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Edited by F.J. CAMM

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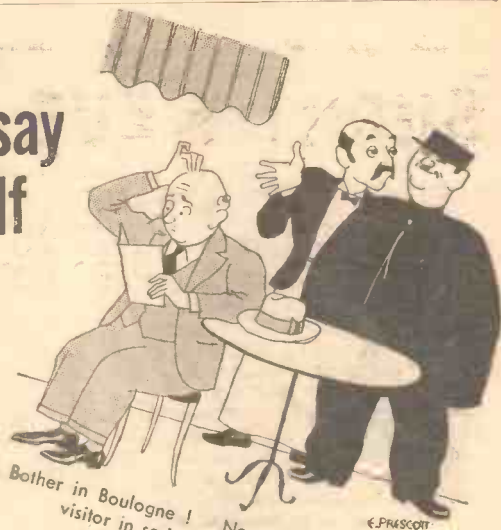
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NEWNES : LONDON

SHORT-WAVE SET REFINEMENTS — SEE PAGE 467



Practical and Amateur Wireless

Edited by F. J. CAMM

Technical Staff:
W. J. Delaney, H. J. Barton Chapple, Wh.8ch.,
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VOL. VIII. No. 200. July 18th, 1936.

ROUND *the* WORLD of WIRELESS

Richard Wagner at His Best

ON July 19th next, from B.S.T. 16.00-21.00, the German broadcasting stations will relay the entire performance of Wagner's opera "Lohengrin" from the Bayreuth Festival Theatre; it is an all-star cast, and the organisers state that it will be one of the finest renderings which has been given in the annals of the theatre.

Radio Marconi Settles Down

THE 50-kilowatt Bologna (Italy) transmitter has now adopted definitely the wavelength 245.5 m. (1,222 kc/s), which is the channel hitherto used by Trieste. It will act as the key-station of the North Italian network, and broadcast the Milan, Trieste, Turin, and Florence programmes. Occasionally, it will also transmit the Rome radio entertainments.

Success of S O S Calls

DURING the past year, of 692 S O S calls broadcast by the B.B.C. 419 achieved almost immediate results. In respect to appeals made by the police authorities for witnesses of accidents, etc., of 268 transmissions 153 met with complete success.

What Radio Does for the U.S.A.

ACCORDING to statistics published by the Columbia Broadcasting System of the United States, North American listeners spent roughly a sum equalling one hundred and twenty million pounds sterling with the radio industry during the past year. Of this amount, £67,200,000 was derived from the purchase of new receivers, £6,200,000 from the sale of valves, £13,600,000 was expended on repairs and improvements to sets, and £30,800,000 on batteries, accumulators, and electric mains current.

Reception Deteriorating on Long-wave Band

THE increasing power of the stations using channels above 1,000 metres is causing considerable anxiety to the authorities, particularly as it appears to be an almost impossible task to recast the Lucerne Plan allocating the wavelengths to the satisfaction of the interested parties. Since the Plan was brought into operation the following transmitters have either been opened or have raised their power: Brasov

(150 kW.); Kootwijk (150 kW.); Lahti (220 kW.); Droitwich (150 kW.); and Motala (150 kW.). In some instances the separation between two neighbouring channels does not exceed 5-6 kilocycles; in others, a wavelength has to be shared by transmitters insufficiently distant from each other.

A Forty-valver!

FROM the U.S.A. comes a story that a Chicago manufacturer proposes to exhibit shortly a new wireless receiver in which he has incorporated *forty* valves.

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It will not be classed as a "portable set," as if the account is accurate the weight of the receiver exceeds 600 lbs.!

Proposed Station at Tunis

AS Tunisia possesses no broadcasting service, the P.T.T. authorities are planning the installation of a 25-kilowatt transmitter on a site in the vicinity of Tunis. It would work on 345 m. The establishment of a regular programme of radio transmissions has been desired for some considerable time, as the only local broadcasts available to listeners are those given by two amateur stations at Sfax and Bizerta.

Radio Cité and Ile de France to Move

OWING to the congestion caused by the number of private broadcasting stations in Paris, pressure is being brought

upon the owners to transfer the plants to the outskirts of the capital. Radio Cité (280.9 m., 1,066 kc/s) may move to Argenteuil, and the Poste de l'Île de France (formerly Radio Vitus), on 222.6 m. (1,343 kc/s), will be re-erected at Romainville.

B.B.C. Will Relay from St. Paul's Cathedral

THE Thursday broadcasts of the afternoon service from Westminster Abbey have been discontinued owing to the prolonged absence of the organ which was dismantled some months ago. They may be resumed next year, but in the meantime the B.B.C. has made arrangements to relay the service from St. Paul's Cathedral every Wednesday afternoon.

Development of Broadcasting in India

THROUGH the activities of the Indian Village Welfare Association interest in radio programmes is growing apace throughout the Dominion. Community receiving sets have been installed at schools, government departments, and agencies in a large number of districts, with the result that the natives now roll up in their hundreds to listen to the wireless entertainment.

Radio Ath Luain

AS the power of the Athlone (I.F.S.) transmitter is not deemed sufficient to ensure good reception throughout Great Britain, it is shortly to be increased to 100 kilowatts. Broadcasts on 531 m. (565 kc/s) so far during the summer months have not been well heard on the south and south-eastern coasts of England.

Power of U.S.A. Police Radio Stations

REGULATIONS have been framed by the Telegraph Division of the Federal Communications Commission of the United States to control the power of the transmitters used by the police authorities in cities and townships. The actual power for which a licence is to be granted is based on population of the centre to be served and varies from 50 watts (under one hundred thousand inhabitants) to 500 watts for communities of over seven hundred thousand souls. State police stations may use up to 5 kilowatts during daylight hours, and 1 kilowatt after sunset.

