connecting socket may be mounted on the rear runner of the chassis and wired to the control with ordinary connecting wire passed through lengths of insulated screened sleeving. Make certain that a sound earth connection is made to the screening wire, and no trouble should be experienced.



The Battery Push-button 4.

#### Extension Speaker

If an extension listening point is required it may, of course, be used in the usual manner. Extension speaker sockets have not been provided, but a pair of sockets may, if desired, be mounted on the rear chassis runner and wired as follows: One socket is joined to the chassis holding bolt, in other words, to earth. The other socket should be joined to one side of a 2mfd. fixed

condenser, and the other side of this condenser should be joined to the anode terminal of the output valve. Alternatively, one of the Clix L.S. Control panels could be mounted and connected as recommended by the makers. With this device the internal or built-in speaker may be silenced, which will not be possible with the arrangement just mentioned.

possess sufficiently sensitive instruments to enable all circuits to be tested properly, a list of the various anode voltages will be sufficient to enable most amateurs to verify that everything is in order. In the case of the battery receiver, of course, the voltages depend upon the condition of the H.T. battery. The following figures were taken with a 120-volt battery which had been in use for some time and which gave a total reading of 115 volts.

V1—Anode 90, Oscillator anode 35 volts.

V2—Anode 94, Screen 38 volts.

V3—Anode 20 volts.

V4—Anode 115 volts.

The bias used was 3 volts at G.B. 1 and 4½ volts at G.B.2.

The voltage on the third valve is not, of course, an accurate reading as the valve is a detector and is resistance-capacity coupled to the following valve. The reading will vary considerably according to the resistance of the meter used. We used the standard Avometer.

The total anode current, measured in the H.T.—circuit, with the Avometer set to the 120 mA range was just over 12 mA.

In the case of the mains receiver the following voltages were obtained when the receiver was connected to 230-volt A.C. mains.

V1—Anode 280, Oscillator anode 120.

V2—Anode 280, Screen 280 volts.

V3—Anode 250, Screen 280 volts.

The total anode current of this model on the 120 mA range was 70 mA.

#### DETAILED LIST OF COMPONENTS FOR THE MAINS MODEL.

- One enamelled steel chassis 11½ in. by 8½ in. by 2½ in., with aerial-earth strip fitted, 5s. 6d. (Peto-Scott).
- One special all-wave tuning unit with switches, filter unit, etc., type P.B.4, 18s. 6d. (Peto-Scott).
- One 6-pt. push-button mechanism with station plate, knob, buttons and escutcheon, 20s. (Peto-Scott).
- One two-gang bar-type condenser, .00043 mfd. each section, with special mounting bracket, 4s. 6d. (Peto-Scott).
- One station-named scale and drive, brackets, driving drum, pointer and cord, 4s. (Peto-Scott).
- One special potentiometer mounting bracket, 4d. (Peto-Scott).
- Two I.F. transformers, types BP.122 and BP.123, 7s. 9d. each (Varley).
- One mains transformer, type P.B.4, 20s. (Heyberd).
- Fixed condensers:
  - One at .0001 mfd., type 451, 1s. (T.C.C.).
  - One at .0002 mfd., type 451, 1s. (T.C.C.).
  - Four at .006, type M, 1s. 6d. each (T.C.C.).
  - One at .01 mfd., type 451, 1s. (T.C.C.).
  - One at .02 mfd., type 451, 1s. (T.C.C.).
  - Three at .1 mfd., type 341, 1s. 4d. each (T.C.C.).
  - One 8-8 mfd. electrolytic, type 712/3, 6s. (T.C.C.).
  - One 25 mfd. electrolytic, type FT, 1s. 6d. (T.C.C.).
- Fixed resistors:
  - One at 100 ohms, 1-watt type, 1s. (Erie).
  - Two at 150 ohms, 1-watt type, 1s. each (Erie).
  - One at 200 ohms, ½-watt type, 1s. (Erie).
  - One at 20,000 ohms, ½-watt type, 1s. (Erie).
  - Three at 25,000 ohms, ½-watt type, 1s. each (Erie).
  - One at 50,000 ohms, 1-watt type, 1s. (Erie).
  - Four at 500,000 ohms, ½-watt type, 1s. each (Erie).
- Four valveholders, three 7-pin and one 5-pin, types V1 and V2, 3s. (Clix).
- One volume control, 100,000 ohms, Lab. type, 3s. (Erie).
- One volume control, 500,000 ohms, with on/off switch, 3s. 6d. (Erie).
- Two dial lamps, 6.3 volts, 3 amp., 9d. each. (Bulgin).
- Three top-cap connectors, type P.41, 2d. (Bulgin).
- Connecting wire, length of screened braid, mains flex and plug, 5s. (Peto-Scott).
- Four valves:
  - One type TX4 (Tungsram).
  - One type VP4-B (Tungsram).
  - One type DDPP4B (Tungsram).
  - One type APV4 (Tungsram).
  - One energised loudspeaker, type EM/PB (W.B.).

# Problems of Output

An Explanation of Some of the Difficulties which Beset the Battery User

By W. J. DELANEY

THESE are still many listeners who are using battery supplies for their receivers, in some cases from necessity, and in other cases by prejudice. Many listeners still believe that the only apparatus which is capable of good quality is that which is operated from batteries. This is, of course, an erroneous impression, and where real quality is desired a mains receiver or amplifier can certainly be employed. Among the queries which are received by us are a large number asking for details of a battery-operated amplifier for use as a public-address unit, the reason usually being given that mains facilities are not available, and that the ordinary battery designs available are only for power outputs up to 2 watts or so. It seems to be overlooked by many that for real public-address work 5 watts is the minimum of power which should be used, and this is practically impossible with ordinary battery circuits. An examination of the characteristics of standard valves will show that the ordinary power valve for battery operation will deliver an output of about 500 to 700 milliwatts—that is, just over  $\frac{1}{2}$  watt. If these are used in push-pull the output is still much below the needed rating. Pentodes will deliver up to 1 watt, and again, a push-pull circuit will only enable 2 watts or so to be obtained. In a very small hall where an audience is quiet, such an amplifier could be used for speeches. For dancing, however, the output would be drowned by the noises of a very few couples.

## Mains Valves on Batteries

A solution which is often overlooked is to use the higher-efficiency mains-type valves, but to supply these from batteries. The A.C. type of valve is best, and the 4 volts for the heaters may be provided by two large accumulators or a car battery of the 6-volt or 12-volt type suitably tapped. For the H.T. supply it is desirable to use the maximum of 200 or 250 volts recommended by the makers, and this is obtainable from good batteries, although for really reliable working—especially if much work is to be carried out in this way (such as in remote country districts) banks of H.T. accumulators should be employed. Transport difficulties would be overcome if a small car or van were available, and similar results to those obtainable from standard mains equipment could then be obtained. H.T. smoothing would not, of course, be needed, and even at 150 volts many good mains valves will give results far superior to the battery equipment.

Another difficulty which is continually cropping up is the feeding of Q.P.P. and Class B type amplifiers from mains units. The current in the anode circuit of this type of amplifier varies with the signal voltage and volume variations. This is of little account when good batteries are used, but the standard type of mains unit has a smoothing choke, and perhaps a series resistance, in the H.T. positive lead. It is well known that current flowing through a resistance results in a voltage drop across the resistance, and the voltage drop is dependent upon the current flowing. The resistance, of course, remains constant. If, therefore, a standard type of mains unit is used with Q.P.P. or Class B amplifier,

the voltage applied to the anodes will vary with the signal, and this results in distortion. A very small unit may fail to give signals altogether, due to the effects of the voltage drop. The peak current with such types of amplifier is usually in the neighbourhood of 30 mA. if any sort of volume is being

suitable. To obtain best results duplicate output circuits should be provided, one to feed the Q.P.P. or Class B stage, and another to feed the remaining stages. The rectifier is connected in a half-wave circuit, and the chokes must be so chosen that a minimum drop is obtained for the output valves whilst the other may be chosen to suit the voltage required on the valves. With this circuit a variation of only about 10 volts will be given and thus satisfactory working will be obtained.

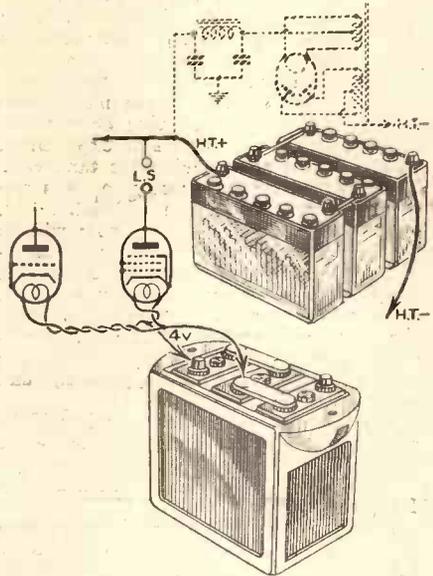


Fig. 1.—How to use batteries for the operation of mains (A.C.) type valves.

obtained, and this is another factor which has to be borne in mind.

If it is desired to use a mains unit for this type of apparatus a specially designed mains unit should be used, or a standard unit capable of delivering 30 mA. may be modified by connecting a Neon Stabiliser across the output terminals. This compensates for the varying current of the

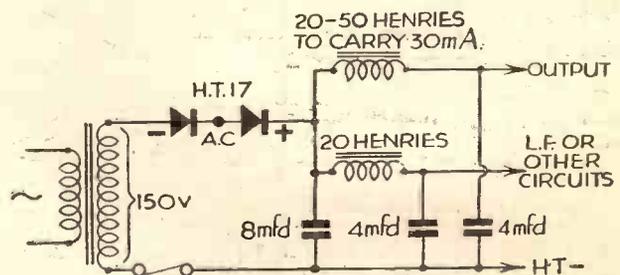
## Parallel and Push-pull

If the output from a straight type of amplifier is insufficient, it can be increased by obtaining another valve similar to that used in the output stage and connecting the two in a push-pull circuit. Connecting another valve in parallel is not worth while, as the signal input cannot be any greater and the same total H.T. current will be taken with little gain in amplification. Some constructors make the mistake of making modifications on the above lines, but overlook the additional current consumption, with the result that the same small H.T. battery is employed, and the additional load results in the output from the battery falling very rapidly. From the quality point of view, two good triodes in parallel will give a nice low impedance which can deliver a fine output when fed to a suitable speaker, but no attempt should be made to force the output volume up to beyond 2 watts. Even then, the operation of such equipment is generally uneconomical.

## H.T. Accumulators

If you are forced to use battery supplies, owing to the absence of mains facilities, it should not be forgotten that the ordinary type of dry H.T. battery is rated for a fairly low current, and although super-capacity types of battery are available, it is well worth while considering the use of the H.T. accumulator type of supply. This offers many advantages. It is certainly bulky, but it delivers a really smooth output, free from the risk of noises (if kept clean and in good condition); may be modified by the addition of fresh units; and it is

Fig. 2.—A mains unit which may be used for battery receivers employing Q.P.P. or Class B output stages.



output stage and enables the voltage applied to the amplifier to remain reasonably constant.

## Special Rectifier

It is possible, however, to dispense with the stabiliser if a special type of metal rectifier is employed—that known as Type H.T.17 in the Westinghouse range is quite

still used by many large concerns who have mains supplies available—in the interests of hum, and ripple-free voltages. This is, in my opinion, the best solution to the problem of the most satisfactory way of obtaining a really good output from battery supplies, provided that the question of transport is not insurmountable and that mains type valves are employed.

# The Amateur Transmitter

This Article Describes the Characteristics of the Three Forms of Coupling Mentioned Last Week, and Explains How Their Features can be Recognised by Simple Experiments

By L. O. SPARKS

**T**HE need for the closest co-operation between all amateur transmitters has been stressed before in previous articles, but in view of the correspondence received from lone experimenters it appears that there are still many who would welcome the opportunity of comparing notes, discussing problems, and exchanging experiences with other enthusiasts in their

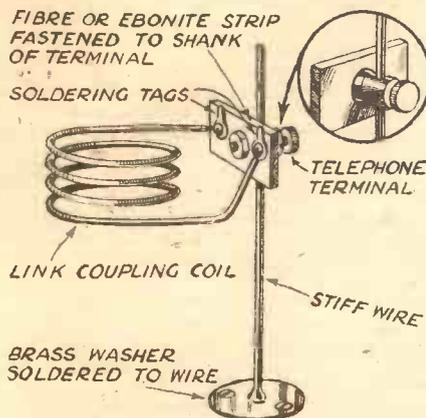


Fig. 1.—One method of supporting link coils so that the degree of coupling can be varied.

districts. There is only one way to eliminate this "working-in-the-dark" effect, and that is by getting together; that is where the Co-operation Circle can prove most useful, as its object is to pass along reports and experiences of station owners to other readers, and thus provide a means whereby those in the same locality can get in touch with each other.

If you are interested—and you should be—just let us hear from you when you have any problem or item of interest, and help to build up a strong circle of enthusiasts all sharing the same hobby.

To start the ball rolling, here is a call from E. J. D., of Aldershot, who is anxious to get in touch with others in his neighbourhood interested in transmitting and Morse practice. Now then, come in, someone.

## Couplings

Each of the three forms of coupling mentioned last week has its own individual characteristics and, if the experimental chassis has been put to good use, these will have been observed and noted.

One cannot say that any one particular method has outstanding features or popularity, as so much depends on the design and lay-out of the complete transmitter.

## Link Coupling

This method has many advantages and, in spite of one or two disadvantages, it is undoubtedly one of the most satisfactory couplings to use for both experimental and general work. That is, taking all things into consideration.

The snags, if they can be called such, from the constructional point of view are:

the making and mounting of the link coils, the need for an additional tuned circuit, and the possible necessity of changing the link coils when changing tank coils. None of these items is serious; it should not be a difficult matter to devise some simple method of supporting and forming the link coils. The arrangement shown last week is only one of many; the coils can be self-supporting or wound on thin formers. They can be fixed, once the optimum point has been determined, or variable, the latter being secured by devising a sliding support, as in Fig. 1. If the coils are made large enough, and fitted with plug or terminal connections, no difficulty will be experienced with changing or removing the tank coil.

The remaining item really becomes one of cost and space, as an additional coil, coil holder, and tuning condenser will be required for the valve following the oscillator or preceding stage, when comparing the method with, say, capacity coupling. There are many advantages of this method, the most outstanding being: good efficiency, simplicity, freedom from restriction as regards placing of apparatus, and stability.

With the oscillator chassis and artificial aerial already described (Fig. 2), couple the two together by means of the link coupling coils and a piece of twin twisted flex—say, 18ins. in length.

Adjust the circuits until the maximum energy is being transferred to the A.A., taking care to see that the link coil on the anode tank coil is placed at the point of greatest efficiency. Note how the output to the A.A. is affected by movement of the link coil; try link coils having different ratios of turns from the tank and see how that affects output and oscillator

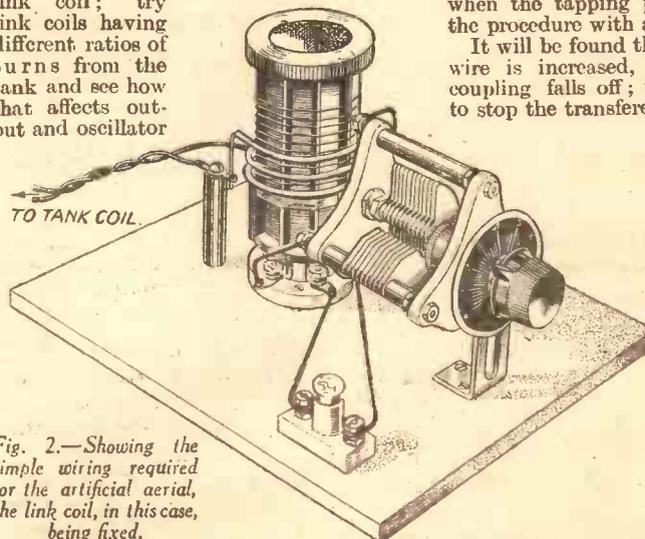


Fig. 2.—Showing the simple wiring required for the artificial aerial, the link coil, in this case, being fixed.

operation. Remember, an approximation of the turns required is in the region of 10 per cent. of the tank coil winding.

When these adjustments have been made increase the length of the twin lead to, say, 10ft., and note if any difference is visible in the output. It may be necessary to make a minute adjustment of the tuning, but, if all is as it should be, no appreciable loss

will be noticed, indicating that the coupling lead does not affect, or throw an additional load on, the oscillator. This is a very desirable feature. It indicates that one does not have to study the distance between two sections of apparatus, thus allowing greater latitude in design and placing of gear. If wire is available, the length of the lead can be increased considerably; for example, it is not always possible or convenient to have the aerial tuning arrangements close to the transmitter. By using the link system of coupling, therefore, the P.A. tank coil can be coupled to the aerial even if it is several yards away, without, if reasonable care is taken with the placing of the coupling lead, appreciable loss in efficiency.

## Capacity Coupling

The chief advantages of the method are simplicity and cheapness. The disadvantages can readily be understood by using the chassis on A.A. and carrying out the following simple tests.