THE PICK of the PROGRAMMES

Organ Recitals

LOVERS of organ music will be able to hear two recitals in the Western programme on July 20th. In the morning Reginald Porter-Brown will broadcast from the Regal Cinema, Torquay, and in the evening Colin Howson from the Regent Theatre, Bristol.

MAKE THESE DATES
WITH YOUR RADIO

and will consist of a visit to various places of interest in that town. Included in the broadcast are a light entertainment from

A POPULAR ACTRESS LISTENS-IN



MARY CLARE, famous star of "Cavalcade," could not play her part in the radio presentation owing to Criterion Theatre contracts, so she had to listen-in to the part she should have played on the air. The illustration shows her in her dressing-room at the theatre with her Cosor receiver.

Concert from Torquay

DOROTHY JENNINGS (soprano) will be the vocalist at the concert by the Torquay Municipal Orchestra conducted by Ernest W. Goss from the Pavilion, Torquay, on July 21st.

Birmingham City Police Band

RICHARD WASSSELL will conduct the Birmingham City Police Band, which is one of the leading police bands in England, in a popular programme from the Midland Regional on July 21. The vocalist will be the young Birmingham tenor, Harry Porter, who made his radio debut last year.

Cabaret from Bath

DANCE CABARET will be broadcast from The Pavilion, Bath, on Tuesday, July 21st, when Nosmo King and The Pump Room Dance Orchestra under the direction of Arthur Clark will be heard.

Percy Grainger's Songs

ON July 23rd Edgar Morgan will conduct the B.B.C. Midland Singers in a programme of songs by Percy Grainger, the Australian-born composer of folk-music settings.

Aberystwyth Night

WESTERN Regional listeners will be taken around one of Wales' best-known seaside resorts on July 24th. This programme is called "Aberystwyth Night"

the Municipal Hall, and a short interlude by the Evered Davies Dance Band from the Pier Pavilion. Listeners will also hear the Municipal Orchestra, conducted by Victor Fleming, from the Jubilee Band Stand.

Foden Works Band

F. MORTIMER will conduct this famous band in a popular programme to be given from the Arboretum, Derby, on July 22nd, in the Midland Regional programme. Foden's won the Bellevue Challenge Cup for three consecutive years, and at the Crystal Palace won the Thousand Guinea Trophy. It played before King George and the Prince of Wales (now King Edward VIII) by special command.

"Bouquets" from Scarborough

THE famous "Bouquets" Concert Party is to broadcast again from the Spa Theatre, Scarborough, on July 21st, in the Northern programme. Murray Ashford (entertainer) and Will Ambro (comedian) are in themselves sufficient guarantee of a good show, and the company includes many other entertaining people. The "Bouquets" are broadcasting in the main Regional programme on Thursday afternoon, July 23rd.

A "Porthcawl Night"

LISTENERS who are unable to go to the seaside will be able to do the next best thing on July 18th, that is, tune in to a programme entitled "Porthcawl Night."

Listeners will be taken for a trip around Porthcawl to hear how the visitors are amusing themselves. Microphones will be placed at Coney Beach, the popular entertainment ground, and listeners will be told what is happening on the "Figure 8," the "Chute," and "Brooklands Track." It is hoped that a spieker (who is one of the men who stand outside the stall and tell you to spend your money on some frivolous pastime or other) will be induced to make some realistic remarks before the microphone. Microphones will also be placed at the Esplanade Hotel, where a Cabaret show will be in progress, and at the Grand Pavilion where there will be a Concert Party.

"You Ought to See Us"

RONALD FRANKAU'S long-promised musical revue will be broadcast on July 29th and 31st in the National programme. It bears the engaging title of "You ought to see us." Actually this title has something to do with the presentation, as Ronald is proposing to describe to listeners the scenes and players. The description will be considerably à la Ronald Frankau, and will give this clever comedian scope for innumerable witticisms. He has with him in the cast his wife (Rene Robertson), Tommy Handley and Mrs. Handley (Jean Allistone), Robert Algar, Grace Vivian Russell and Dorothy Kay. Ronald Frankau describes the production as fast-moving entertainment, "as topical as convention will allow," and with as many changes as can be crowded into one hour.

Sydney Baynes and his Orchestra

AS already announced, Sydney Baynes and his Orchestra are taking over the Variety Orchestra's work while its members are on holiday. His first appearance will be on July 17, when he and his orchestra will give a light programme called "Dining Out." The second broadcast in this series will take place on July 30th and bears the title of "At Home." This orchestra has made its name with listeners because of the popular type of material used.

SOLVE THIS!

PROBLEM No. 200.

Allen built a quality receiver, using a PP5/400 valve in the output stage and MV5/Pen, 41/MH1, and 41MP valves in the three preceding stages. He carefully calculated the value of the required dropping resistance for connection in the common anode lead of the first three valves, but was surprised to find that 350 volts were registered at the anode of the first valve when the set was switched on. What was wrong and what remedy should be applied? Three books will be awarded for the first three correct solutions opened. Address your letters to the Editor, PRACTICAL AND AMATEUR WIRELESS, George Newnes, Ltd., 8-11, Southampton Street, Strand, London, W.C.2. Envelopes must be marked Problem No. 200 in the left-hand corner, and must be posted to reach this office not later than the first post Monday, July 20th, 1936.

Solution to Problem No. 199.

By using the tapping marked for a voltage lower than the actual mains voltage the L.T. and H.T. secondary voltages were higher than normal. A tapping point equal to, or higher than, the mains voltage should be used.

The following three readers successfully solved Problem No. 198, and books are accordingly being forwarded to them: E. B. Elmer, 146, Manor Lane, Sheffield, 2; H. Phillips, 52, Foxton Road, Birmingham, 8; J. Juniper, 68, Plymouth Road, Penarth, Glam.

STONE CONTROLS

(Continued from previous page)

balance or "tone," yet in actual fact each of them has a definite effect on quality of reproduction on radio signals:—

- (1) Variable Selectivity or Band-width.
- (2) Gain Control.
- (3) Whistle Filter.

Note that the usual tone control is retained, in addition to most, or all, of those mentioned.

Variable Selectivity Adjustment

Although provision for variable selectivity adjustment in superhets is wrapped up with selectivity, as the name implies, the final choice of a setting largely determines the available amount of high-note response which can be conjured from the tone control. To describe the effect in another way, the tone control in this case depends on what is fed to it from the intermediate-frequency amplifying stages.

Control of the I.F. transformers is sometimes mechanical and, to a lesser extent, sometimes electrical. On the mechanical basis the control knob acts to close or widen the space between the coupled windings. The closer the coils are together, the greater the band-width, and the better the reproduction, but the selectivity is then at its lowest. For the reason that the closest coil coupling often introduces heterodyne interference, the knob controlling the I.F. units is sometimes marked "Optimum" at a point where the coils are wider apart, and which provide a band width up to about 9,000 cycles, which is a compromise between selectivity and high-note response, combined with maximum I.F. amplification. Under operating conditions, the setting of the variable selectivity control will be governed by the reception conditions pertaining to the particular station it is intended to tune in.

It logically follows that the statement "the closer the coils are together the better the quality" must be qualified to include "subject to the absence of heterodyne interference."

These reasonings hold good for an I.F. unit in which the band-width is governed by means of a variable resistance manually controlled across a third winding situated between the primary and secondary.

Strictly speaking, a variable selectivity control for radio reception takes precedence over a tone control for the reasons already given. When operating a receiver incorporating these features, therefore, it is essential that the variable selectivity knob first be turned to "optimum" or even maximum selectivity (poorest high-note response) and the tone control to a midway position. The transmission can then be accurately tuned in by means of the tuning knob (and perhaps also by the aid of a neon or visual tuning indicator), the selectivity control finally being rotated to the minimum selectivity end to a point prior to where adjacent channel heterodyne interferences begin to appear.

Removing Heterodyne Interference

Should the transmission to which the set is now tuned seem lacking in brilliance, the tone control can be readjusted to include more "top." It may so happen that in removing severe heterodyne interference bordering on "monkey chatter" the received transmission will appear to be very indifferent in quality. In this case the tone control may impart greater clarity to the reproduction, although the probability is that so much "top" (high notes) has been removed that the tone control has none passed to it to correct!

There is a doubt whether the vast majority of listeners would attach such importance to the reception of a station, unless it was a case of "reception at any cost." In the latter event Stenode circuit arrangements might offer better possibilities of satisfaction.

Whistle Filter Controls

With regard to gramophone pick-up reproduction, the tone control will invariably be included in an L.F. circuit which is common to it. A whistle filter

control may also act in the common L.F. circuits, although it is more usual to include a scratch filter in the pick-up circuit and to operate *only* on record reproduction. Variable selectivity and whistle-filter controls are rarely included in the same receiver, for the reason that the first renders the second redundant. A whistle filter is a valuable adjunct where no means of varying the selectivity is provided. Owing to the fact that a multi-section whistle filter provides a sharp frequency cut-off, it is often arranged to operate mechanically in conjunction with the tone control. One practical scheme incorporated in R.G.D. radiograms is shown in Figs. 2, 3 and 4. These three diagrams represent the three switching positions, the switch being omitted for clarity.

Gain Control

A comparatively recent innovation is that of gain control, which expressed simply means the boosting of low audio-frequencies (bass notes) at low volume levels. Most moving-coil loudspeakers only provide realistic reproduction when they are fully loaded from the output valve. Immediately the volume control is retarded for lower volume, the quality of reproduction rapidly deteriorates, especially at the bass end. A number of reasons account for this phenomenon, such as the physical characteristics of the driving member (cone and coil) which must be fed with a sufficient A.C. current to overcome the inertia, the progressive loss of amplification at low frequencies due to the receiver, even at maximum volume, and the natural tendency for middle frequencies to predominate aurally below a given volume level. Manual methods of gain control and automatic schemes with two or more additional valves have been evolved. It is not possible in this article to delve into the technicalities of these systems. They are merely introduced into the discussion owing to their effect on reproduction, and because they meet a demand in ambitious radiograms which the tone control does not fulfil.

Cabaret from Plymouth

WESTERN Cabaret No. 9 will be broadcast from the Duke of Cornwall Hotel, Plymouth, on July 25th, when Leon Shortt's Paramount Dance Orchestra will play.

"Tit-bits of 1936"

FEW there are who cannot enjoy those effervescent seaside entertainments, the concert parties, which seem to have graduated with the passing of time from the old Pierrots. It is appropriate that the microphone at this season of the year should make fairly frequent visits to seaside resorts, and on July 22nd listeners to the Northern Ireland programme may spend half an hour in the Town Hall at Port-stewart, a charming resort on the North Coast of Ireland, where they will hear Jim Jonson's Seaside Concert Party, "Tit-bits of 1936."

Concert Party from Montrose

THE Pavilion Follies of 1936, described as a bright holiday show full of originality, pep, punch and personality, will be presented to Scottish listeners on July 20th by Mr. G. W. Bowic. The cast appearing at the microphone may include Tom Cable and Dot Carr, Comedy Couple; Babs Major (Soprano) and Cyril Webster (Baritone) in songs, duets, and song scenes; Monty McVean, Comedy Enter-

ITEMS OF INTEREST

tainer; and other well-known names, as well as the Pavilion Melodysmakers under the direction of Billy Hall. The broadcast

THE WIRELESS LEAGUE

NOTICE IS HEREBY GIVEN that an Extraordinary General Meeting of the Members of The Wireless League will be held on Friday the seventeenth day of July, 1936, at 3.15 o'clock in the afternoon at 12, Grosvenor Crescent, London, S.W., for the purpose of considering and, if thought fit, passing the following Resolutions, viz:—

RESOLUTIONS.