With the coupling condenser forming the coupling between the two circuits by means of a short length of wire, bring the A.A. coil close to the tank coil. Note what effect this has on the circuits; it will be found that it is possible to obtain inductive coupling between the two coils, apart from that provided by the condenser. Now remove the A.A. and place it, say, just out of the effective field of the tank coil, and adjust the condenser and the tapping point on the tank coil for maximum transference of energy. After doing this and, incidentally, noting the behaviour of the oscillator circuit when the tapping point is varied, repeat the procedure with a longer coupling wire.

It will be found that as the length of the wire is increased, the efficiency of the coupling falls off; in fact, it is possible to stop the transference of energy by using a lead of too great a length or one having a high capacity to earth.

From this it is apparent that this method of coupling necessitates a short coupling lead which, in turn, restricts the placing of the apparatus and does not, therefore, offer the advantages of the link system.

## Inductive Coupling

As the name implies, this method depends solely on inductive coupling between the tank and A.A. circuits, so it becomes necessary to modify the coils for this experiment.

In place of the normal A.A. coil, wind one on a thin former of a diameter which will allow it to be placed over the tank coil as shown in Fig. 3. The two ends must be connected to the tuning condenser in the

(Continued on page 195)

# ON YOUR WAVELENGTH



**The International Spelling Problem**  
**A** READER tells me that under International Spelling Rules the name Newman would be *Nouvelhomme*, not *Nouveauihomme*. I do not agree, and insist that my spelling is correct. Perhaps some reader can tell me why London should be *Londres* to a Parisian; Berlin should be *Berliner*, Rome should be *Roma*, and so on. We have so many International Committees that I am surprised that they have not agreed upon spelling. It must occasion them a lot of work transcribing their reports into the particular spelling of the country.

## Howlers

**H**ERE are some howlers sent in by T. R. C., of Coventry.

"A man who was discussing ohms was asked why he did not discuss aways."

"Why should henries be confined to chokes? What about Jack's, Bobs, etc."

"Why talk about cycles when most people own cars."

## The Push-button Four

**H**EREWITH poem by F. C., of Southport:

"Oh, Mr. Camm, Sir, whatever shall I do?"

You've gone and given us a battery set,

And an A.C. mains set, too,

Whereas I am on D.C. mains,

And likely to remain,

Oh, Mr. Camm, Sir, isn't it a shame!"

I do hope that F.C. feels better after that. If Mr. Camm describes a D.C. set he would have a shoal of letters from readers telling him that it was waste of space, as everybody is changing over to A.C.

## If You Were Director-General!

**O**NE reader, Mr. F. W. J., of Harrow, has replied to my question as follows:

"If I held this position the following would be some of the first things I would do:

"(1) Find out by means of a carefully planned census what my eight and a half million licence-holders really require for their money.

"I should use a tuck-in folder, reply post paid, on which would be

## By Thermion

shown every existing item as now broadcast by the B.B.C., together with a request for suggestions. Thirty points would be allotted to each item, and licence-holders would be asked to give the proportion of these 30 points (which, of course, may be the full 30 points or nil) for each item shown. By this means a true idea of what the *majority* want could be obtained, programmes based on it, and not on what a few people think who just happen to write to the B.B.C., or even on the opinion of 20,000, which, to my mind, is like asking one licence-holder in every 450.

"(2) Revise the Sunday system by:

- (a) Starting earlier.
- (b) Varying all Regional programmes.
- (c) Give no more Religious items than the public ask for.
- (d) Close down later.
- (e) Take little notice of what the church or other religious bodies care to say on this matter.
- (f) Not consult any outside authority on what I should broadcast.

"(3) Combine a moderate proportion of gramophone record programmes with advertising, as per certain Continental stations, the profit from this to go to a fund for ex-broadcast artists who need financial assistance. In short, my programmes would be built on what the majority require and *not* on what may be deemed to be the choice of the elite section of the public which, after all, must be a very small proportion.

"(4) Finally, when individuals are expounding their opinions at the 'mike,' my census of the same would be only to prevent personal remarks."

## Cyclists and the B.B.C.

**T**HE difficulties of the B.B.C. in arranging outside broadcasts is demonstrated by the recent protest by the Cyclists' Touring Club and other bodies against the broadcast arranged outside Earls Court during the recent Motor Show. A pedestrian, a cyclist and a motorist were invited to give their views, and these cycling bodies imagined that the B.B.C. had prearranged the remarks of each speaker. The B.B.C. in reply shoot a smart riposte denying the allegation and pointing out that the remarks of each speaker were extempore and unrehearsed. The cyclists are, indeed, a testy crowd, and thought the remarks came off too pat to be spontaneous.

## Lectures

**R**EADERS are suggesting that I should appear before local clubs and give lectures, humorous or otherwise. I am quite prepared to do so providing that I can appear in a mask, and that no effort is made to pierce my identity. I will lecture on any subject nominated—programmes, humour, the technical side of radio, literature, or art. I require an attendance of at least 100 members. How many clubs will comply with those conditions? How many clubs really want to know my views, since I have expressed most of them in this journal? You know that I am anti-crooner, anti-jazz, anti-dance-music broadcasts, and that I am in favour of longer, better and certainly more varied Sunday programmes. If there is any more that you want to know concerning my views on life, let me know, and I will write a few paragraphs to set your minds at rest.

## Crooning

**A** PROPOS my recent paragraph concerning this, S. H. D., writes:

"Mr. Felix Mendelssohn, in his 'Short History of the Noble Art of Crooning,' overlooks a vitally important point, as the full story of the commencement of this disease, given by contemporary historians, is as follows:

"An ordinary straight vocalist, arriving at the studio in possession of what might be described as a 'peach of a cold,' found that he could hardly

speak, much less sing. As there was no one able to take his place at such short notice, it was decided to make the best of a bad job, and the patient was instructed to stand as near to the microphone as possible, and then to do his best (or worst). The resulting extremely feeble sounds were then amplified up to the level of the ordinary singing voice, and 'that's how crooning was born.'

"As practised at present, the vocalist stands right up to the mike, and then sings in a badly produced and strained voice, which is amplified as before, and it is this treatment which causes musicians to condemn this practice, which we hope (in the good old army patois) will cease forthwith.

"You apparently are aware that in La Belle France people call you *Le Beau Thermionique*, and farther away in Vladivostok you are always referred to as *Thermionivitch*."

#### Radio and War

HEREWITH letter from L. F., of Liverpool:

"Wireless telegraphy receiving and transmitting sets that were in existence at the time of the last war were taken into bond for the duration of the war, and later returned to their owners. As the holder of a pre-war licence—which was only obtained by being able to show the necessary qualifications—I am quite conversant with what took place.

"On the outbreak of war, I received a telegram from the Postmaster-General cancelling the licence; my aerial was removed by Post Office officials, on the presentation of a 'Defence of the Realm notice'; the set itself was not taken into bond until shortly after the Scarborough raid, but was returned at the close of war.

"I must say that at the time I did not see what advantage there was in closing licensed stations for the reception only of wireless signals, as it would not have been much trouble for many of the pre-war type experimenters to have put together another set. In putting this view before one of the officials at the time, he suggested that a telephone receiver would be a difficulty—but I pointed out that low-resistance phones could be used together with a transformer; of course, an indoor aerial could have been used.

"It is astonishing what long distances were bridged and what good results were obtained by efficiently constructed crystal sets with the best types of high-resistance adjustable headphones—in pre-war days."

## Notes from the Test Bench

### Mains Consumption

SOME listeners are rather anxious to know what their receiver consumes from the mains, and in an endeavour to work out the cost attempt to calculate the total load and transpose this into terms of watts. This is not usually possible, owing to the effect of the transformer in the case of A.C., although on D.C. supplies a more or less correct answer would be obtained. It should be remembered that an ammeter may be included in series with the mains lead and the load worked out from the reading given, or alternatively one of the special wattmeters may be joined to the mains input circuit. These are now obtainable with two pins and two sockets so that they may be plugged into the mains socket and the receiver plug then inserted into the meter. A direct reading is given in watts for various mains voltages.

### A Wiring Point

IN some receivers it is found that two or more wires need to be joined to a common point and difficulty is sometimes experienced owing to the fact that when the second wire is being connected the first becomes unsoldered. The simplest way of overcoming this difficulty is to twist the two wires together after tinning, but as this usually results in a clumsy and unsightly joint, a better plan is to use one of the special double-ended soldering tags and make certain that the iron is not so hot that the first joint is unsweated.

### Anti-microphonic Valveholders

SOME years ago special vibrating valveholders were supplied in an endeavour to overcome microphony, and a case was recently investigated where excessive microphony was experienced in a receiver. The constructor had made a valveholder incorporating what he called "anti-microphonic" principles, but as he had a defective valve in which the electrodes were loose, the vibration from his speaker was setting this valve into violent movement on the rubber suspensions incorporated in the holder and accentuating the trouble. Although the valve should have been replaced, a rigid holder did not give nearly as much trouble.

### A Television Dinner

THE first Television Dinner will take place on Wednesday, November 2nd, at the Dorchester Hotel. This is in support of the appeal for the New Premises Fund of the R.P.S., and a speech by Mr. J. B. Priestley will be televised (both sound and vision) from Alexandra Palace. The Duke of Kent, K.G., is presiding.

### Television Progress in U.S.A.

I UNDERSTAND that Mr. David Sarnoff, president of the Radio Corporation of America, announced recently that by the time the New York World's Fair opened next spring television programmes would be available. Broadcasts would take place every day for periods of at least two hours. They would be made from the company's transmitter on the top of the 102-storey Empire State Building.

### Eclipse of the Moon

THE moon stages a total eclipse on November 7th, at approximately 10.25 p.m., and I am informed that the B.B.C. has arranged to describe the event for listeners unable to see the eclipse themselves, or lacking the opportunity to do so.

Travellers along the by-pass road to Mill Hill will have noted on the left-hand side of the road a white dome surmounted with a green cupola. The building is the London University Observatory and contains the largest telescope in this country. Professor C. L. Gregory will be present on November 7th to observe the eclipse. Michael Standing, of the B.B.C. Outside Broadcasts Department, will, with a microphone erected alongside the telescope, be an interested visitor. At a few minutes before 10.0 o'clock, Michael Standing will introduce Professor Gregory and himself to listeners and will then, as an amateur, look through the famous telescope and tell listeners what markings and shapes he sees on the face of the moon. The Professor will explain, and listeners will overhear, what the various shadows and shapes are supposed to be. This introductory period will last until 10.0 o'clock.

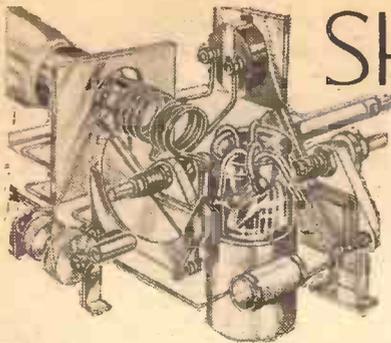
When the black shadow starts to darken the moon's face, Michael Standing, with the assistance of Professor Gregory, will describe what is happening, and explain briefly the causes of this impressive phenomenon.

A third observation period will be broadcast later at 10.55 p.m., when the moon will be regaining its brilliant orb. This interesting broadcast will end at about 11.0 o'clock.

## PRACTICAL WIRELESS SERVICE MANUAL

By F. J. CMM.

From all Booksellers 5/- net, or by post 5/6 direct from the Publishers, George Newnes, Ltd. (Book Dept.), Tower House, Southampton Street, London, W.C.2.



# SHORT-WAVE SECTION

## COMMENCING ACTIVITIES ON THE SHORT-WAVE BANDS

For the Benefit of Beginners, Various Experimental Circuits are Discussed in this Article.

Of the many circuit arrangements recommended to those extending their activities into the short-wave field is one which seems to predominate, this comprising simply an untuned R.F. stage followed by leaky-grid detection and one or more stages of L.F. amplification.

The merits of this combination will be apparent to those used to handling these bands, but for the beginner there exists

consideration becomes the effects of dead-spots in the tuning range.

This condition can be brought about in a number of ways; for example, the natural wavelength of the aerial can at certain harmonics resonate with the tuning inductance, this being in some instances adjustable by the actual coupling. The characteristic of these dead-spots is the difficulty of the detector to oscillate at these resonant

handled, and unless consideration is given to this point another cause for dead-spots arises, particularly if this component is of inferior make.

The positioning of this choke when metal chassis construction is being used enters into the question, since the inductance can easily be affected by "damping" through the close proximity of the component or just one end of the winding to chassis.

### Bread-board Layout

It should, therefore, be possible for the newcomer to try a bread-board layout, giving thought to these first important considerations, and with a little patient experiment the actual influence of certain positions of the choke with relation to

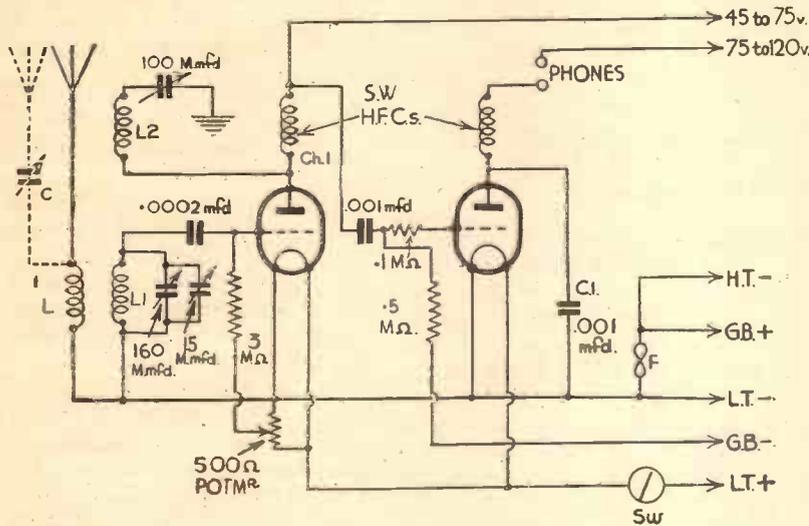


Fig. 1.—Circuit diagram for an experimental two-valve short-waver.

some doubts as to the actual advantages to be obtained in the circuit functions.

It is generally appreciated that to accustom oneself to the behaviour of the higher frequencies there is no better way than that afforded by comparative "hook-ups," and it is therefore proposed to explain here a simple basis upon which to obtain the necessary preliminary grounding.

### Experimental Circuits

Firstly, a skeleton circuit can be chosen for a two-valver, this being followed by a single-valve tuned R.F. adapter for the analysis of certain points about to be explained, and which have bearing on the performance, technically and in practice, of the above-mentioned untuned R.F. receiver.

In Fig. 1 it will be seen that a leaky-grid detector tuned by a six-pin coil is followed by a resistance-capacity coupled L.F. stage. To all intents and purposes this would appear to be quite a satisfactory arrangement judged from experiments on the broadcast bands, but actually there are a multitude of possible snags which can arise in its use, and thus the newcomer has an admirable starting point for his tests.

In the first place the R.F. input is governed immediately by the coupling of the coils L and L1, disregarding for the moment the series condenser "C," and one's first

points of the band, or even in the complete cessation of reaction.

The next possible cause is slightly more involved, and concerns the function of the anode H.F. choke, Ch1. This component should be chosen along the same lines as those of the tuning inductances, namely, the effective overall frequency range to be

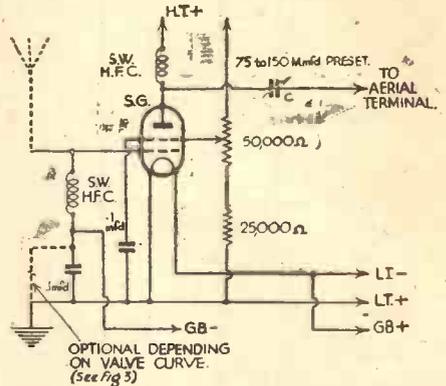


Fig. 2.—Circuit diagram for an untuned R.F. unit.

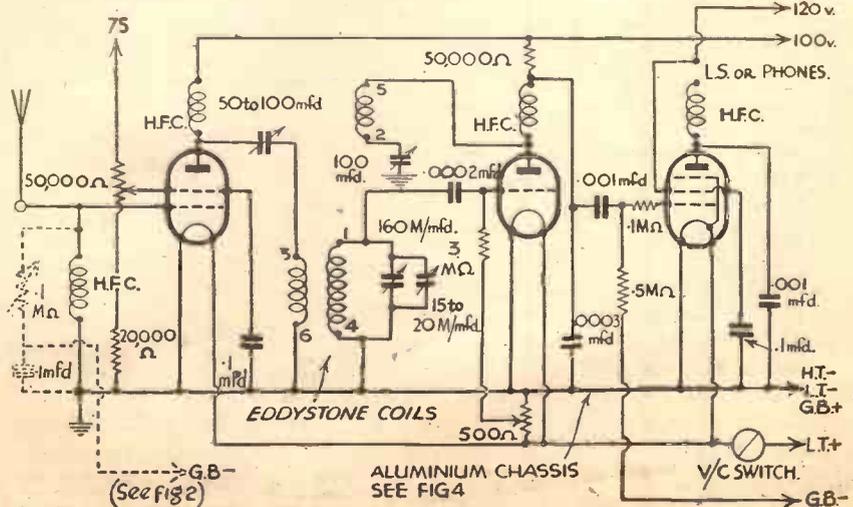
chassis—if there is any metalwork about—will prove a self-explanatory method of circuit function.