- (a) That the Committee be, and they are hereby authorised, to take all necessary steps and cause to be executed all necessary documents for the purpose of effecting the merger of The Radio Association with The Wireless League, such combined body to be known as The Listeners' League.
- (b) That the objects of The Wireless League be altered in such manner as the Members thereof present at such meeting shall direct, such objects to be subsequently adopted as the objects of The Listeners' League.

Dated the 8th day of July, 1936.

By Order of the Committee.

I. JOSS, Secretary.

NOTE: A copy of the objects as proposed to be altered may be inspected at the office of the League, No. 12, Grosvenor Crescent, London, S.W., on any week-day (except Saturday) between the hours of 10 a.m. and 5 p.m.

portion of the programme will last thirty minutes.

Another Height Record in the Stratosphere

FROM the reports issued by the U.S.S.R. Aerological Institute at Slutsk, near Leningrad, a specially constructed gas balloon fully equipped with radio apparatus was recently released in Francis Joseph Land and attained the record height of 36,000 metres (118,800 feet).

Has Anyone Heard Radio Ceuta?

AT Ceuta (North Morocco), on the borders of the Mediterranean, a small broadcasting station has been opened by an association of listeners; it is stated to operate on 205.5 m. (1,460 kc/s) and announcements are made in the Spanish and Arabic languages.

More New Stations for North Africa

THE P.T.T. authorities of Algeria propose to replace the present transmitter used for the Radio Algiers broadcasts by a station of a power of at least 120 kilowatts, capable of being raised later to 200 kilowatts as the need arises. The plan also comprises a medium-wave transmitter at Oran, together with a short-wave station for the relay of programmes to Constantine. The installations are to be completed by the middle of 1938.

Speedy Repairs

Many Receiver Breakdowns can be Temporarily Remedied in Less than Five Minutes—This Article Gives Details of the Various Methods which May be Adopted By IDRIS EVANS

RECEIVERS sometimes break down at very inopportune moments—just before the commencement of an anxiously awaited programme, or perhaps after an important commentary has commenced. Fortunately, however, it is possible to effect temporary repairs within a few minutes in most cases. This does not mean that a faulty component can be repaired or even replaced in this time, but there are many alternative connections which can be made in a receiver whereby a defective stage or component part may be isolated so as to provide reasonably good reception temporarily.

Aerial and Earth Systems

If the outside aerial breaks or is suspected of shorting at some point, it is advisable to disconnect it at the receiver and use a temporary indoor aerial consisting of a length of insulated wire wound around the picture rail; if the receiver is reasonably efficient this type of aerial can be relied upon to pick up the local stations at good strength. In a portable receiver the frame aerial windings sometimes become broken; when this happens the quickest remedy is to fit an indoor aerial as mentioned above, with the receiver end connected to the fixed vane terminal of the tuning condenser connected to the frame winding. If an H.F. stage is used, better results may, in some cases, be obtained by connecting the aerial lead to the cap of the S.G. valve—this will be dealt with later. A bad earth connection can also spoil reception: if the earth lead is making bad contact with, or is broken away from, the earth tube, the receiver earth terminal should be connected to the nearest main water pipe or temporarily to the gas distribution pipe.

Battery Receivers

The most common fault in battery-operated straight two or three valve receivers is a break or partial break in one of the components carrying direct current. These are the anode resistances, H.F. choke, low-frequency transformer primary winding, and speaker winding or filter choke winding. A partial break will be indicated by crackling noises with the stations audible in the background. A complete break on the other hand will, of course, prevent signals from passing to the speaker. This type of fault can be located by checking the anode voltages; if no voltage is applied to one of the anodes it will indicate that there is a break in that circuit. A crackling component can generally be quickly located by shorting each of the suspected anode components in turn until the crackling ceases.

Commencing at the anode of the detector valve, the first component is the H.F. choke. If this is at fault it may be short-circuited by connecting a wire across it in most medium- and long-wave receivers. In short-wave sets, however, this is likely to affect the reaction control, and therefore a resistance having a value of approximately 10,000 ohms should be connected in its place if a replacement choke is not readily

available. Next comes the L.F. transformer primary winding. This is a very common source of noises in a battery receiver, but fortunately a fault in a transformer winding is easily located by the testing method previously mentioned. As there are thousands of turns of very thin wire on the windings, however, repairing such components is a very tedious procedure and it is generally much easier to fit a replacement. If a suitable replacement is

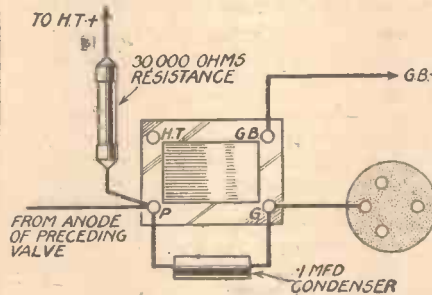


Fig. 1.—A method of isolating a defective L.F. transformer.

not readily available, resistance-capacity coupling can be substituted temporarily as shown in Fig. 1. It will be noted that the lead normally connected between the H.T. terminal of the transformer and H.T.+ has been removed and a resistance connected between the P terminal and H.T.+, with an extra condenser connected between P and G terminals. The required component values are not critical, and any resistance value between 20,000 and 75,000 ohms will give reasonably good results in conjunction with a condenser having a value between .05 and .5 mfd.

S.G. Receivers

The most popular battery receiver nowadays is the three-valve type, having an S.G. or H.T. pentode valve in the first stage, followed by a detector and a pentode output stage. The faults mentioned in the preceding paragraph are common to this type of receiver also, but there is an additional fault which is often experienced: the primary winding of the coil which couples the first two valves passes direct current in most cases and is likely to break down. This is indicated by the absence of voltage at the cap of the valve, and it generally takes a reasonably long time to effect a repair to the coil. The best procedure in such cases is to connect the aerial lead (through a .0001 mfd. or a .0003 mfd. preset type condenser) to the fixed vane terminal or tag of the tuning condenser joined to the grid condenser of the detector valve. In a receiver using choke coupling in this stage the same procedure may be adopted if a break occurs in the choke. Alternatively a resistance having a value of between 5,000 and 15,000 ohms may be used in place of the choke.

It sometimes happens that a fault occurs in the aerial coil or in the S.G. valve of such a receiver. The best procedure then

is to connect the aerial to the cap of the S.G. valve as shown in Fig. 2. If the fault is definitely traced to the primary winding of the aerial coil, however, better results will be obtained by connecting the aerial (preferably via a .0001 mfd. condenser) to the grid of the S.G. valve, or to the fixed terminal of the aerial tuning condenser.

A.C. Mains Receivers

In A.C. mains receivers the faults referred to in the foregoing paragraphs are also experienced, and the suggested remedies can be applied. In these receivers, however, the L.T. and H.T. voltages for the valves are obtained from the secondary windings of a mains transformer. If a fault occurs in the L.T. winding the required four volts for a small receiver can be obtained temporarily from a large four-volt accumulator, or the L.T. winding only of a spare mains transformer may be used with the centre tap of the winding connected to earth terminal of the set.

In mains receivers the speaker is generally of the energised type, and a break is therefore likely to occur in the field winding or in the transformer primary winding. If it occurs in the field winding this may be replaced by a choke of similar resistance, and a permanent magnet speaker may be used temporarily. If the fault occurs in the transformer winding, however, the field winding of the energised speaker may be left in circuit and the input leads of a P.M. speaker connected in place of the transformer of the energised model.

A.C./D.C. Receivers

In A.C. receivers the valve heaters are connected in parallel, and therefore, if the H.F. valve burns out reception can be obtained in the same manner as in the battery operated receiver by connecting the aerial lead to the cap terminal of the

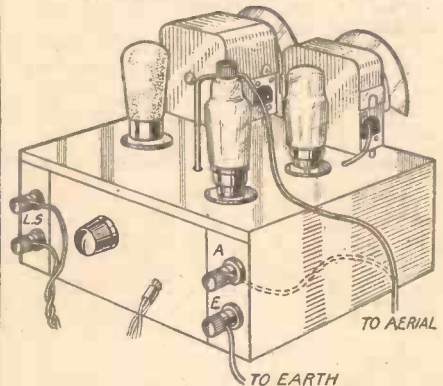


Fig. 2.—Showing how the H.F. stage can be cut out by connecting the aerial to the valve cap.

S.G. valve. In A.C./D.C. receivers, the heaters are connected in series and therefore, when one heater burns out the complete heater circuit is broken. If the H.F. valve burns out, however, it is permissible to connect a wire across its heater terminals and connect the aerial to its cap terminal (preferably via a fixed condenser). This procedure completes the heater circuit once more and current flows through the remaining valves. When this is done the heater current will slightly increase owing to the loss of the heater resistance of the damaged valve and therefore it is advisable to raise the tapping point on the main dropping resistance; for example, if the mains voltage is 230 volts and the mains lead is connected to the 230-volt tapping normally, it should be transferred to the 240-volt tapping in order to compensate for the resistance of the faulty valve.

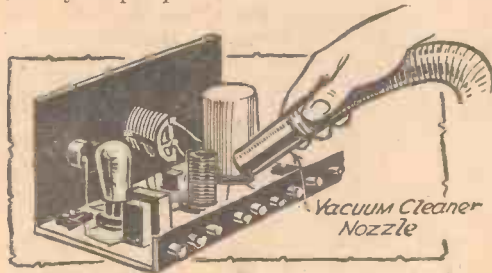
A Systematic Overhaul

EVERY receiver needs a periodic overhaul if it is to continue to give of its best, and no time is more appropriate than the present when, with the longer daylight hours, reception conditions are deteriorating somewhat and the maximum efficiency is required if a reasonable log of stations is to be received at good volume during the summer.

If your receiver is due for an overhaul—as apart from reconstruction—do it thoroughly and pay particular attention to four points—dirt, leakages, corrosion, and mechanical damage. Before setting about the job, make a note of any small deficiencies which you have discovered in the performance of the receiver—that annoying vibration in the speaker at full volume; that noisy volume control; the erratic action of that wave-change switch, and so on. Then, when you have an evening to spare, take down the set and proceed systematically.

The Effects of Dust

First, give the whole receiver a good clean. Dirt and dust will inevitably collect in any set, however well boxed in, if it is in service for a considerable time. The vacuum cleaner is an excellent tool for shifting loose dirt, but if one is not available a bicycle pump is a useful substitute.



A vacuum cleaner is particularly useful for removing dust from the interior of a set.

Neither, however, will remove all the dirt, especially that of a sticky or greasy nature. An artist's large, soft paint-brush is a handy tool for cleaning out nooks and crannies, and a supply of pipe cleaners, or large feathers, will assist in the more inaccessible places, and for removing fluff and dust from between condenser vanes.

A favourite spot for dust to collect is the air-gap of moving-coil speakers, and this dust usually contains a proportion of iron filings which are attracted to the magnet and are difficult to remove on account of the strong attraction. By cutting a small strip of rubber plaster, or even sticky insulating tape, warming it slightly until it begins to become tacky and pushing it very carefully into the gap, thereafter moving it gently backwards and forwards, all the filings and other particles can be collected and withdrawn.