The important point deduced from the first notes on aerial resonance brings one to the question of isolating the aerial in some way; the use of a series aerial condenser can, of course, be tried, but it will be found that another control makes tuning awkward, whilst from a theoretical viewpoint it will be apparent that the very small R.F. input is going to be weakened and, therefore, one must consider the question of another stage for the isolation of the aerial.

### R.F. Amplifier

This now brings one to the untuned or tuned R.F. amplifier, and the question of economy also arises. The tuned R.F. stage can be ruled out from the beginner's angle as unless very critical ganging of the two sets of tuning coils can be arranged, the

(Continued overleaf)



### SHORT-WAVE SECTION

(Continued from previous page)

last resort is for two separate controls, and some experience will be necessary in the handling of these, which is obviously going to be critical, due to the wide variation in frequency resulting in one stage being out of step.

Fig. 2 gives a straightforward circuit for an untuned R.F. stage or unit, but before dealing with this, there are one or two other considerations to be made with the two-valve circuit. The choice of valves is to some degree important, even with this simple circuit, and one having a mutual conductance of about 1.5 mA/v. should be suitable for the detector, the grid-leak and condenser constants being approximately those given in the circuit diagram. To obtain smooth reaction a 500-ohm potentiometer can be wired across the filament leads, and the end of the grid-leak returned to the slider, the reason for this being due to the actual potential at which it will be necessary to maintain the grid for the effect of reaction on telephony and C.W. signals, since very weak signals will in all probability require a slightly more negative bias for maximum sensitivity and quality.

The use of a resistance-coupled amplifier is preferable to that of a transformer, which could influence very perceptibly the stability and general performance of the circuit. It is improbable that the output stage will be influenced by stray H.F. in a bread-board layout, but as a precautionary measure it will be as well to include in the grid circuit a "stopper" resistance of 100,000 ohms in order that attention can be directed to the functions of the detector stage without having to hunt for possible causes of any parasitic oscillation in the output stage.

Hand-capacity effects arising through the 'phone leads is another point which can result in the difficult control of the receiver on weak signals. Any H.F. which might get past the grid stopper resistance can be by-passed to earth through the condenser "C," or prevented from causing feed-back to a great extent by the incorporation of another H.F. choke.

It is not proposed here to detail the

actual baseboard, or chassis construction, as this class of layout has been dealt with in previous issues, but the necessity for short, rigid wiring cannot be over accentuated in this stage of one's experiments.

### Untuned R.F. Stage

The untuned R.F. stage is a simple job, and little need be added to the notes already given except concerning the value of the condenser "C," Fig. 2. This condenser should have a value of from 75 mmfds. to 150 mmfds., and, where possible, should be of the pre-set type, thus affording a marginal variation for coupling when higher frequencies are to be handled, as, for example, when it is proposed to try

of this arrangement is essentially the obviation of dead-spots in the isolation of the aerial.

For those who are new to the subject, a suggested component layout is given in Fig. 4, and principal component values are included.

A final word on the operating voltages: the detector should preferably have about 75 volts on the anode, with approximately 100 volts for the output valve; lower voltages are, of course, permissible, without serious loss to the performance of the set, but these shown can be taken as a good average for new or old valves with proportional bias.

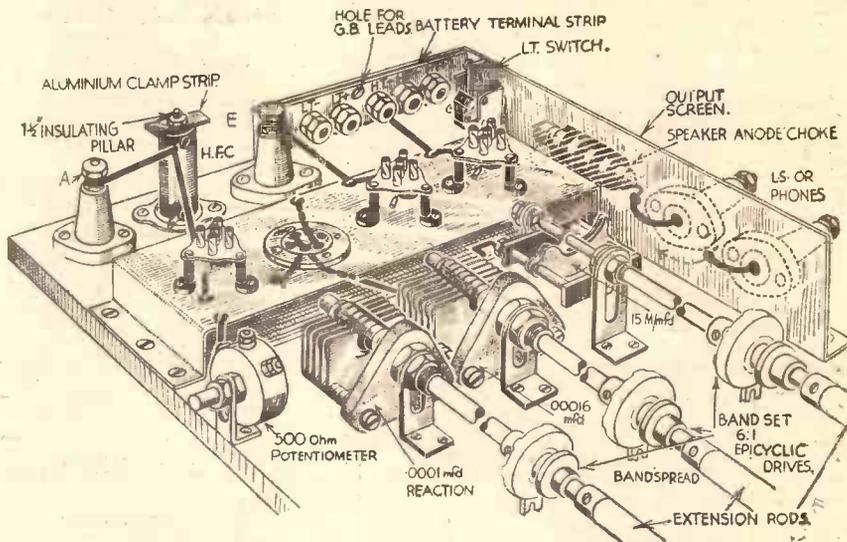


Fig. 4.—Suggested layout of components for the three-valve circuit shown in Fig. 3.

below 10 metres without alteration to the existing wiring.

The method of connecting the U.R.F. unit to the receiver is clearly depicted in Fig. 3, and when trying this combination out, it should be remembered that the gain of this stage will be so small as to be hardly appreciable, but the point in favour

The importance of short, generous earth returns will be realised, thus in Fig. 4 the adoption of an aluminium mount for the valveholders and coil base will prove advantageous in this respect, whilst at the same time permitting short connections to be made to the variable condensers and baseboard components.

## Leaves from a Short-wave Log

### Broadcasts from New York Opera House

THE Eighth Season of matinee performances at the Metropolitan Opera House, New York, will open on November 26th, and as in previous years, will be relayed by the National Broadcasting Company to their short-wave transmitters, thus making these musical broadcasts available to European listeners.

### Public Benefactor No. 1

KING FAROUK OF EGYPT, in an endeavour to popularise the broadcasts of the Cairo and Alexandria stations, has made a gift of three thousand wireless receivers to the native population of the Nile Valley.

### Schenectady's High-power Short-waver

AS from November 1st, the General Electric Company's station, W2XAD, at Schenectady (N.Y.) in the N.B.C. network will broadcast on a power of 100 kilowatts, as against the 18 kilowatts hitherto used. The channels are 31.41 m. (9.55 mc/s), and 19.57 m. (15.33 mc/s).

### Singapore's Daily Radio Programmes

THE British Malaya Broadcasting Corporation of Singapore, through its transmitter ZHP on 30.96 m. (9.96 mc/s), 400 watts, now transmits programmes daily according to the following timetable: G.M.T. 09.40-14.40 (Monday to Saturday inclusive); Sunday, G.M.T. 10.25-14.40 and 23.40-06.10. Extra broadcasts are also made on Wednesday and Saturdays from G.M.T. 05.40.

### The Short-wave Stations of Uruguay

CXA4, Montevideo, on 48.98 m. (6.125 mc/s), is a 5-kilowatt operated by the Servicio Oficial de Difusion Radio Electrica, Calle Mercedes, Montevideo. Three other transmitters are in course of construction, namely: CXA6, 31.41 m. (9.55 mc/s); CXA10, 25.22 m. (11.895 mc/s), and CXA18, 19.61 m. (15.3 mc/s). Further stations which are being built are CXA9, 31.78 m. (9.44 mc/s), and CXA19, 25.65 m. (11.695 mc/s), owned by the Difusoras el Espectador; CXA5, 31.63 m. (9.485 mc/s); CXA7, 25.56 m. (11.735 mc/s); CXA16, 19.51 m. (15.38 mc/s), and CXA17, 16.85 m. (17.8 mc/s) to be operated by Señores

Figuera, Canepa y Cia; CXA3, 49.38 m. (6.075 mc/s), to be installed by Sres H. Leon y A. Landeira, and CXA2, 50 m. (6 mc/s), 5 kilowatts, already advertised by Sres Racine y Caissols, all at Montevideo. Another transmitter is being installed at Real de San Carlos (Uruguay) by Señor Jaime Yankelevich, and will use two channels, namely, CXA8, 31.12 m. (9.64 mc/s), and CXA13, 48.74 m. (6.155 mc/s).

### More News Bulletins from China

SIMULTANEOUS broadcasts of news bulletins in the English language are carried out by XOZ and XOY, Chengtu (China) daily from G.M.T. 14.45-15.30 on 19.34 m. (15.51 mc/s), and 32.02 m. (9.37 mc/s) respectively.

### Another Station in Paraguay

ZP8 is the call of a new 12-watt transmitter opened at Asunción, Paraguay, by Señores Ysem y Sacarello, of that city. The channel allotted to this station is 31.56 m. (9.505 mc/s).

So far, the only broadcasts heard from that South American Republic have been through ZP14, Villarrica, on 48.78 m. (6.15 mc/s), said to be working on a power of 300 watts. The call is: *Radio Cultural* or *La Voz del Corazon de Sud America*. The approximate distance from London by air-line is 6,000 miles. Standard Time is Greenwich Mean Time less four hours.

A PAGE OF PRACTICAL HINTS

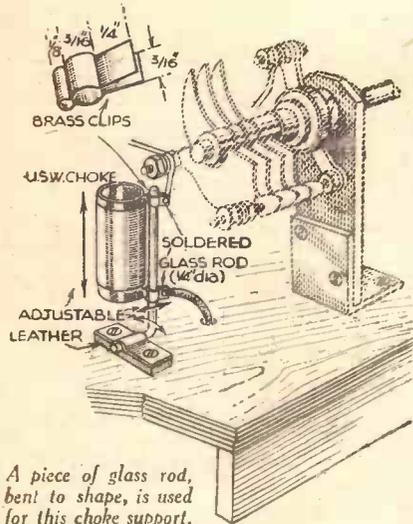
SUBMIT YOUR IDEA

READERS WRINKLES

THE HALF-GUINEA PAGE

A Neat H.F. Choke Support

WHEN building a new short-wave "rig-up" it occurred to me that I could attain extra rigidity for certain components by the aid of some glass rod



A piece of glass rod, bent to shape, is used for this choke support.

which I had handy. One such arrangement is depicted in the accompanying sketch. The glass rod was easily bent by holding over a flame and allowing the short end—which fits under the baseboard clip—to droop as the glass softened. The small solder clips were made from torch battery contact strips, and the necessary bending is done by pressing the strip round a suitable fine tool. Other components can likewise be given this means of extra rigidity, and different lengths and diameters of glass rod will prove exceptionally useful for short-wave construction.—E. J. HORROX (Seven Kings).

A Removable Meter Front

TO enable different calibrated scales to be fitted to an 0-1 mA. meter, I have evolved a method whereby this operation can be done without the removal of the meter from the panel of my tester. Firstly, the meter was carefully dismantled for the extraction of the original glass, but this was comparatively simple. The meter was then fitted to the tester panel, and all that was required was a thin rubber band and a thin clock glass of approximately the diameter of the meter glass. By shaping four brass cleats—obtained by utilising disused torch battery contact strips—a suitable means of clamping the glass and rubber band to the meter was obtained. In the accompanying sketch it will be seen that the new scales required to be split to facilitate their fitment without possible damage to the meter needle, whilst a light steel spring "A" provided a means for securing the new scale in position.—J. R. WATSON (London, W.C.2.).

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.

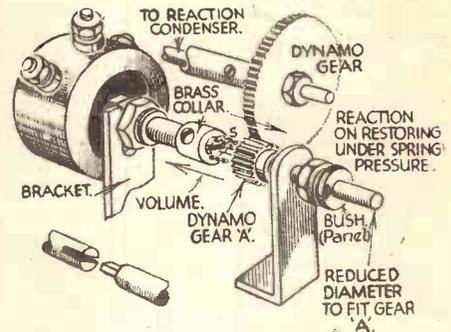
SPECIAL NOTICE

All wrinkles in future must be accompanied by the coupon cut from page iii of cover.

A Uni-knob Tone and Reaction Control

I HAVE used the gears from an old H.T. dynamo for the clutch and reduction drive movement embodied in this idea. From the pictorial illustration it will be

drive gear whilst neatly engaging with the tone control shaft. The spindle or shaft for the gear "A" had necessarily to be of smaller diameter than the standard

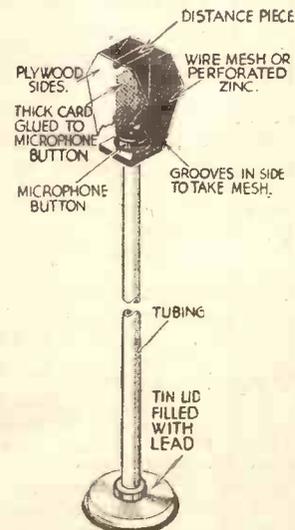


A simple geared dual-control device.

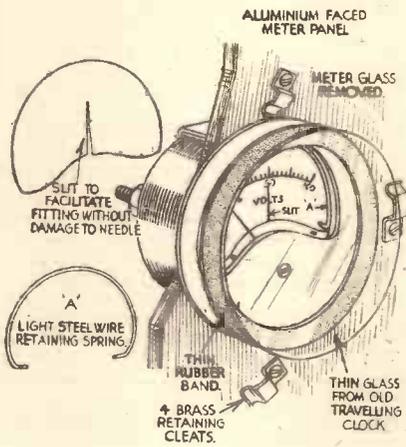
1/2 in. diameter tone control, but I was able to procure a suitable bush from an old ganged mica variable condenser. The action is comparatively whip free, and a little machine oil helped considerably.—C. L. WHITTINGHAM (Jedburgh, Roxburgh).

A Small Microphone

THE small microphone shown in the sketch was built from scrap material, and has proved very satisfactory. The two sides are cut from three-ply and are screwed to distance pieces about 2 in. long. On the lower distance piece a microphone button is screwed, and a rectangular diaphragm, made of thick card, is cemented to the reed of the button. The side pieces are grooved about one-eighth of an inch from the edge, all round, and a piece of perforated zinc is cut to fit, and inserted



A small microphone, and stand made chiefly from scrap material.



A simple method of providing a removable meter front.

seen that for the clutch action I have simply slotted the tone control shaft to engage, under pressure of the light steel wire spring "S," with the screwdriver shaped end of the gear shaft. The width of the small gear teeth is such that approximately 3-16 in. thrust will clear the reaction

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By F. J. GAMM

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between the sides before screwing them up tight. The complete unit can then be screwed to a piece of curtain rod, or tube, cut to the height required. The base is made out of a tin lid, about 5 in. diameter, filled with scrap lead. A screw through the base into the rod holds it securely.—K. RUSSELL (Southbourne).



# Practical Television

November 5th, 1938. Vol. 3. No. 124.

## A Museum Presentation

**A**FTER the very successful television exhibition held last year at the Science Museum, South Kensington, it was proposed to embody a number of the exhibits into a large and permanent television section which would, of course, also accommodate the equipment already held by the authorities. Unfortunately, these plans have not yet materialised, but in the meantime the Science Museum have been acquiring from various sources interesting apparatus, especially that associated with the initiation of new developments. One of the latest items in this connection is part of the apparatus used by Mr. Baird in a series of television performances given to the public at the Dominion Theatre, London, in January, 1937, as part of the cinema programme. Some of it was also used in the first public demonstration of large screen colour television in February, 1938, in the same theatre, the colour television pictures being transmitted by ultra-short waves from the South Tower of the Crystal Palace. The actual apparatus presented comprises a specially-designed mirror-drum, and a colour filter disc. The first named is an example of great engineering skill, for the drum, with 20 mirrors mounted on its periphery, was made to revolve at 6,000 r.p.m. The resultant picture was interlaced six times through the medium of the slotted disc revolving at 500 r.p.m., so that a final definition of 120 lines was secured. For the colour demonstration alternative slots in the disc were covered with red and blue-green filters, and the final picture size (vertical scanning) was 12ft. by 9ft. It is hoped that the original plans of the museum authorities for a large permanent television section will soon materialise, for the public interest in this science is growing very materially, and students and others wishing to study the early apparatus employed in television's rapid progress to a service stage will take full advantage of the facilities so provided in the museum.

## A Debatable Point

**W**HEN plans for the alterations of the Alexandra Palace were prepared so as to convert one section into the B.B.C. television station, great care was expended on ensuring that the transmitting aerials for the vision and sound signals were located as high as possible. To this end a lofty lattice mast was built on to the top of one of the towers, and subsequent experience with this scheme has seemed to justify the efforts made with the view of providing a service area for good reception of as great a magnitude as possible. This same reasoning has been followed by the French authorities, who were provided with an ideal ready-made site in the Eiffel Tower itself, while all the American experiments have been undertaken with aerials on the roofs of New York's highest skyscrapers. In Germany, however, a different situation seems to have arisen. While admitting that the new "country" stations are being

built on high mountain sites such as the Brocken and Feldberg, the television station which is to serve Berlin, and its suburbs, has been conceived from quite a different angle. The vision and sound aerials have been erected on the roof of an office building not far from the Exhibition buildings, while the high-powered ultra-



Mr. Baird, the pioneer of television, who gave his first demonstration in 1926, is here seen demonstrating one of the latest big-screen television receivers.

short-wave radio transmitter is located on the floor below. The aerials have therefore a relatively low elevation, but the feeder cable linking these with the output stage of the radio transmitter is very short indeed. While admitting that there must be a loss of range power due to this somewhat low height, the Germans state that it is more efficient than using a very high aerial with a resultant long feeder cable. They believe that the power losses associated with the latter scheme far outweigh any of the benefits known to be associated with transmitting aerial height, and have in consequence based their new station design on this factor. The proof of these conclusions will only be furnished after a period of trial with the new 441 line station, and experts are awaiting the results with interest, for these may quite justifiably

alter the plans of other countries if they prove to be correct.

## A Camera Suggestion

**I**N order to obtain a satisfactory television picture it is essential that the transmitted signal should embody the full range of contrast values which are necessary for a true light replica of the scene being radiated. At the same time proper allowance must be made for the changes in the background illumination which occur from time to time, say, that between a bright sunlit view, and an action in twilight. This brings into action the D.C. component as it has come to be known, and it is often found difficult to comply with these extreme conditions, and yet conform to the contrast requirements mentioned previously. To meet the difficulty it has been proposed in one quarter to cut down the mean value of the light intensity which falls on the mosaic screen of the camera, by the inclusion of an auxiliary device. It is claimed that in this way the camera will be better able to follow the changes in average or background illumination. To allow this to happen a partially transparent mirror is inserted in the path of the scene optically focused on to the camera mosaic. This will cause some of the original light to be diverted, and this is then made to fall on the active cathode surface of a photo-electric cell. After amplifying the resultant electrical signal, this is then fed to a Kerr cell which acts as a form of light shutter, since it is placed in the path of the optical beam focused on to the camera. In this way any very excessive light changes will be moderated, and enable the camera to handle the television signal generation in what is claimed to be a more efficient manner because of the absence of extreme light values. It is not yet known how effective this suggestion will prove as far as the home viewer is concerned, but past experience has shown that the vagaries of the weather in the case of outside broadcasts, and the deliberate scene lighting changes introduced in the studio to provide more exact production, can place a "strain" on the camera which the above suggestion may prove effective in mitigating.

## PRACTICAL MECHANICS HANDBOOK

By F. J. CAMM

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Tower House, Southampton Street, W.C.2.

# The List of Components!

## Some Notes on the Choice and Interchangeability of Certain Components in Other than *Practical and Amateur Wireless* Guaranteed Receivers

IT has always been a policy of PRACTICAL AND AMATEUR WIRELESS to specify one component—and one only—for each position in the circuit of receivers completely described in these pages. As all regular readers know, the reason is that in designing every new receiver in our laboratories, innumerable tests and experiments are made to find the most suitable part for each circuit requirement. Another

In each case, the aerial lead-in is connected to a tapping on the tuned winding, through

*by The Experimenters*

a fixed condenser for preference, and a switch is used to short-circuit the long-wave

medium-wave winding, and a simple on-off switch is used to short-circuit the long-wave section. The reaction winding is a separate coil and is not connected to the tuned winding except magnetically. This circuit arrangement is satisfactory when selectivity on long waves is not very important, and when only moderate selectivity is required on medium waves. In general, a coil of this type is most satisfactory when sensitivity is the first requirement; when only a very poor aerial is available, for example.

The circuit marked B employs a somewhat more elaborate tuner, for in this case the aerial may be connected to one of two tappings: one on the long-wave and one on the medium-wave winding. This is known as a transfer tapping. In addition, there is the shorting switch for wave-changing, whilst a third tapping is provided for the grid connection to the detector valve. The reaction winding differs from that in the previous example, since one end is permanently connected to the lower end of the tuning winding. This means that the reaction condenser must be between the winding and the anode of the valve instead of between the winding and earth. Although the two switches used when wavechanging are shown in broken lines, they are generally built into the coil itself and operate as a single unit. Connections are marked to correspond with those on the circuit previously discussed, and it should be noted that there is an additional one, marked V.C. (variable condenser). Actually, the grid could be joined to this if desired in order to obtain slightly increased sensitivity and reduced selectivity.

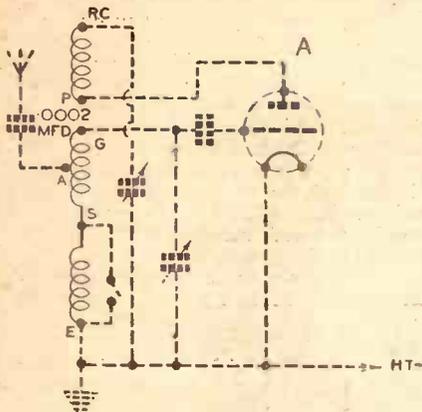


Fig. 1.—Three typical aerial circuit tuners with aerial tapping.

reason is that, by following this system every reader who builds a PRACTICAL AND AMATEUR WIRELESS receiver is assured that on completion it will behave in the same manner as the original perfected design.

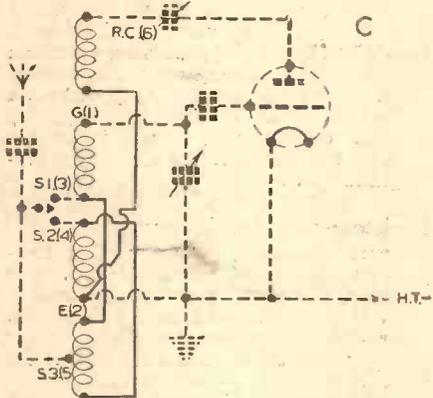
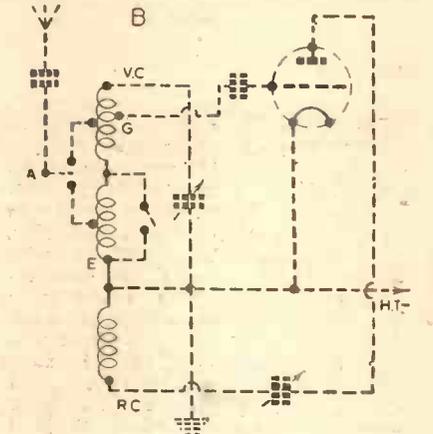
In a few instances results might not be affected by replacing a fixed condenser or a resistor or even a transformer—but, on the other hand, the complete design might be spoiled. What is more, the unique PRACTICAL AND AMATEUR WIRELESS guarantee would not apply.

Despite these special circumstances, there are many occasions on which it is permissible to use one of a number of similar components. Such occasions arise principally when experimental circuits only are given, as contrasted with complete designs, wiring plans and detailed instructions. In these cases it is often essential to make use of a few components that are on hand, or which can be taken from another receiver which is to be dismantled. Sometimes it might even be difficult to obtain a certain component of the exact type suggested.

### Aerial-circuit Tuners

One of the components that is of prime importance is the coil, or set of coils. These are available in innumerable makes and types, many of which are interchangeable provided that the correct connections are known, and many of them which could not be interchanged without upsetting the complete receiver.

We can first consider the aerial coil (with reaction) suitable for use in a Det.-L.F. receiver of fairly simple type. It might be of any of the kinds shown diagrammatically in Fig. 1. At first glance, all of these appear to be entirely different, although in principle they are alike and—within fairly wide limits—interchangeable.



winding when medium-wave reception is required.

Perhaps the simplest of the three tuners is that marked A, for there is only one tapping for the aerial, this being on the

### Double Centre-tapping

At C we show a third typical coil circuit, where provision is made for connecting the long-wave section between two halves of the medium-wave winding. The long-wave winding is also tapped, so that the aerial is automatically joined to a centre tapping whether the three-point switch is set to medium wave (closed contacts) or long wave (open contacts). Although not widely used to-day, this type of coil is remarkably effective, especially if the optimum tapping points are carefully chosen. The different terminal markings should be noted.

It will have been observed that, in each

(Continued overleaf)

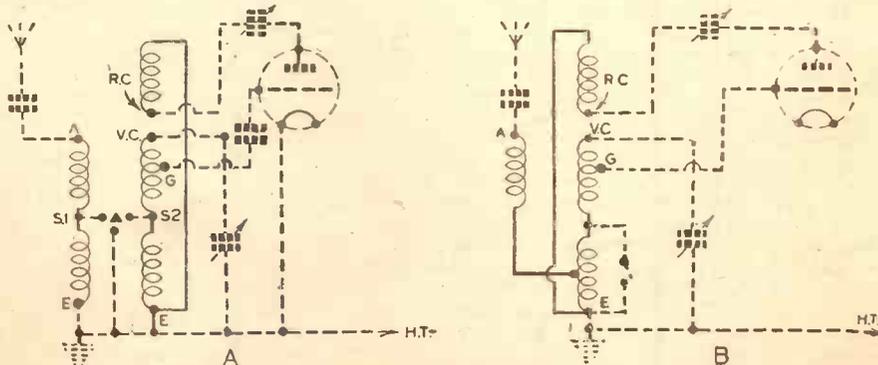


Fig. 2.—Typical tuners of the type having a separate aperiodic or untuned primary winding. This can be used for aerial coupling or as the primary of an H.F. transformer used between H.F. and detector valves.

**THE LIST OF COMPONENTS!**

(Continued from previous page)

circuit, letter references have been given to the terminals; as you are aware, figure references are more frequently given in practice. But since terminal numbers are not standardised, letters are more convenient. Additionally, most manufacturers describe the connections in a form such as: 1, grid; 2, earth; 3, one contact of three-point switch; 4, second point of switch; 5, third point of switch and aerial lead; 6, reaction condenser. This example applies to the coil in the circuit marked C. It should now be clear how the three typical coils dealt with can be replaced one

oscillator coil of the same make and pattern) simply by omitting the reaction connections. In the same way, any of the coils could be used between an H.F. stage and a detector simply by connecting the "aerial" terminal to the anode terminal of the H.F. valve through a fixed condenser; the usual H.F. choke should, of course, be included in the anode lead to the H.F. valve.

**Inter-valve Coils**

A coil with a separate grid and aerial or aperiodic windings could also be used in a tuned-transformer inter-valve circuit, as shown in Fig. 3.

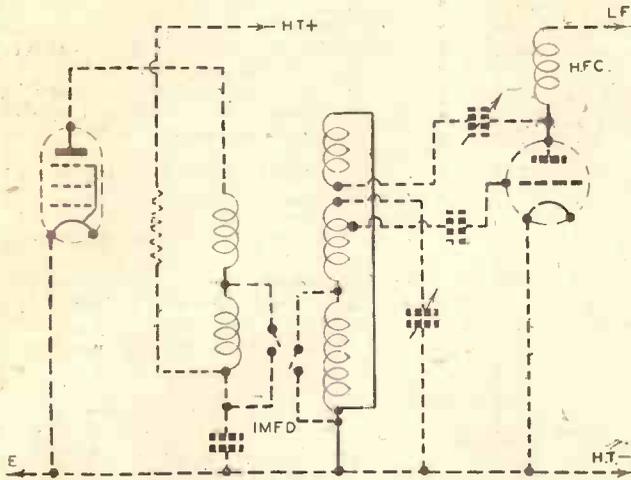


Fig. 3.—A coil of similar type to that shown in Fig. 2 used for inter-valve coupling.

for the other. At the same time it is necessary to add that in many cases, especially when the coil is designed so that it can be ganged with others, the wave-change switch is often built into it and can thus be ignored as far as its connections are concerned. The circuits are applicable to either air-core or iron-core coils, but the particular connections shown are seldom used with iron-core components.

**Coils with Aperiodic Winding**

There is another general type of aerial coil which is now used extensively in simple sets. It has a separate aerial winding, generally tapped, and the reaction winding has one end permanently joined to the grid winding. Fig. 2 gives two examples. In the first, the coil has eight terminals, and a three-point wave-change switch is required to short-circuit a portion of both aerial and grid windings for medium-wave reception. There is a separate grid tapping and there are two separate earth terminals. By disconnecting the earth lead from terminal E on the aerial winding, and leaving it connected to the other earth terminal and to H.T.—, a doublet type of aerial can be used by attaching the two leads from this aerial to the two ends of the aerial winding.

The second example is of a type of coil not widely used to-day, but one that is often very satisfactory. On long waves the aerial winding is joined to a tapping on the long-wave winding, whilst on medium waves the bottom of this winding is virtually earthed. It is not an ideal arrangement, but comparison of the two circuits will show how the coils could be interchanged.

Any of the tuners so far described could be used in the aerial circuit of an H.F. receiver (and even of a superhet receiver if they were designed to match a particular

as .0005 mfd. At the same time, a reaction condenser of .0003 mfd. will serve in most cases. The most satisfactory reaction control is to be ensured by using the smallest condenser that will make the detector oscillate over the complete wavelength-ranges.

**Resistors and Condensers**

Apart from coils, there are other components that are interchangeable. For example, it is rare that the performance of a set is altered by replacing a 5,000-ohm one-watt resistor of one make by a similar component of another, of good make. Be sure, however, that the replacement is non-inductive if that specified is, and that it will fit mounting clips when these are used. Similar rules apply to fixed con-

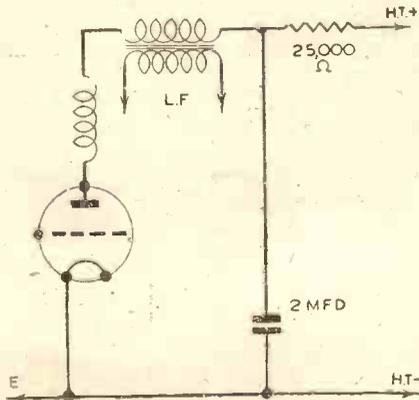


Fig. 4.—A small L.F. transformer designed for parallel-feed connections could not satisfactorily be used in the circuit shown since there would be too high a D.C. current through the primary windings.

densers, but in this case it is often important to check carefully the working voltage; test voltage might be of little significance. If the condenser recommended had a rated working voltage of, say, 500 volts, another condenser of "500 volts test" might "blow up" immediately the power supply were switched on. Pay attention also to the need or otherwise of a non-inductive condenser.

**L.F. Transformers**

It might appear perfectly in order to use an alternative L.F. transformer if it had the same step-up ratio, but this is not always the case. Suppose the circuit required a directly-fed transformer, as shown in Fig. 4, it would probably be fatal to results to use a smaller and less expensive component intended for parallel feed, as illustrated in Fig. 5. While the first transformer has to carry the full anode current of the valve with which it is used, the second carries only the A.F. current—no D.C. If appreciable D.C. were passed through the primary winding the transformer might be "saturated," when reproduction would be badly distorted—if the results were not still more serious. It should be understood that the transformer designed for use in the Fig. 4 circuit could generally be used in the arrangement shown in Fig. 5 without any attendant disadvantages, provided that it

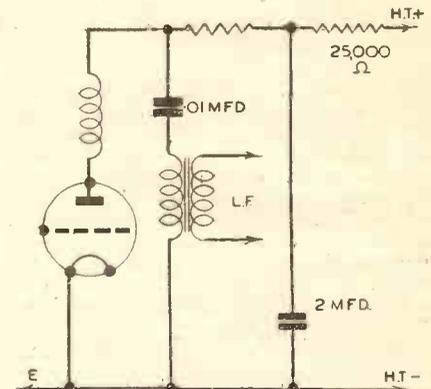


Fig. 5.—Parallel-feed connections which should always be used with small transformers not intended to carry more than a minute D.C. primary current.

were sufficiently compact to fit the available space.

**H.F. Chokes**

It is often thought that all H.F. chokes are the same in other than outward appearances. This is not so. A simple and inexpensive choke intended for use in the anode circuit of a detector valve (often called a reaction choke) would not be of much use in the anode circuit of an H.F. pentode; not only would the inductance be much too low, but the current-carrying capacity would rarely be sufficient. Reaction chokes have an average inductance value of about 100,000 mH., whereas a so-called S.G. choke should have a value of about 300,000 mH.

**An Ideal Book for the Beginner!  
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By F. J. CAMM

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**THE AMATEUR TRANSMITTER**

(Continued from page 186)

usual manner, but, to simplify matters, the indicating bulb will have to be connected in series with the winding and not in the reaction coil as previously.

Adjust the oscillator and then slide the A.A. coil along the tank coil until maximum output is obtained, noting the effect on the tuning of the oscillator as the load is added.

It will be found that a position can be reached where the tank meter indicates the normal rise in current, as the energy is transferred, and that the tuning of the two circuits becomes closely related and effective on each other.

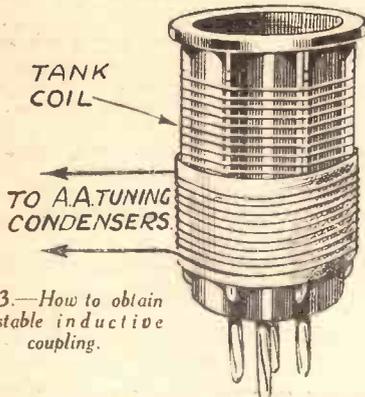


Fig. 3.—How to obtain adjustable inductive coupling.

Now try making the coupling tighter, by bringing the coils closer together, and then note the effect of the tuning of the two circuits, the tank meter reading and the output as indicated by the lamp in the A.A. circuit.

If an increase in output is expected, the results will be disappointing. The meter will indicate a rise in current, but there will be a falling off in the transference of energy due to the tight coupling allowing the A.A. circuit to impose a load too great to allow the oscillator to maintain correct operating conditions. The effects should be noted, as they are bound to be experienced in future work, in the form of overloading.

**A NEW PROJECTION SCREEN**

A VERY ingenious form of projection screen has recently been patented by Baird Television, Ltd., the details of which have now been released. This is made up from an interweaving of rods or fibres of a transparent material which are arranged to pass light without refraction occurring except at the screen boundary, and at the same time there is a minimum of haphazard light scattering or optical absorption. If desired, this type of screen can be made reflecting, and also be combined with an additional screen of translucent or transparent material. The actual material used in making the screen can vary, but one suggestion is flexible threads of glass formed by extrusion which can be intermeshed by a knitting process. When necessary the screen can be silvered, while when it is required to employ an additional screen as mentioned above, this latter can be made from glass, gelatine, or similar substances; being used either in close proximity, or applied as a coating. Yet another suggestion is to make the auxiliary screen with a coarsened surface to render it dispersive, this, if desired, being interposed between the woven screen and a reflective layer. The versatility of the arrangements extends very considerably the applications of this projection screen, and there is no doubt that it will be in evidence very shortly.