Troubles that Accrue

Dust results in two troubles—bad contacts and leakages. Most devices such as switches and volume controls having moving contacts are self-cleaning, but occasionally a larger piece of dirt than usual gets lodged between two moving contacts and a high resistance contact results which may cause loss of signal strength, noisy operation, or erratic reception. Usually by passing a thin slip of paper between the

slider and resistance track of a volume control the offending particle will be dislodged. Although most cleaning should be done "dry," it is permissible to use just the merest trace of some lubricant such as vaseline on moving contacts—not sufficient to act as a trap for more dust but enough to restore the silky action which characterises a good component of this type. Switch contacts may be dressed

It is Surprising How a Set's
Performance can be Im-
proved Very Materially by
a Systematic Overhaul
By H. J. BARTON CHAPPLE

lightly with the finest grade of carborundum paper, but care should be taken to blow away or otherwise remove the dust thus formed. Dirt and slight oxidation may render the contacts between valve pins and sockets poor, and here, too, fine abrasive paper on the pins, and inserted into the sockets wrapped round a match-stick, will do the trick. Thereafter the valves should be inserted two or three times and removed to dislodge the last traces of dirt.

Leakages

The accumulation of dust plus a certain amount of moisture across the moulded case of a mica condenser connected between the anode of a detector valve and earth has been known to earth partially the H.T. battery and produce noisy operation plus some waste of H.T., while still more serious wastage and terrible crashing noises resulted from the bridging of a reaction condenser by dust between the vanes. Such troubles are not of frequent occurrence in a well-made set, however, and the chief faults due to leakages of the dusty type are in the signal circuits. Pay great care, therefore, to wiping the space between the connections of fixed condensers, the rims of valve-holders, and the terminals of transformers; all insulation should be wiped or brushed over to remove adhering particles, as should also the ends of screened leads, to avoid the formation of a conducting bridge between the core and the braiding.

Corrosion

By far the largest amount of faults due to leakage and poor contact are caused by corrosion, and, especially in home-constructed sets, is due to unsatisfactory soldering. In the majority of cases this can be traced to the use of excess flux. The best results, electrically, are obtained when using resin as a flux—resin-cored solder is the handiest way. Resin, of course, is not self-cleaning, and the metals to be joined must be carefully cleaned before soldering. But just because it is not self-cleaning, it is non-corrosive and the joint, once made, will not corrode later on. If the stronger chemical fluxes are used they must be used in moderation, and the excess must be removed carefully after the joint has been completed.

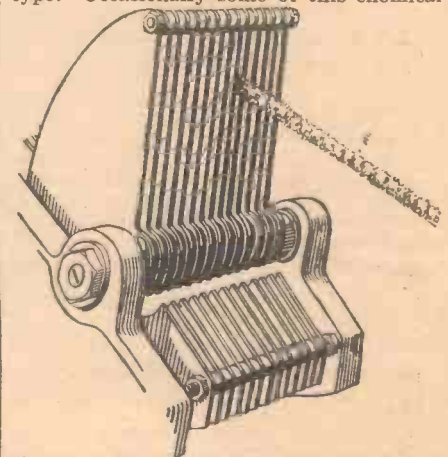
The next type of corrosion is that due to

the batteries in a battery set, this being of two sorts. There is the actual corrosion at the terminals and leads of the low-tension accumulator—easily avoided by a smear of vaseline after a good clean each time the battery is charged, and by the use of lead-sheathed tag ends for the leads, plus a periodical examination and prompt renewal of the leads themselves. Then there is the corrosion of metal parts in the receiver itself due to chemical fumes and creepage. The interior of the receiver cabinet is not the ideal place for the accumulator. It is true that most commercial battery sets have self-contained batteries, but it will be found usually that a separate compartment is provided. If the battery must go in the set, it is best placed above the chassis—but a separate battery box is better still, and has the advantage that it is not necessary to move or open up the set when changing batteries.

A good high-tension battery should not cause any corrosion, but if used for a considerable time there may be leakage of chemicals due to one or more of the zinc containers becoming eaten through, and if this reaches the chassis considerable harm may result; but, usually, high-tension batteries are changed before they become as bad as this. Grid batteries, on the other hand, are often left far too long before they are replaced, and many cases have been known in which they have been found to be a mass of corrosion, causing serious damage to nearby components, in addition to resulting in severe under-biasing of the valves.

The Wiring

The last type of corrosion which, however, does not often occur, is due to the electrolyte of electrolytic condensers of the "wet" type. Occasionally some of this chemical



A pipe cleaner, or a feather, effectively removes foreign matter from between condenser vanes.

material reaches the outside due to "spitting," and cases have been known where corrosion resulting from this spitting has caused either intermittent bad contacts or partial shorts.

Purely mechanical faults are not very frequent to-day as the general standard of workmanship in components has reached a very high level, and such faults, when they do occur, are usually traceable to faults in installation. Watch for frayed flexes—do not overlook, in this connection, the mains lead in the case of an all-electric set.

On Your Wavelength

Another "Hitch"

I READ that the B.B.C. has experienced another of those "hitches" which seem to have been the lot of television for the past two years, and it is now doubtful whether television apparatus will be on show at Olympia. It is getting on for two years since the Television Committee issued its report. I believe that it is a case of too many cooks spoiling the broth, and it would have been better for the B.B.C. to have permitted say E.M.I. to have undertaken the programmes for the first six months and then to have allowed Baird to do the same for a further six months. Two rival interests under present arrangements will transmit each on its own system, and receivers must be so designed that the "looker" can immediately switch over from one system to another. I understand on



The aerials of yesteryear.

excellent authority that the real trouble is that one of the two parties is ready with its transmitting equipment, whilst the other is not. One party to this unusual contract is therefore being penalised because the other party is not ready. I have no doubt that there are excellent reasons for the delay, but the race is to the swift, and from time immemorial it should be first come, first served. Under the present arrangements no time limit seems to have been set, and it may be another year before we see television programmes. If you have a house built you give the builder a time limit; you do not undertake to have the house a year after it should have been completed. And so, I think the B.B.C. might usefully tell both parties that if its apparatus is not ready by a particular time, their contract goes by default.