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**PUSH-BUTTON 4 KITS BATTERY MODEL**  
**KIT "A" CASH or C.O.D. YOURS £5:5:0**  
 CARRIAGE PAID FOR £5:5:0  
 9/- down and 12 monthly payments of 9/-.  
 Comprising all first specified parts for Mr. Camm's receiver, including Peto-Scott ready-drilled chassis, push-button unit, condenser and dial, etc. Varley I.F. transformers, wire, flex, and screws, but less valves, speaker and cabinet.  
**SET OF 4 SPECIFIED VALVES, 36/-**, or add 3/- to Kit "A" deposit and to each monthly payment.  
**SPECIFIED PETO-SCOTT (P.B.4) CABINET**, Cash, C.O.D., carriage paid, 27/6 or yours for 4/- down and 7 monthly payments of 4/-.

**S.T. 900 ALL-WAVE KITS with FREE WIRING INSTRUCTIONS**  
**KIT "A" CASH - C.O.D. CARRIAGE PAID 55/-**  
 or 5/- down and 11 monthly payments of 5/3.  
 Comprising all first specified parts as used by the designer, Mr. John Scott Taggart, in his all-wave battery world-beater and including FREE station dial and comprehensive wiring, building and operating instructions, less coils, valves and cabinet.  
**5 specified valves 30/3, or 3/6 down and 11 monthly payments of 2/9.**

**A.C. Mains Model**  
**A.C. P.B.4. KIT "A,"** comprising all parts exclusively specified by Mr. F. J. Camm for the mains model including: drilled steel chassis, all-wave tuner, push-button unit, station-name scale, mains transformer, etc., but less valves, cabinet and speaker. Cash or C.O.D. 7 gns. or 12/9 down and 12 monthly payments of 12/9.

**KIT "A 10" CASH or £4:5:0**  
 C.O.D.  
 As KIT "A," but with Konectakit—comprising special kit of connecting wire, flex and battery plugs and SET OF 10 specified B.T.S. self-locating one-shot inductors covering 9.5 to 2,000 metres. Yours for 8/6 down and 11 monthly payments of 8/-.

**BATTERY 4-VALVE All-wave S/HET CHASSIS**  
 Sensitive 4-valve 7-stage circuit with filter to triode pentode frequency changer, Litz-wound transformer coupled to H.F. pentode as I.F. amplifier similarly coupled to double diode triode followed by output pentode. Wave-range 19-2,000 metres. 6-station press-button and manual tuning. Station-named dial. Low H.T. consumption. Chassis size 11 1/2 ins. wide, 9 1/2 ins. high, 8 1/2 ins. deep. Supplied complete with 4 valves, all knobs and plate with British valves, knobs and cabinet.  
**CASH C.O.D. £5:12:6**  
 Yours for 5/- down.

**BUY A PETO-SCOTT CHASSIS GUARANTEED FOR 12 MONTHS**

**A.C. 4-VALVE All-wave S/HET CHASSIS**  
 6-stage 4-valve A.C. version of the above. Amazingly efficient circuit providing world-wide reception and press-button tuning for 6 principal medium and long-wave stations. Supplied complete with 4 valves, all knobs and P.B. escutcheon. Guaranteed, fully tested. For A.C. mains 200-250 volts 40/100 cycles. £6:19:6, or 5/- down and 18 monthly payments of 8/10.

**5/- DOWN**

**6-VALVE A.C. All-wave S/HET CHASSIS**  
 A marvelous 6-stage superheterodyne for the connoisseur. 4 wave-ranges, 10-2000 metres. A.V.C. and tone control. Illuminated station name and metre-calibrated scale. Six buttons for automatic tuning for principal M.W. and L.W. stations with settings instantly changeable without the necessity for opening up set. All-world reception by manual tuning. Complete with 6 valves, all knobs and escutcheon. Guaranteed, fully tested. Cash C.O.D. £7:19:6, or yours for 7/6 down and 18 monthly payments of 10/-. Matched energised high fidelity speaker 27/6 extra, or same deposit but add 1/10 to each monthly payment.

**Free! SEND NOW!**  
 for the new Peto-Scott beautiful Art Brochure illustrating the complete range of Peto-Scott Receivers and Radio-grams. Prices from £5:15:0 to £15 gns. Also, now ready, new Peto-Scott chassis, accessory, short-wave and all-wave kit lists, all available in an easiest of easy terms.

**DEMONSTRATIONS DAILY OUR NEW BRANCH: 41, HIGH HOLBORN, LONDON, W.C.1.**  
 Tel.: Holborn 3248.

**PETO-SCOTT 6/7-WATT A.C. AMPLIFIER**  
**ITS MANY USES COMPELS PURCHASING AT THE PRESENT LOW PRICE**  
**A.C. AMPLIFIER ONLY.**  
 Employs a highly efficient 4-valve push-pull output circuit giving an undistorted output of 6-7 watts, with pleasing tone balance. Sound range 500 feet. Soudly constructed on a steel chassis with volume control fitted. Recommended for speech and gramoc. amplification. Complete with 4 valves, fully tested and ready for immediate use.  
**CASH £3:10:0 or 5/- DOWN**  
 balance in 11 monthly payments of 6/3.

**MICROPHONES**  
 Thoroughly recommended, Transverse current types for use with any amplifier. Can also be attached to your existing set (via P.U. sockets) for home broadcasting. Two models available and supplied complete with matching tuning in separate case together with 25 feet of microphone flex.  
**PROFESSIONAL (chromium plated) FLOORSTAND MODEL**  
**CASH 42/- YOURS FOR 2/6 DOWN**  
 balance in 11 monthly payments of 4/-.  
**TABLE MODEL.** Cash or C.O.D. 25/-, or yours for 2/6 down, balance in 11 monthly payments of 2/6.

**Electric CLOSE-SHAVER**  
**REMINGTON Super Electric Close Shaver.** No lathering—no soap—no brush—no blades—no scraping—no sharpening! Glides smoothly over the skin and gives the closest, fastest, safest shave you have ever had. Hygienic ivory finish. For any voltage D.C. or A.C. Real leather case, flex, etc. Price £3:7:6, or 2/6 down (plus 6d. cart., packing, etc.) and 12 monthly payments of 6/-. Send for illustrated leaflet.

**YOURS FOR 2/6 DOWN**

**CASH or C.O.D. 67/6**

Britain's Great Mail Order House. Est. 1919.

**WORLD-WIDE RECEPTION ON THIS 1-VALVE ALL-WAVER**

- All-wave tuning. ● Simple to operate. ● Extraordinary efficiency and low cost.
- Wave-ranges 18-52, 200-550, 900-2,000 metres. ● Ready assembled tuning unit requiring 6 connections only.

KIT comprises all parts for building including ready-drilled chassis and panel, all drawings and instructions but less valve.

**CASH 29/6 YOURS FOR 2/6 DOWN**  
 balance in 11 monthly payments of 2/9. Required high-efficiency L.F. valve, 2/9 extra.

**PETO-SCOTT CO., LTD.,**  
 77, Pr.11, City Road, London, E.C.1. Tel. Chiswell 9875.  
 41, Pr.11, High Holborn, London, W.C.1.

# B.L.D.L. The British Long-Distance Listeners' Club

## Reaction Circuits

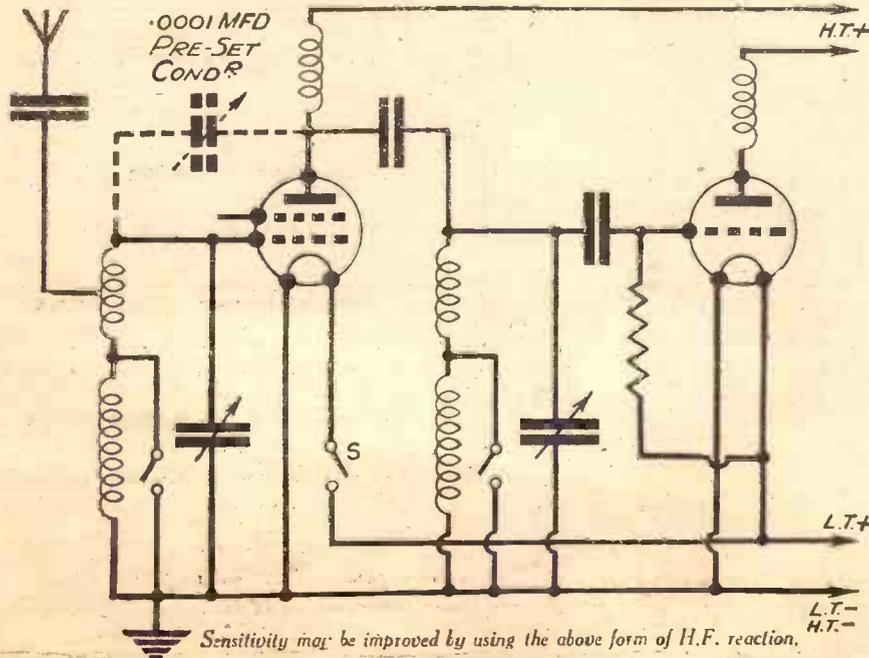
THE simpler types of receiver depend for much of their efficiency on the reaction circuit. In a one-valver, for instance, if reaction is cut out altogether the results will be very little better than those obtained with a simple crystal set. In the early days of wireless it was quite a common thing to say that reaction was equivalent to a single H.F. stage. For instance, an H.F. and detector stage without reaction will give very little better results than a single detector stage without reaction. It is, therefore, well worth while spending a little time in getting the reaction circuit to work properly. In quite a number of receivers it will be found that when this control is turned up signals build up slowly, and suddenly the set bursts into oscillation, but when the control is reversed it has to be turned very much further in order to stop reaction. To make this effect clear let us imagine that the reaction control has a pointer and a dial is fitted reading from 0 to 100. As the control is advanced signals build up until at, say, 60 on the dial they are blotted out by the sudden oscillation. Now when the control is turned back it may have to be turned right down to 40 or even lower before the set comes out of oscillation, with the result that the pointer has then to be turned towards the 60 mark and without a scale it will be found very difficult to find the position of maximum signals, which in the hypothetical case mentioned will be about 59 on the scale.

To be in proper order oscillation should set in at, say, 60 on the dial and should cease at 59, and if the pointer is moved from 59 to 60 it should be possible to make the set oscillate and stop instantly over that small movement of the control. This is a very desirable feature, and when properly obtained will greatly enhance the value of a receiver. In some receivers reaction

is fed back to the aerial circuit through a reaction winding coupled to the aerial coil, and this affects tuning by the variation in damping on the aerial coil. Consequently, the tuning control has to be shifted slightly as reaction is advanced. This point should be borne in mind. In other circuits the reaction condenser is merely joined from the detector anode to the aerial lead, but although this is not a very desirable arrangement it often proves very useful. The same idea may be used in an H.F. detector type of receiver to sharpen tuning and give a slight increase in efficiency and sensitivity. If a pre-set condenser is connected as shown in the accompanying illustration it will often be found that better long-distance results are obtained. The exact setting of this extra condenser may be found very critical—depending upon the layout of the receiver and the efficiency with which the H.F. stage is operating.

## Death Rays

We have been hearing a lot about death-rays lately, and one or two members have written to say that they have seen reports of these rays being used in practice. This is quite true, if the subject is looked at in the right light. It is possible to kill by certain short-wave radiations. This practice is adopted extensively in some countries to destroy certain forms of microscopic life in furniture, grain, etc. We understand that at the Rutgers University in America a short-wave transmitter, operating on a frequency between 3 and 30 megacycles, with a power of 250 watts has been employed successfully in the destruction of bugs and germs in grain without affecting the grain. This method is also employed for purifying water, whilst other frequencies at different power have been found to aid in the rapid germination of seeds and have been used to control the growth of crops.



## Important Broadcasts of the Week

**NATIONAL (261.1 m. and 1,500 m.)**  
 Wednesday, November 2nd.—Symphony Concert—3, Season 1938-9, from the Queen's Hall, London.  
 Thursday, November 3rd.—Dance Band programme.  
 Friday, November 4th.—Women's International Fencing: Alfred Hutton Cup.  
 Saturday, November 5th.—Llanelli Rugby League Match: England v. Wales.

**REGIONAL (342.1 m.)**  
 Wednesday, November 2nd.—Variety from Her Majesty's Theatre, Carlisle.  
 Thursday, November 5th.—The Old Lady Shows Her Medals, play by J. M. Barrie.  
 Friday, November 4th.—Dance Cabaret, from The Grand Hotel, Torquay.  
 Saturday, November 5th.—Linen, the story of a great Ulster Industry.

**MIDLAND (297.2 m.)**  
 Wednesday, November 2nd.—Paul Temple and The Front Page Men, serial thriller: No. 1, Murder in the Afternoon.  
 Thursday, November 3rd.—La Valse: Orchestral programme.  
 Friday, November 4th.—Midland Organs and Organists—1, Worcester Cathedral.  
 Saturday, November 5th.—Mr. Anthony Eden speaking at The Reunion of Heroes of the Victoria Cross at the Regent Hotel, Royal Leamington Spa.

**WEST OF ENGLAND (285.7 m.)**  
 Wednesday, November 2nd.—The Use of the Land—4, The Work of the Tenant Farmer.  
 Thursday, November 3.—A Choral and Orchestral Concert, from the Colston Hall, Bristol.  
 Friday, November 4th.—Dance Cabaret, from the Grand Hotel, Torquay.  
 Saturday, November 5th.—Sports Special.

**WELSH (373.1 m.)**  
 Wednesday, November 2nd.—Getting and Spending the Rates: Houses, a series for Discussion Groups.  
 Thursday, November 3rd.—Where We Came From; Men of the Rhondda—recollections.  
 Friday, November 4th.—Night Express, a radio serial: Episode 3—Cross-examination.  
 Saturday, November 5th.—Leisure Time: Cardiff Amateur Ciné Club.

**NORTHERN (449.1 m.)**  
 Wednesday, November 2nd.—Music in Durham Cathedral: Organ, choral and instrumental recital.  
 Thursday, November 3rd.—Finish Under Fire, a comedy by Lyn Durham.  
 Friday, November 4th.—Castleford's Town To-night: A recorded programme of the annual Industrial Harvest Festival and Darts Tournery.  
 Saturday, November 5th.—Saturday Concert Hall.

**SCOTTISH (391.1 m.)**  
 Wednesday, November 2nd.—On the Spur of the Moment, or Documentary at Last! A light musical programme.  
 Thursday, November 3rd.—The Old Lady Shows her Medals, a play by J. M. Barrie.  
 Friday, November 4th.—Gaelic Concert.  
 Saturday, November 5th.—Choral programme.

# B.T.H. "Straight-line" Carbon Mike

THE small carbon type of microphone is very popular among amateur transmitters and experimenters, but in most cases it suffers from an annoying background noise of a rustling nature. The new B.T.H. carbon mike, one form of which is illustrated below, possesses the



The B.T.H. mike mounted on its neat stand, which is detachable.

main advantages of the carbon type of instrument without the disadvantage above mentioned. High sensitivity is one of the attributes, and to this may be added neatness of appearance. As will be seen from the illustration, the mike is extremely small, the actual dimensions being 2 3/8 in. long by 1 1/8 in. high by only 1/8 in. deep. It may be obtained mounted direct on a small base or on the stand shown in the illustration, the overall height in this case being approximately 21 in. By unscrewing the rod the mike unit may be screwed direct on to the base. The output from the unit is remarkably free from distortion and the response curve is very straight. We tested the unit with our 12-watt amplifier, coupling between the two being effected through an Eddystone microphone transformer. The sensitivity is of a very high order and it is not unduly directional. The actual figures of the unit are: Input impedance, 250 ohms; sensitivity, 68 db. below 1 volt per bar at 250 ohms; frequency characteristic, plus or minus 4 db. between 50 and 10,000 c.p.s. The price of the microphone alone is £1 17s. 6d., and with stand the price is £2 5s. 0d.

**PATENTS AND TRADE MARKS.**

Any of our readers requiring information and advice respecting Patents, Trade Marks, or Designs, should apply to Messrs. Rayner and Co., Patent Agents of Bank Chambers, 29, Southampton Buildings, London, W.C.2, who will give free advice to readers mentioning "Practical and Amateur Wireless."

# N.T.S. CHASSIS AND SET BARGAINS

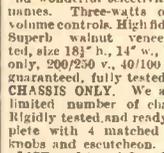
## REPLACE YOUR OLD SET AT A FRACTION OF USUAL COST



**BRAND NEW 1939 ALL-WAVE** A few only 3-valve ALL-WAVE

**4-valve A.C.S./HET**  
List Value £8:19:6  
Ready to play **BARGAIN 5/6**  
Yours for 5/- down and 18 monthly payments of 7/-.  
This modern-to-the-minute handsome, highly efficient famous-name All-wave A.C. Mains receiver is yet another example of the marvellous value only obtainable from N.T.S. Simple to tune. Wave-range 18-2,100 metres. Exceedingly high order of sensitivity for world-wide reception.

And wonderful selectivity. Calibrated dial, metres and station names. Three-watts output. Sensitivity and volume controls. High fidelity moving-coil speaker. Superb walnut veneered cabinet, illustrated, size 18 1/2" h., 14" w., 10" deep. For A.C. mains only, 200/250 v., 40/100 cycles. In sealed carton, guaranteed, fully tested.  
**CHASSIS ONLY.** We are willing to supply a limited number of chassis only of the above. Rigidly tested and ready for fixing in your own cabinet, complete with 4 matched valves, station-name dial, knobs and escutcheon. Less speaker and cabinet.  
**LIST VALUE £6:10:0 BARGAIN CASH 84/-**  
Or yours for 5/- down, balance in 14 monthly payments of 6/-.



**S.G.3 CHASSIS**  
**BATTERY MODEL**  
LIST VALUE £5:19:6  
**BARGAIN 70/-**  
Yours for 5/- down, balance in 15 monthly payments of 6/-.  
**4 WAVEBANDS:** 14-21, 28-32, 200-550, 900-1,200 metres. Slow-motion drive. Pentode output circuit. Station-name dial. Slow-motion tuning switch. Airplane dial (stations and wavelengths).

**BRIEF SPECIFICATION:** Provides reception from all parts of the world. Variable selectivity. Stora enamelled steel chassis, size 11 1/2" w., 9" h., 9" deep. Screened coils. Low H.T. Consumption. Each chassis supplied complete with Screen Grid, Detector and Pentode output valves. Fully tested on all wavebands before despatch. An excellent bargain you must not miss.  
**4-VALVE A.C. VERSION.** Highly efficient 8/0 Bandpass and Pentode output circuit. Station-name dial. Slow-motion tuning. Sensitivity control. Wave-range 18-2,100 metres. 3 watts output. P.U. sockets. Brand new, guaranteed fully tested. Complete with 4 valves, knobs and escutcheon.  
**LIST VALUE £6:6:0 BARGAIN CASH 79/6**  
Yours for 5/- down and 18 monthly payments of 5/-.



# AMAZING BATTERY 3-VALVE S.G. BARGAINS

Two brand new types with cabinet and M/C speaker. These wonderful S.G. 3-valve pentode-output battery receivers give a marvellous performance with a wide choice of British and Continental stations. Wave-range 200-2,000 metres. Screened coils. Metro-calibrated scale. Amazing volume. Low H.T. consumption. Concert-grand moving-coil speaker fitted. Less batteries. Choose your model and order early.  
**UPRIGHT MODEL**  
Housed in the beautiful walnut finish cabinet on left, size 18 1/2" h., 14" w., 10" d. Guaranteed fully tested.  
**4/-** Yours for 4/- down and 10 monthly payments of 4/3.

**TYPE "H" MODEL**  
Handsome horizontal walnut finish cabinet, size 18" x 10" x 10". Exactly the same wonderful performance. Guaranteed fully tested.  
**4/-** Yours for 4/- down and 10 monthly payments of 4/3.



# 5v. A.C. ALL-WAVE RADIOGRAM CHASSIS

LIST VALUE £8:18:6  
**BARGAIN £4:17:6**  
Complete with 5 valves, knobs and escutcheon, less speaker. Yours for 5/- down, balance in 18 monthly payments of 6/3.  
To tour the world is simple on this amazingly efficient 6-stage all-wave superhet. Wonderful selectivity and quality reproduction. P.U. sockets. No trouble-wave-change and grammo switching. Chassis size, 11 1/2 ins. wide, 8 1/2 ins. high, 5 1/2 ins. deep. Ready to play; for A.C. mains only. 200/250 v. With matched moving coil speaker. Cash or C.O.D., £4:5:0, or 5/- down and 18 monthly payments of 7/11.



# POWERFUL CLASS "B4" ALL-WAVE CHASSIS

Complete with Valves  
LIST VALUE £7:0:0  
**Bargain 79/6**  
or 5/- down, balance in 15 monthly payments of 6/-.  
A snip not to be missed. Volume and range equal to a mains set. 3 wavebands, 18-2,100 metres. Efficient S.G. Bandpass circuit. Station-name dial. Screened coils. Chassis size 11 1/2 ins. wide, 9 1/2 ins. high, 8 1/2 ins. deep. Complete with 4 matched valves. Guaranteed, fully tested. Available with matched moving-coil speaker, cash or C.O.D., £4:19/6, or 5/- down and 18 monthly payments of 6 3/4.



# Efficient 4-valve A.C. Bandpass RECEIVER.

Ready to play.  
List value 7 1/2 gns.  
**BARGAIN 4 GNS.**  
Yours for 5/- down balance in 18 monthly payments of 5/6.  
Latest 4-valve S.G. bandpass circuit. Amazing station setter with exceptional selectivity.  
Illuminated dial engraved 200-2,100 metres. Output over 3 watts. Pick-up sockets. Concert-grand moving-coil speaker fitted. Superb inlaid walnut cabinet. Illustrated, 19 1/2 ins. high, 14 ins. wide, 10 ins. deep, but with new modern contrastingly veneered walnut seal escutcheon. For A.C. mains only, 200/250 volts. Brand new, guaranteed fully tested. Don't miss this bargain.  
**CHASSIS ONLY.**—A few only of the chassis used in the above set are available. Incorporate all the special features and an excellent opportunity to fit a brand new chassis in your favourite cabinet. Complete with 4 valves, all knobs and escutcheon. Rigidly tested before despatch.  
Cash or C.O.D. 5/8, or yours for 5/- down and 12 monthly payments of 5/-. Bargain Mains Speakers offered, quite suitable.



# 5-Valve BATTERY SUPERHET

For chassis value, this offer cannot be beaten. 7 stages. Wave-range 200-2,100 metres. Wonderful range and power. Class "B" output. A.V.C. Tone control. Station-name dial as above. Screened coils and condenser. Low H.T. consumption. Complete with 5 valves and rigidly tested before despatch.  
LIST VALUE £7:0:0 **BARGAIN £3:19:6**  
or 5/- down and 15 monthly payments of 6/-.  
2 only complete receivers available in ultra modern veneered walnut upright cabinet, 21 ins. high, 14 ins. wide, 11 ins. deep, with concert-grand moving-coil speaker fitted (brand new and ready to play). List value 9 gns. **BARGAIN** (less batteries), £5:15:0 or 7/- down and 18 monthly payments of 7/3.



# S.G.3 BATTERY ALL-WAVE CHASSIS

Appearance as Class "B" illustration above. Highly efficient V.M. H.F. Pentode, Det. and distortionless output pentode circuit. World-wide reception. Wave-range 18-2,100 metres. Station-name dial. Wonderful volume. Low H.T. consumption. Complete with 3 valves, knobs and escutcheon. Brand new, rigidly tested before despatch.  
**LIST VALUE £6:6:0 BARGAIN 75/-**  
or 5/- down, balance in 16 monthly payments of 6/4.

# SPEAKERS. Special offers!

**P.M.'s.** New purchases for power and pentode output or extension purposes (state which when ordering), famous name makes. List value 30/- Bargain, 12/6.  
**MAINS SPEAKERS.** Rola enclined types 2,500 ohm field, complete with Pentode matching transformer. List value 27/6. Bargain, 10/6.

# NEW TIMES SALES CO.,

56 (P.W.11), Ludgate Hill, London, E.C.4.  
Tel.: City 5516

SEND FOR BARGAIN LISTS

# TelevIEWS

## "View-Phones"

QUITE recently a retiring Post Office engineer stated that in his opinion television telephones can be provided in this country if the public are prepared to pay for them. It was subsequently said that while some things are technically possible, they are not always economically possible. It is natural to suppose that if any scheme of this character was proposed for this country, then unless there was some form of State aid for the initial periods the cost of a television telephone call would be prohibitive except for the very wealthy.

This is not the case in Germany, however, where progress in the view-phone, as they call it, is still being maintained. Local visual calls within the boundaries of Berlin cost but little more than that for an ordinary telephonic connection. A visual telephone conversation between Berlin and Munich, that is, a total distance of just over 400 miles, costs about nine shillings. Although considerable progress has been made since the service was inaugurated two or three years ago between Berlin and Leipzig, there is still room for material improvement. The standard of the picture definition is maintained at 180 lines, while it is noticed that there are considerable variations in the intensity of the light beam scanner with a consequent disturbance of the eyes. Furthermore, it is felt that picture detail

should be improved. The images are rather lacking in contrast due no doubt to imperfections in the line amplifier characteristics, while at times a fine mesh appears across the picture due to some form of instability. It is certain that before long these imperfections will disappear and the service extended. Delay in this direction has been occasioned in Germany by international matters, a fact still further borne out by the recent announcement in that country that the opening of the new Berlin high-definition television station scheduled for October 1st has been postponed indefinitely. At present only a meagre experimental film programme is radiated on 441 lines, this being followed by one of 180 lines, a picture standard which is now regarded as being too low for all-round entertainment purposes.

## Electron Cameras

ONE of the disadvantages of the storage type electron camera is the inclination of the mosaic screen to both the optical picture focused on to it and the scanning beam of electrons which restores the elemental charges to normal in order to produce a picture signal. In one case it is now proposed to improve this by making a screen from the deposition of photo-electric particles on to a very thin sheet of soda glass. This glass, although a dielectric, has the additional property of being very slightly conductive. The picture to be televised is therefore focused on to the photo-sensitive layer set at right angles to the focusing beam and this, of course, charges up the particles in the usual way. Due to the slight conductivity an equivalent electric image is set up on the rear uncoated surface of the plate, which is in a plane normal to the scanning electron beam. In very close proximity to this charged uncoated surface is a collecting grid which develops the signal currents of the picture on the reverse side of the plate when brought under the action of the scanning beam.

10 FOR 6<sup>0</sup>  
20 FOR 11<sup>0</sup>

MEDIUM STRENGTH  
**CAPSTAN**  
Navy Cut  
CIGARETTES  
W.D. & H.O. WILLS  
BRISTOL & LONDON

**THE  
DEMAND  
INCREASES  
DAILY**

- W.D. & H.O. Wills

Issued by The Imperial Tobacco Company (of Great Britain and Ireland), Ltd. C.C.630M

## TELEVISION FEATURE

LESLIE BANKS made his first appearance in television in the name part of "Cyrano de Bergerac," which was performed in the Alexandra Palace studios on October 30th. Constance Cummings played the part of Roxane.

George More O'Ferrall, who produced this famous play by Edmond Rostand, took advantage for the first time of the new studio equipment to use two studios simultaneously, and the production was on a correspondingly large scale. Three control rooms were in operation and eight camera channels—double the number yet used in television.

"Cyrano de Bergerac" tells the story of that gloriously gallant, "nose-conscious" figure who, despite his cruel affliction, carried his "Panache"—the spirit of bravery, the wit of courage, the humour of heroism. Feared by all his adversaries in war, he is doomed to unhappiness in his love of the beautiful Roxane who loves the young Baron Christian de Neuvillette.

"Cyrano de Bergerac" will be repeated in the afternoon on November 4th.



# WE TURN LEARNING INTO EARNING

"Thanks to your excellent training, valuable introductions, and good advice, I am now earning twice as much as when I enrolled, only six months ago."

That is an extract from just one of the hundreds of letters from grateful students. What they have done, you can do. Without interfering with your ordinary occupation, you can learn in your own home how to become a Qualified Radio Technician. Let us train you for a successful radio career and help you to secure employment, or earn good money in your spare time.

★ POST COUPON NOW FOR FREE COPY OF "RADIO AS A CAREER" AND FREE SPECIMEN LESSON ★

## T.&C. RADIO COLLEGE

Fairfax House, High Holborn, London, W.C.1

(Post in unsealed envelope, 1d. stamp)

Please send me Free Specimen Lesson and Free copy of "Radio as a Career," in plain envelope.

NAME .....

ADDRESS .....

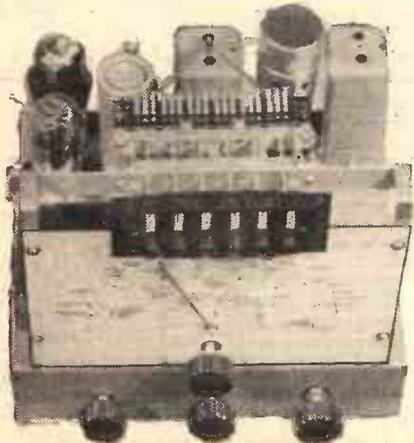
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## ARMSTRONG 7-STAGE

All-Wave Radiogram Chassis incorporating Push-button and Manual Tuning, supplied complete with 8in. Matched Moving-Coil Speaker, model A.W.3PB. Price £7 18s. 6d. complete.

Call at our Showrooms and hear this latest chassis.

Specification: New method of Push-button Tuning incorporating genuine Silver Mica Condensers to obviate station drift, principal Medium Wave Stations and Luxembourg can be obtained by the Push-button method. All latest refinements, including large Tuning Scale calibrated in degrees and station-names on all wavebands. Short-wave covers all principal bands from 15.9 to 50 metres. Volume and Tone Controls work on Gramophone as well as Radio. Pick-up Leads may be permanently connected. Moving-coil speaker made especially for chassis.



Packing and Carriage Free. 7 Days Trial. Carriage Paid.

Armstrong 12 months guarantee.

The above is only one of many attractive models and full details will be sent on application. 8 New Models, send for Catalogue.

ARMSTRONG MANUFACTURING Co.

100, ST. PANCRAS WAY (Formerly King's Road),

CAMDEN TOWN, N.W.1

'Phone: GULLiver 3105.

# NOTES FROM THE TRADE

## Ferranti Amplifier

THE illustration below shows the equipment which was specially built for supplying speech and music to the radio receivers recently exhibited at the North National Radio Exhibition. The equipment utilised two banks of four Ferranti amplifiers, each delivering an undistorted output of approximately 30 watts to six feeders. The total audio power available was 240 watts. Four of these amplifiers employed two PX25A valves in low-loading push-pull, and are similar to the Ferranti type AC32C amplifiers, giving a level response  $\pm 1\frac{1}{2}$  dB from 30 to 10,000 c.p.s. The other four utilised two KT66 beam power tetrodes in low-loading push-pull with 23 per cent. inverse feed-back. It is claimed that the results from this arrange-

in a small wallet, comprising various types of box spanner, turn screws and hexagon tools. There are ten in all and the cost is 10s.

## Triplett Instrument Shunts

UNIVERSAL ELECTRICAL INSTRUMENTS CORPORATION have now introduced a kit of parts to overcome the difficulty usually experienced in obtaining correctly wound shunts, resistors and other parts to complete their Triplett Foundation Instruments. The kit, which is listed at £2 4s. 6d., enables the meters to be used as multi-range test sets. There are two models, one having a 3 $\frac{1}{2}$ in. dial and the other a 5in. dial and both have a full-scale deflection of 1 mA. With the aid of this kit the meters may be arranged to indicate D.C. voltages from 0 to 1,000, milliamp ranges up to 250, and resistance ranges up to 1 megohm.

## G.E.C. Test Set

THE General Electric Company are also listing a multi-range test set providing eight voltage and current ranges for D.C., six voltage and current ranges for A.C., and a resistance range. An M.C. meter with knife-edge pointer is fitted, and the scale is 3in. in length fitted with an inset mirror. Switches are employed for range selection and the internal resistance on D.C. is 2,000 ohms per volt, and 400 ohms per volt on A.C. The price is £16 10s.

## Runbaken Testscope

RUNBAKEN ELECTRICAL PRODUCTS announce an interesting tester, built in the form of a fountain pen and incorporating a neon. A screw-driver blade is provided, a compass is mounted on the top, and a protective cover fits over the blade. The tester may be used to ascertain live mains leads, polarity indications, leakages, and for various other purposes. The neon glows when connected to various sources and will no doubt be found of great value to service

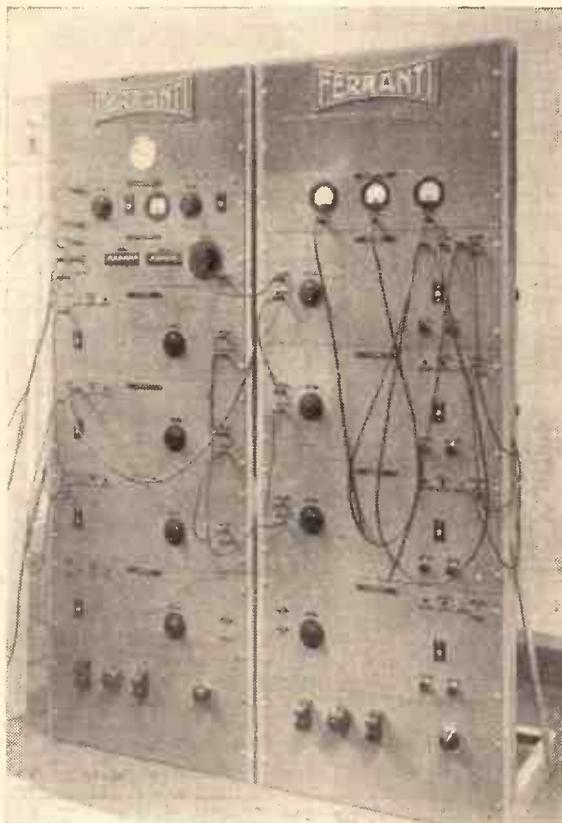
engineers. The price is 17s. 6d.