Partnerships of this sort seldom function satisfactorily. As it is, the two rival interests are housed in one

By Jhermion

building—Alexandra Palace. Let us hope that they will give the lie to the old adage that too many cooks spoil the broth. The B.B.C. in this matter does not seem to have displayed its customary business acumen.

In point of fact, I see no particular reason why the B.B.C. should have anything at all to do with television any more than it has anything to do with the film industry. Government control of public institutions never works for the benefit of the public, and it usually assumes a dictatorship. We have enough dictators on the Continent without having them at home.

The Sunday Programmes

OUR B.B.C. Chief, squaring his shoulders and standing four square to all the winds that blow, long ago decided that like a lot of Sunday school children entertainment properly so described was not good for us on Sunday. We should have Sermons, music which ought to have died with its composers, silly talks, and those who have relied upon the radio to leaven their week of toil have been made thoroughly miserable. Old ideas pass, giving way to new; the public to-day is not in the thrall of the Church. It is not so many years ago that the Church held such sway that it was almost compulsory for the artisan class to go to Church on Sunday under fear of getting the sack. To-day the public enjoys freedom of action and of thought, and Sunday is *its* day, on which it intends to do as it jolly well likes, Sunday Observance Act or no. You cannot push religious programmes down the throat of the public, and now under duress the B.B.C. grudgingly agrees to give us brighter Sunday programmes sometime. It will be interesting to hear what the B.B.C. considers is a bright Sunday programme. Its charter is to be renewed for a further ten years—in my opinion too long a period bearing in mind the "we-are-perfect" policy it has adopted in the past. It has openly stated that it gives every

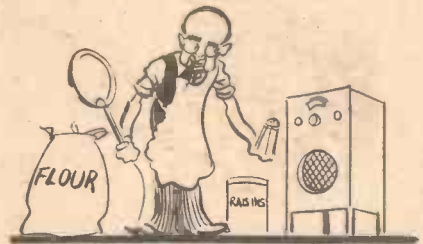
consideration to letters of criticism received from listeners. I find this rather a hard lump to swallow, for you cannot find any listener who likes the B.B.C. Sunday programmes. It is a disappointment to me that control was not completely vested in a Cabinet Minister; perhaps that will come in time.

An Offence Reported

THIS from F. H., of Farnworth:

"This afternoon I listened to — and his orchestra, and his crooner. Knowing that crooning is your particular 'bête noir' I assume that you would not be listening, so thought I would inform you of the offence.

"I have heard comedians caricaturing crooners, but this particular crooner out-crooned them all.



With frying-pan poised beside my loudspeaker.

"I am now left wondering whether he was really sincere about his job or if he was really showing us what this crooning business may come to if allowed to go on.

"We have hospitals and sanatoriums for all diseases nowadays. Why not have 'croonacy' sanatoriums? These, unlike other institutions from which we receive appeals for help, would never lack public support. Restrain the crunatics!

"Another advantage of my suggestion would be the forming of another branch of the medical profession, say, 'croonology'!

"I'm feeling 'batty' myself after this. But do try to listen to the fellow I refer to and you'll understand."

A Change-over Difficulty

I SHOULD not like readers to conclude from my citations of their letters of criticism that this is the only style of correspondence I receive.

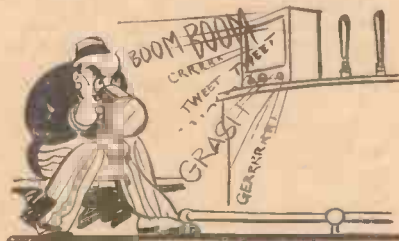
A good deal of it is of a helpful nature, and I pass it along to my readers. Here is a letter from H. H., of Somerset:

"Greetings from an old reader now in a vastly different sphere where more time can be spent on radio and record reproduction.

"My object in writing to-day is to vent a possible difficulty some radiogram enthusiasts of your circle—now so vast—may experience when essaying the same change-over as I have made, viz., from one electric motor and pick-up to a dual or rather twin turntables with fader unit.

"I have had the experience several times during an evening of record reproduction of finding the volume suddenly falling off badly, though the receiver meters showed no loss in milliamperage and the fader unit still in position set. A chance switching on of second motor brought the volume back to the usual—and this expedient I have used on each occasion the volume drops and up goes volume at once and no falling off occurs on switching second motor off. This is a genuine experience of some thirty or more occasions, and has been observed by members of my staff.

"My amplifier and twin motors are run off a 5-amp. power plug, and the lead to motors passes through a double fuse and leads from other end of fuse run to both motors. The pick-ups are B.T.H. Senior needle armature and the fader unit is a Reliance Manufacturing Co.'s



Pub enemy number one!

100,000 ohm, centre-tapped and correctly wired up. Action of this fader is delightful and silent.

"Maybe you would like to refer to this experience in your notes in case of others having a similar experience, and your advice on such would be much appreciated. Maybe this would lead to other readers ventilating their peculiar findings on the record reproduction side as well as radio. Peculiar faults are always interesting to us, who find the more we know the less we actually know.