## New Mullard C.-R. Tube

A SMALL monitor cathode-ray tube is announced by Messrs. Mullard. This has a screen diameter of 3 cms, and although the price has not yet been definitely fixed, it will probably be about 30s., and will be available at the end of this month.

## Avo Instrument Guide

A SMALL comprehensive folder is now supplied by the Automatic Coil Winder & Electrical Equipment Co., Ltd. (Acweeco, Ltd.), giving full details of the various electrical testing instruments which they make. The folder will be sent free on application to the firm at Winder House, Douglas Street, London, S.W.1.



Ferranti amplifier panels for redistribution at the Manchester Exhibition.

ment are quite as good as the two PX25A's. The amplifiers were fed from the penultimate stage of a Ferranti "Prestune" radio receiver or from mike or pick-up. The Telefunken TO.1001 pick-up was used.

## New Service Aids

MESSRS. HOLIDAY & HEMMER-DINGER announce some new accessories of special interest to service engineers. One of these is a slide rule suitable for calculations in Ohm's Law, resistance values, discounts, etc. The rule is made from well-seasoned and polished mahogany, celluloid-faced back and front, and the price is 3s. 6d. for the 6in. pocket size and 6s. 6d. for the 12in. desk size. Both sizes are complete in a case. The other accessory is a set of trimming tools

# Practical and Amateur Wireless BLUEPRINT SERVICE

## PRACTICAL WIRELESS Date of Issue No. of Blueprint

### CRYSTAL SETS.

Blueprints, 6d. each.		
1937 Crystal Receiver	9.1.37	PW71
The "Junior" Crystal Set	27.8.38	PW04

### STRAIGHT SETS. Battery Operated.

One-valve: Blueprints, 1s. each.		
All-wave Unipen (Pentode)		PW31A
Beginner's One-valver	19.2.38	PW55
The "Pyramid" One-valver (HF Pen)	27.8.38	PW03
Two-valve: Blueprints, 1s. each.		
Four-range Super Mag Two (D, Pen)		PW36B
The Signet Two (D & LF)	24.9.38	PW70
Three-valve: Blueprints, 1s. each.		
The Long-range Express Three (SG, D, Pen)	24.4.37	PW2
Selectone Battery Three (D, 2 LF (Trans))		PW10
Sixty Shilling Three (D, 2 LF (RC & Trans))		PW34A
Leader Three (SG, D, Pow)	22.5.37	PW35
Summit Three (HF Pen, D, Pen)		PW37
All Pentode Three (HF Pen, D (Pen) Pen)	20.5.37	PW39
Hall-Mark Three (SG, D, Pow)	12.6.37	PW41
Hall-Mark Cadet (D, LF, Pen (RC))	16.3.35	PW48
F. J. Camm's Silver Souvenir (HF Pen, D (Pen), Pen) (All-wave Three)	13.1.35	PW49
Genet Midget (D, 2LF (Trans))	June '35	PM1
Cameo Midget Three (D, 2 LF (Trans))	8.6.35	PW51

1936 Sonotone Three-Four (HF Pen, HF Pen, Westector, Pen)		PW53
Battery All-Wave Three (D, 2 LF (RC))		PW55
The Monitor (HF Pen, D, Pen)		PW81
The Tutor Three (HF Pen, D, Pen)	21.3.36	PW02
The Centaur Three (SG, D, P)	14.8.37	PW04
F. J. Camm's Record All-Wave Three (HF Pen, D, Pen)	31.10.36	PW09
The "Colt" All-Wave Three (D, 2 LF (RC & Trans))	5.12.36	PW72
The "Rapid" Straight 3 (D, 2 LF (RC & Trans))	4.12.37	PW82
F. J. Camm's Oracle All-Wave Three (HF, Det, Pen)	28.8.37	PW78
1938 "Triband" All-wave Three (HF Pen, D, Pen)	22.1.38	PW84
F. J. Camm's "Sprite" Three (HF Pen, D, Tet)	26.3.38	PW87
The "Hurricane" All-Wave Three (SG, D (Pen), Pen)	30.4.38	PW80
F. J. Camm's "Push-Button" Three (HF Pen, D (Pen), Tet)	3.9.38	PW02

Four-valve: Blueprints, 1s. each.		
Sonotone Four (SG, D, LF, P)	1.5.37	PW4
Fury Four (2 SG, D, Pen)	8.6.37	PW11
Beta Universal Four (SG, D, LF, Cl. B)		PW17
Nucleon Class B Four (SG, D, (SG), LF, Cl. B)	6.1.34	PW34B
Fury Four Super (SG, SG, D, Pen)		PW34C
Battery Hall-Mark 4 (HF Pen, D, Push-Pull)		PW40
F. J. Camm's "Limit" All-Wave Four (HF Pen, D, LF, P)	20.9.36	PW67
All-Wave "Corona" 4 (HF Pen, D, LF, Pow)	9.10.37	PW70
"Acme" All-Wave 4 (HF Pen, D (Pen), LF, Cl. B)	12.2.38	PW83
The "Admiral" Four (HF Pen, HF Pen, D, Pen (RC))	3.9.38	PW03

Mains Operated		
Two-valve: Blueprints, 1s. each.		
A.C. Twin (D (Pen), Pen)		PW18
A.C.-D.C. Two (SG, Pow)		PW31
Selectone A.C. Radiogram Two (D, Pow)		PW19
Three-valve: Blueprints, 1s. each.		
Double-Diode-Triode Three (HF Pen, DDT, Pen)		PW23
D.C. Ace (SG, D, Pen)		PW25
A.C. Three (SG, D, Pen)		PW29
A.C. Leader (HF Pen, D, Pow)		PW35C
D.C. Premier (HF Pen, D, Pen)	31.3.34	PW35B
Ubique (HF Pen, D (Pen), Pen)	28.7.34	PW36A
Armada Mains Three (HF Pen, D, Pen)		PW38
F. J. Camm's A.C. All-Wave Silver Souvenir Three (HF Pen, D, Pen)	11.5.35	PW50
"All-Wave" A.C. Three (D, 2 LF (RC))		PW54
A.C. 1936 Sonotone (HF Pen, HF Pen, Westector, Pen)		PW56
Mains Record All-Wave 3 (HF Pen, D, Pen)	5.12.36	PW70
All-World Ace (HF Pen, D, Pen)	28.8.37	PW80

Four-valve: Blueprints, 1s. each.		
A.C. Fury Four (SG, SG, D, Pen)		PW20
A.C. Fury Four Super (SG, SG, D, Pen)		PW34D
A.C. Hall-Mark (HF Pen, D, Push-Pull)	24.7.37	PW45
Universal Hall-Mark (HF Pen, D, Push-Pull)	9.2.35	PW47
A.C. All-Wave Corona Four	6.11.37	PW81

## SUPERHETS.

Battery Sets: Blueprints, 1s. each.		
£5 Superhet (Three-valve)	5.6.37	PW40
F. J. Camm's 2-valve Superhet	13.7.35	PW52
F. J. Camm's £4 Superhet	—	PW58
F. J. Camm's "Vitesse" All-Waver (5 valver)	27.2.37	PW75
Mains Sets: Blueprints, 1s. each.		
A.C. £5 Superhet (Three-valve)	—	PW43
D.C. £5 Superhet (Three-valve)	1.12.34	PW42
Universal £5 Superhet (Three-valve)	—	PW44
F. J. Camm's A.C. £4 Superhet 4	31.7.37	PW59
F. J. Camm's Universal £4 Superhet 4	—	PW60
"Qualitone" Universal Four	16.1.37	PW73

## SHORT-WAVE SETS.

One-valve: Blueprint, 1s.		
Simple S.W. One-valver	9.4.33	PW89
Two-valve: Blueprints, 1s. each.		
Midget Short-wave Two (D, Pen)	—	PW38A
The "Fleet" Short-wave Two (D (HF Pen), Pen)	27.8.38	PW91
Three-valve: Blueprints, 1s. each.		
Experimenter's Short-wave Three (SG, D, Pow)	30.7.38	PW30A
The Precise 3 (D, 2 LF (RC and Trans))	7.8.37	PW63
The Band-Spread S.W. Three (HF Pen, D (Pen), Pen)	1.10.38	PW08

## PORTABLES.

Three-valve: Blueprints, 1s. each.		
F. J. Camm's ELF Three-valve Portable (HF Pen, D, Pen)	—	PW65
Parvo Plyweight Midget Portable (SG, D, Pen)	19.6.37	PW77
Four-valve: Blueprint, 1s.		
"Imp" Portable 4 (D, LF, LF, Pen)	19.3.38	PW86

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

Issues of Practical Wireless	4d. Post Paid.
Amateur Wireless	4d. " "
Practical Mechanics	7d. " "
Wireless Magazine	1s. " "

The index letters which precede the Blueprint Number indicate the periodical in which the description appears: Thus P.W. refers to PRACTICAL WIRELESS, A.W. to Amateur Wireless, P.M. to Practical Mechanics, W.M. to Wireless Magazine.

Send (preferably) a postal order to cover the cost of the blueprint and the issue (stamps over 6d. unacceptable) to PRACTICAL AND AMATEUR WIRELESS Blueprint Dept., George Newnes, Ltd., Tower House, Southampton Street, Strand, W.C.2.

## MISCELLANEOUS.

S.W. Converter-Adapter (1 valve)	—	PW48A
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## AMATEUR WIRELESS AND WIRELESS MAGAZINE CRYSTAL SETS.

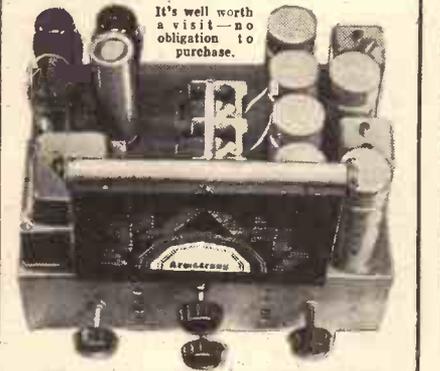
Blueprints, 6d. each.		
Four-station Crystal Set	23.7.33	AW427
1934 Crystal Set	—	AW444
150-mile Crystal Set	—	AW450

## STRAIGHT SETS. Battery Operated.

One-valve: Blueprints, 1s. each.		
B.B.C. Special One-valver	—	AW387
Twenty-station Loudspeaker One-valver (Class B)	—	AW449
Two-valve: Blueprints, 1s. each.		
Melody Ranger Two (D, Trans)	—	AW383
Full-volume Two (SG det, Pen)	—	AW392
Lucerne Minor (D, Pen)	—	AW426
A Modern Two-valver	—	WM409
Three-valve: Blueprints, 1s. each.		
Class B Three (D, Trans, Class B)	—	AW380
New Britain's Favourite Three (D, Trans, Class B)	15.7.33	AW394
Home-built Coil Three (SG, D, Trans)	—	AW404

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ARMSTRONG CHASSIS  
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Model AW3FP. Pre-Amplifier and 8 Watts Resistance Capacity Triode Push-pull Output.  
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**KIT 'A'**  
Complete Kit of parts, less Valves. Cash Price, £5.5.0, or **9/-** with order and 12 monthly payments of 9/-.

**KIT 'B'**  
The same as Kit 'A' but including set of 4 specified Valves. Cash Price £7.1.0, or **12/-** with order and 12 monthly payments of 12/-.

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**ELECTRADIX BARGAINS**

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**UNITS ONLY.** Westinghouse Metal Rectifier Units, 110 v. 75 amp., 85/-; 63 volts 1.5 amp., 37/6. 20 volts 3 amps., 40/-; 9 volts 2 amps., 26/-.

**SMALL CHARGERS.** From A.C. mains to 6 volts 1½ amp., £30/-; Tungar BC1 250 v. A.C. to 7½ v. 2 a. D.C., £3/17/-.

**TRIGGLE CHARGERS.** Midget for 2 volts 1 amp., 10/-.

**MILLIAMMETERS,** 3/6 only for a new 8 m/a meter for back of panel, illuminated plain dial, 1in. needle, back lamp and bracket. For D.C. anode tuning current, or test galvo.

**L.F. TRANSFORMERS.** Fine lot of Ferranti shrouded and B.T.H. Bakelite for coupling and outputs. Ferranti A.26, R.D.354, 2-1, etc., 5/6. B.T.H. 4-1 at 5/- each. Ferranti O.P.S., B. & D. for output to speaker, 6/-; 46A Push Pull, 6/6. O.P.M. 3 ratio output, 6/6. Large B.A.F.

**LIGHT RAY CELLS.** Photocells for sound on Film. B.G.A., 25/-; G.E.C., £3/10/-; Selenium, 5/-.

**Beck Angle Prisms,** mounted in carrier, 5/6. Micrometer adjusters for lens, 1/-.

**Eye-pieces** with prisms and lenses for photocell, 12/6. A.R.P. Helms. Portable field phone in leather case, with sling, 35/-.

**Cable on drums,** 55/- mile. Lucas dry or night signal lamps, £3/10/-.



**TELEPHONES.**—For all purposes. Table or wall, house or office phones, from 10/-.

**Headphones.** Pocket type W.D. leather Headbands, 2/6 pr. Sullivan Radio Aluminium Headbands, 2/6 pr. 4,000 ohm S/W lightweight Headphones, 4/6 pr.

**CONSTRUCTORS.** Ceramic S/W lead-in, brass stem, 8d. 3in. stand-off S/W insulators, 6d. Portable valve sets kits assembled in suitcase, partly wired, speaker, aerial, and all parts, less valves, 2/1/-.

**Metal rectifiers,** chassis type, 180 v. 30 m/a output, 5/-.

**Lightning Arrestors,** make aerial safe, 1/-.

**COILS.** S.W. coils plug-in, 1/6. Ribbed formers, 9d. Long-wave and B.C. 2-pin, 1/-.

**3- and 4-pin coils,** 1/6.

**Reaction tuners,** 9d.

**Rugby** and other coils in stock.

**All wavelengths** in 2-pin, 1/3. Dual-range 200/2,000, 1/8. M.I.C. concert coils, set of 4, 2/6; aerial, react., long, short and multiple, 1/8.

**S.W. Porters** ribbed and slotted, 4d.

**PARCELS** of useful oddments for the Experimenter who wants a junk-box of Coils, Magnets, Wire, Chokes, Condensers, Switches, etc., mostly ex-W.D. parts worth a lot more than 10 lbs. 7/-, or 7 lbs. for 5/-, post free. British Isles only.

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Said Hubby to Wife, "Look, Liza, Shall I build us a nice television?"  
Said Liza (she's bright!), "If you get some FLUXITE For our present set, that would be wiser!"

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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.

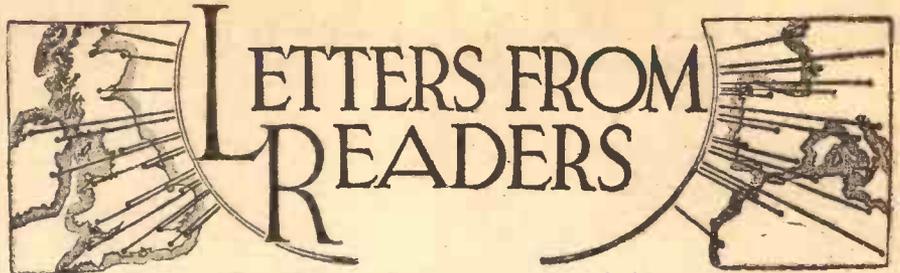


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The Editor does not necessarily agree with the opinions expressed by his correspondents. All letters must be accompanied by the name and address of the sender (not necessarily for publication).

**A Three-valver with Home-constructed Components**

**SIR,**—Being a regular reader of PRACTICAL AND AMATEUR WIRELESS and belonging to the old school of those who like to make as many components as possible, I would like to suggest that a 3-valve all-mains set be published, using home-constructed coils, chokes, mains transformers, etc., instead of having to purchase the manufactured articles.

From time to time you have given instructions on how to make these, but never a complete set with such components incorporated.

I have made a large number of your components from time to time, and the enjoyment one derives is enormous. I would like to know other readers' opinions.

—R. A. REEVE (Sheffield).

YV5AQ, YV1AQ; PK2AY; CE3ET, CE1AH, VU2CQ; VQ4KTB; VP4TK; CORH, COCQ, CO2LY; ZS1AX, ZS1BL; SUIRA, SMA, IRO, 1KG; and CQICL (?). All on 20 metres. I am only sixteen years of age.—S. G. HEUSER (Greenford).

**Prizewinner's Thanks**

**SIR,**—It gives me pleasure to thank you very much for the W.B. Stentorian Speaker that you awarded me in the "Errors" Competition.

I am extremely pleased with its performance, of which I had no doubts, as I have read from time to time in your excellent journal of the virtues of W.B. Stentorians. I consider this speaker an admirable prize. Incidentally, it has fulfilled a long-felt want for an extension speaker.

It may be interesting to reflect that I entered all previous competitions for a Stentorian and was unsuccessful, so I was a little surprised when I read that I was the only entrant with an all-correct entry.

I must congratulate you on maintaining a high standard of interest and information in PRACTICAL AND AMATEUR WIRELESS, and am glad to feel that I cannot make any suggestion for improvement.

May I wish that your success in producing such a fine journal will continue indefinitely.

—L. M. H. RAWLINGS (Cambridge).

**CUT THIS OUT EACH WEEK.**

*Do you know*

- THAT in most cases the rectifying valve may be omitted from an A.C./D.C. set which is to be used only on D.C. mains.
- THAT decoupling and by-pass condensers should be of the non-inductive type.
- THAT wherever possible controls should be wired at earth potential to avoid hand-capacity effects and risks of shocks.
- THAT creeping and corrosion round accumulator terminals may be avoided by smearing with ordinary petroleum jelly (vaseline).
- THAT the natural wavelength of a full 100ft. aerial is approximately 120 metres.
- THAT in an emergency an ordinary power valve (triode) may be used as a half-wave rectifier in a mains unit.

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 Newnes, 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.

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**Public Schools Transmissions**

**SIR,**—I wonder if any of your readers have ever been puzzled when listening in on the 80-metre band, by coming across stations with queer call-signs such as FPA, RJA, OJA, CWA, and others similar to these? They are situated about 89 metres, and also 85 metres. They are various public schools whose O.T.C.s have been equipped with wireless transmitters and receivers. They are supervised by the War Office, and work under Army procedure, but the schools are not, however, the only bodies equipped under this scheme; Cambridge University is likewise provided for.

If any of your readers would care for further details about these stations, I shall be pleased to answer any queries. I myself was at one time a member of one of these schools. Therefore, I shall also be glad to know if any of your readers have "picked them up." — J. M. C. GRIEVE (Earl's Court, S.W.).

**Correspondent Wanted**

**SIR,**—I wish to get in touch with any short-wave listener, in Canada or U.S.A., who is interested in amateur transmissions. I am using a Trophy V receiver which covers from 10-550 metres. My aerial is an outdoor dipole. I must thank your paper for my getting a very interesting correspondent in England.—R. UPHILL, 12, River Street, Bath, Somerset.

**A DX Log From Greenford**

**SIR,**—I append the best of my log during the past three months. My receiver is an 0-v-2—an adapter to which I have added two triode L.F. stages.

My aerial is 35ft. long, 20ft. high N-S, and all stations are on telephony.

VE1BK, 1EI, 1DR, 2JZ, 1BB; PY2AK, 2JC, 2HX, 5BJ, 2BA, 1SM, 3EM, 2CK, 5AK, 4GT; LU4CZ, 4KW, 8AC, 1AX, 1JC, 9BV, 1QA; KA1DH, K4BMG, K4ESF, K4EVC; YV4AF,



# QUERIES and ENQUIRIES

**T**HE Class "B" valve requires a fairly powerful drive and thus if you cut out the driver stage you may find that quality is not very good. However, all that should be necessary is to connect the anode socket of the driver valve to the grid socket, or to the lead from the anode circuit of the detector stage which fed the L.F. component. In some circuits it may be necessary to disconnect one or more leads to avoid short-circuits or the application of a positive potential to the grid of the driver. The driver transformer must, in other words, be included in the anode circuit of the detector, or fed from it through a

## Trimming Tools

"I often get friends' receivers sent to me for adjustment, and find much difficulty in making certain settings due to the differences in screws, nuts, etc. I believe this is common in the service industry and that a firm has attempted to meet the trouble by marketing a set of trimming or adjusting tools. Could you confirm this and give me any details of them, please?"—H. E. D. (Watford).

**A** NEAT case of such tools, consisting of ten instruments—six hexagon, one special Ferranti, 3in., 6in. and 8in. turn-screws—and American and Philips 6mm. and 8mm. hexagon tools, may be obtained from Messrs. Holiday and Hemmerdinger, Ltd., 74-78, Hardman Street, Manchester, for 10s. (postage 3d.). This should meet your requirements.

## Whistles and the Superhet

"I am troubled with whistles on my A.C. £5 Superhet 3. I can get it pretty clear of whistles from about 360 m. to 550 m., but from 360 m. down to 250 m. it is very bad. Can you suggest anything to overcome this trouble?"—W. J. D. (N.15).

**I**N a superhet the commonest cause of whistles is a wrong adjustment of the oscillator trimmer. Until this is correctly set you will experience whistles at most parts of the dial, and therefore you should attend to this point first. If, however, the set has been correctly trimmed and tracked, the trouble may be due to interaction between certain leads on the H.F. side and therefore they should be moved about with an insulated tool; and if this proves ineffective a stage-by-stage test with a good milliammeter is indicated.

## Cutting Out a Stage

"I have a four-valver, H.F., detector, driver and Class 'B,' and find that signals are very weak. After several tests it appears that the L.F. valve is the cause of the trouble, only reading just less than 1/2 a milli-amp. I have examined the anode circuit and find that this is in order, so it must be the valve. How can I cut this stage out without upsetting things too much?"—H. Y. (Manchester).

**RULES**

We wish to draw the reader's attention to the fact that the Queries Service is intended only for the solution of problems or difficulties arising from the construction of receivers described in our pages, from articles appearing in our pages, or on general wireless matters. We regret that we cannot, for obvious reasons—

- (1) Supply circuit diagrams of complete multi-valve receivers.
- (2) Suggest alterations or modifications of receivers described in our contemporaries.
- (3) Suggest alterations or modifications to commercial receivers.
- (4) Answer queries over the telephone.
- (5) Grant interviews to querists.

A stamped addressed envelope must be enclosed for the reply. All sketches and drawings which are sent to us should bear the name and address of the sender.

Requests for Blueprints must not be enclosed with queries as they are dealt with by a separate department.

Send your queries to the Editor, PRACTICAL AND AMATEUR WIRELESS, George Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. The Coupon must be enclosed with every query.

fixed condenser (parallel-feed). It would be simpler, to remove all your difficulties, to take the valve in question to a local dealer and have it tested.

## £4 Superhet

"Could you please tell me the names of the valves specified for the £4 Superhet 4-valve battery model? I made the set when it was first presented, and unfortunately recently blew all the valves. They were thrown away, and now I have forgotten what they were."—J. A. S. (Byfleet).

**T**HE valves were frequency-changer, variable-mu H.F. Pentode as I.F. stage, triode detector and L.F. pentode.

The specified types were 210 P.G., 210 VPT, 210 Det. and 220 PT, all Cossor.

## Extension Speakers

"I have just bought an all-pentode 3-valve battery set. I wish to use my existing Stentorian speaker as an extension speaker, remote from the set, but in the same room—the idea being to give more equal distribution of sound. Please tell me if there is any particular advantage in connecting the speakers in series or in parallel. I have tried both methods, but cannot detect much difference."—H. R. H. (Sunbury-on-Thames).

**I**T is usually more satisfactory to connect an extension speaker in parallel with the output—using a filter condenser for the purpose. Unless the resistances of the two speakers are equal, one will give greater intensity of sound than the other.

## Home Recording

"Could you tell me where I can obtain gramophone discs ready grooved for home-recording? If you know, perhaps you could give me the names and addresses of firms that sell them?"—R. P. (Barnsley).

**W**E suggest you communicate with the V.G. Manufacturing Co., of Gorst Road, North Acton, N.W.10, and Electradix Radios, of 218, Upper Thames Street, London. You do not state what type of record you require, but these firms should be able to supply the types which will satisfy your needs.

## Accumulator Charging

"I am using an Exide accumulator and would like to purchase a trickle-charger. The trickle-chargers I have seen in various advertisements are to charge at 1/2 amp., while on the instructions on my accumulator it states that it should be charged at 2 amps. I would be glad to have your advice on the subject before I do anything."—W. G. (Brighouse).

**T**HE object of the trickle-charger is to compensate for the drain on the accumulator when the receiver is in use, and therefore if you start with the accumulator ready charged and use the trickle-charger for a sufficient number of hours to compensate for the hours during which the receiver has been in use, the cell will keep in a fully charged condition. The battery should, of course, be examined by a good charging station from time to time.

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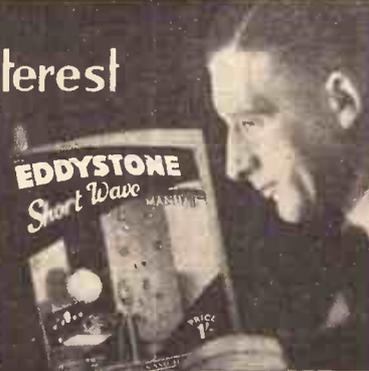
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## EDDYSTONE Short Wave MANUAL

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Group Abridgements can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume or in bound volumes price 2s. each.

**TELEVISION.**—British Thomson-Houston Co., Ltd. No. 489426.

An impedance  $L^1, R^1$ , across which is developed a voltage varying with received vision signals, is connected between the cathode F and controlling-shield G of a cathode-ray tube, and is also so connected between the cathode K and anode D1 of a detector for the signals that the cathode of the detector is connected directly to the shield of the tube. The end of the impedance remote from the shield is

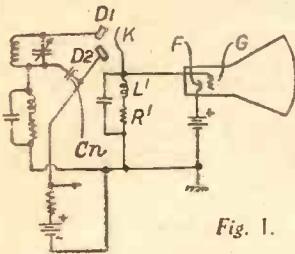


Fig. 1.

earthed. A second anode D2 (Fig. 1) associated with the cathode K is so biased that electrons flow to the anode only on the receipt of a synchronising signal. The circuits associated with the two detectors are so connected by a capacity  $C_n$  that flow of current to the anode D2 is not produced by currents conveyed by the inherent capacity between the two anodes. A triple-diode valve may be used with two of the diodes as a push-pull detector of the vision signals.

**WIRELESS RECEIVING CIRCUITS.**—J. Robinson. No. 489571.

An automatic frequency control system for a heterodyne receiver comprises a highly selective circuit 28 tuned to the true intermediate frequency, the output of which is applied, together with the incoming signals from 20, 33, 34, to a mixing valve 29 to produce a beat frequency which corresponds to the oscillator frequency required to give the true I.F. This beat frequency

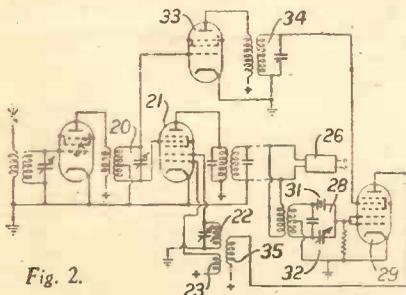


Fig. 2.

is applied as a control frequency to the oscillator circuit 22, 23, over coupling 35 and pulls the oscillator frequency into tune with the control frequency. The signal frequency may be derived from the anode circuit of the first detector 21 and the second detector 26 may be coupled directly to the stage 28 which is a balanced circuit comprising a crystal gate 31 and condenser 32 (Fig. 2).

**WIRELESS RECEIVING-SETS.**—Naamlooze Vennootschap Philips' Gloeilampen-fabriek.

In a manual tuning system the control member is automatically braked at the

resonance point by a movable magnet co-operating with a disc of magnetic material, and switching mechanism is thereby operated. A shaft 2 carries the tuning knob 1 and a gearwheel 3 which meshes with a pinion 4 driving a brake disc 6 of magnetic material. When the braking magnet 7 is energised by the received signal it is attracted to the disc 6 and is carried with it causing one of the extensions 8, 9 of a fork-shaped member 10 to engage one of the arms 11, 12 of the member 13 pivoted at 14. The bottom of the member 13 engages a fixed part of the frame, thus stopping the tuning motion. The spring 18 draws the lever 17 to the left operating cam switches 20 which de-energise the

magnet 7 (Fig. 3), and control the muting of the loudspeaker.

According to the Specification as open to inspection under Sect. 91, when the knob 1

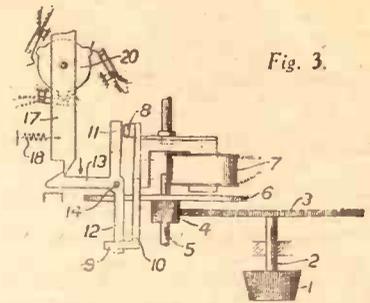


Fig. 3.

is rotated further the lever 17 is returned to its initial position. This subject-matter does not appear in the Specification as accepted.

## NEW PATENTS

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### Latest Patent Applications.

- 29512.—Baird Television, Ltd., and Hill, F.L.—Thermionic-valve circuits. October 12th.  
 29044.—Cole, Ltd., E. K., and Bradfield, G.—Permeability of radio receivers. October 7th.  
 29389.—Cole, Ltd., E. K., and Shackell, A.—Tuning of radio receivers. October 11th.  
 29160.—Electrical Research Products, Inc.—Electro-optical systems for television image transmission. October 7th.  
 29520.—Electrical Research Products, Inc.—Cathode-ray tubes, etc. October 12th.  
 28983.—General Electric Co., Ltd., and Espley, D.C.—Apparatus for transmitting television, etc. October 6th.  
 29423.—I. M. K. Syndicate, Ltd., and Goddard, M.J.—Television receiving-apparatus. October 11th.  
 29127.—Kolster-Brandes, Ltd., and Beatty, W.A.—Television receivers. October 7th.  
 29128.—Kolster-Brandes, Ltd., and Smyth, C.N.—Electron-discharge devices. October 7th.  
 29464.—Kolster-Brandes, Ltd., and Smyth, C.N.—Television receivers. October 11th.  
 29309.—Scophony, Ltd., and Okolic-sanyi, F.—Television receivers. October 10th.

29425.—Thornton, A. A. (Philco Radio and Television Corporation).—Multi-voltage radio receivers. October 11th.

### Specifications Published.

- 493279.—Baird Television, Ltd., and Nuttall, T.C.—Television and like systems.  
 493289.—Philco Radio and Television Corporation.—Thermionic-valve amplifiers.  
 493297.—Electric and Musical Industries, Ltd.—Tuning-indicators for wireless receivers.  
 493304.—Baird Television, Ltd., McConnell, E. D., and Bruce, H. G.—Television and like systems.  
 493337.—Weinreb, H. (Kudar, H., in part).—Means for showing luminous pictures in illuminated rooms.  
 493232.—Dehn, F.B. (Zeiss Ikon Akt.-Ges.).—Picture analysis for television or other distant-transmission purposes.  
 493341.—Philco Radio and Television Corporation.—Signal combining circuits. (Divided out of 493289.)  
 493256.—Standard Telephones and Cables, Ltd.—Two-speed gear mechanisms for actuating tuning devices in radio receivers and other tunable electric apparatus.  
 493527.—Cossor (Holdings), Ltd., A. C., and Jofel, L.—Thermionic-valve circuits. (Divided out of 9767/37).

### Abstracts Published.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at the uniform rate of 1s. each.

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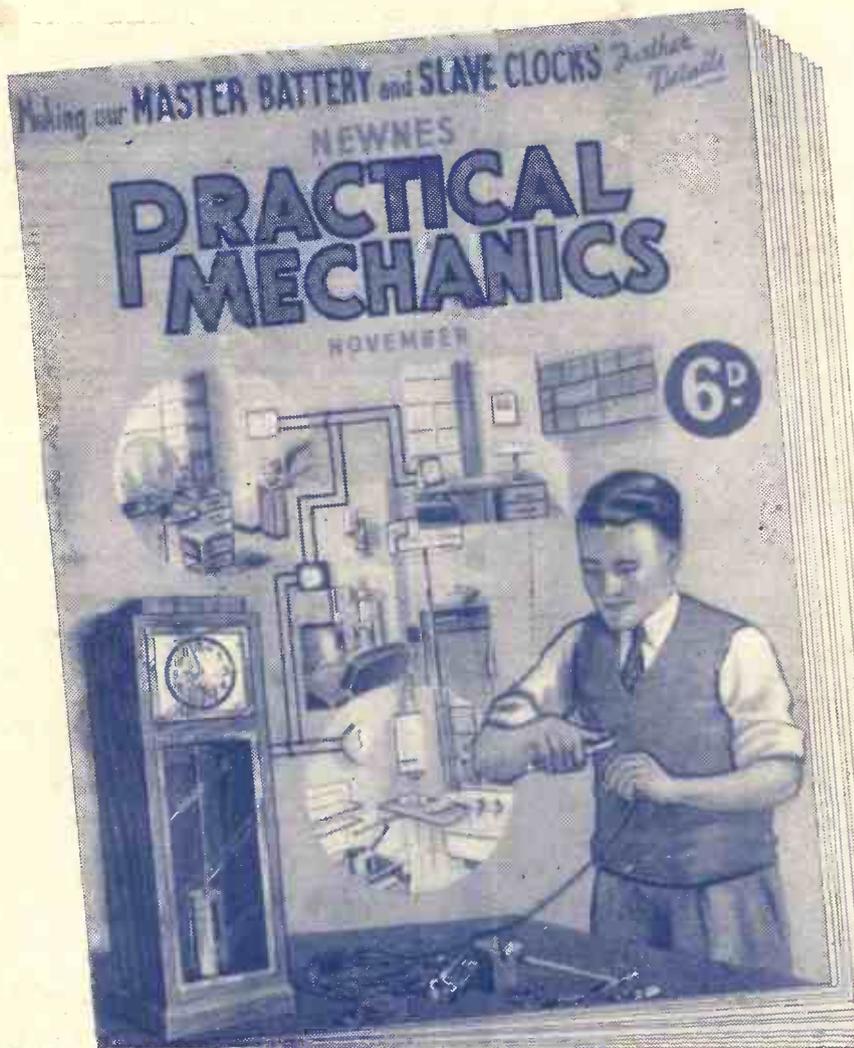
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