"With cheery greetings and full appreciation of your happy columns and hits at the crooning and like



Portable Receivers

THE five-valve type of portable receiver commonly used a few years ago was undoubtedly an expensive instrument to run. The fact that the H.F. stages were untuned also made it somewhat insensitive, and nowadays it is possible to obtain as good, if not better, results by using three valves. More care must be taken in the design of the three-valver than was the case with the old five-valve portable, however, and two tuned circuits must be used if optimum results are to be obtained. A well-designed portable using an H.F. pentode or an S.G. valve in the first stage, followed by a reacting triode detector and a pentode output valve can be relied upon to give good reception of medium-wave stations over a 50-mile radius, and of long-wave stations up to approximately 150 miles. The actual signal strength will be found to vary according to the listening location, however, and good reception cannot be expected in a steel-framed building or in a ship's cabin. As portables are primarily intended for use in the open, however, this limitation should not prove a material disadvantage.

R.C. Coupling

THE high efficiency of the modern S.G. and H.F. pentode valves has also revived the once popular resistance capacity type of L.F. coupler. It will probably be found that the majority of the 1937 straight receivers will incorporate an H.F. pentode detector, resistance capacity coupled to a pentode output valve. This circuit arrangement has two marked advantages—namely, low cost and freedom from hum. To obtain the same degree of volume with a triode detector in use, transformer coupling would have to be used, and this tends to increase the hum level unless very careful screening is effected.

sections who revel in those who make 'low monotonous noises' as one dictionary so gives the name to the 'art.'

Any Rags—Bones—Aerials To-day?

WHERE—oh where are the aerials of yesteryear? Not so many years ago, even the most unpretentious of houses boasted a copper festoon, but now there is hardly a sign of them! There must be miles and miles and miles of copper coiled smugly in the junk-boxes.

Off the Beeton Track!

I READ that the B.B.C. are now giving a series of trial broadcasts to five women cooks and one man cook in an endeavour to discover a new technique in cookery talks. What the B.B.C. wants is "honest-to-goodness" cooks who won't read recipes "my grandmother gave me." The Mrs. Beeton

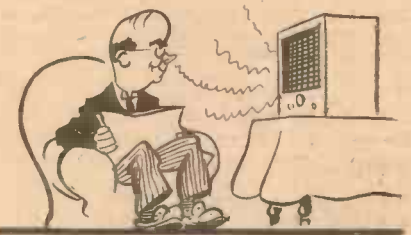
followers and those who cater for the "heads" will not be considered suitable for the broadcasts. The B.B.C. officials hope to find among those to be tested a real cook who is able to serve up the stuff to give the troops—over the air. I am all agog and am patiently waiting with frying-pan poised beside my loud-speaker!

Pub Enemy Number One!

WAS out motoring the other day and dropped into a country pub to have one. The landlord, thinking to show how hospitable he could be, switched on the radio. It was really quite the worst reproduction I have ever heard. Perhaps it was his method of driving people to drink. Pulled up later at a café for tea and here again the "musik" suffered severely from "recognisability." Was remarking on this to a friend of mine and he told me that "refreshment radio" has done more to uphold the theory that we are an unmusical nation than the barrel-organ.

Tick-tock — Ding-dong — Swish-swish!

A CORRESPONDENT to a paper recently suggested that the tick-tock interval signal having been superseded by the peal of bells, these should henceforth be repealed and the swish of waves breaking on the seashore should be substituted. His point was that during the hot weather this form of interval signal would prove very soothing.



The sizzling of roasting chestnuts.

Just imagine listening in on a portable radio during a rather choppy Channel crossing—most soothing! Then again—what are we going to have in the winter—the sizzling of roasting chestnuts or the sound effects from a really good house on fire! Whilst no prize is offered it would be interesting to hear of further suggestions from readers. These I will promise to very carefully place in the waste-paper basket. Gurgle-gurgle, plonk! Plonk, gurgle-gurgle!!

NEWNES' NEW WEEKLY!
THE CYCLIST
 2d. - - - Every Wednesday!

A PAGE OF PRACTICAL HINTS

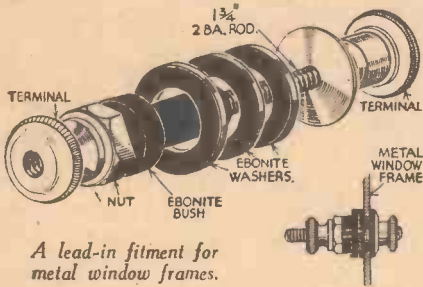
SUBMIT YOUR IDEA

READERS WRINKLES

THE HALF-GUINEA PAGE

A Handy Lead-in Fitment

FACED with the problem of bringing aerial and earth leads through a metal window frame, I made up lead-in tubes, as shown in the accompanying sketch, from



A lead-in fitment for metal window frames.

parts found in the scrap box. These consist of a 1 1/4 in. length of 2 B.A. rod; 2 large 2 B.A. nuts, 2 2 B.A. terminal tops, an ebonite panel bush with collar, and 2 or 3 ebonite washers to slide on the bush. A hole was drilled in the window frame the same diameter as the bush. The hole was drilled well away from the corners of the window frame, as the corners are welded and very hard to drill.—FRED WILLAN (Southport).

Making Iron Cores

HERE is a method of making reasonably satisfactory iron cores for snugly fitting your home-made large, or midget, coils.

As will be seen on referring to the illustration, the whole is comprised of thin celluloid, iron filings, and a piece of 16-gauge copper wire. The inclusion of the wire, although not usual, is purely for experimental purposes. Now the simplest way is to place a piece of celluloid, with a slight overlap, inside the former being used; then, after having "glued" the overlap, and pressed it to make it stick, carefully remove the celluloid tube, and cut off any excess; make slits in the top and bottom as shown, for forming flaps, and when the iron filings are "set" these are eventually further secured by another disc of celluloid top and bottom.

Now place a disc of wood or suitable hard material in the bottom, stand the box



THAT DODGE OF YOURS!

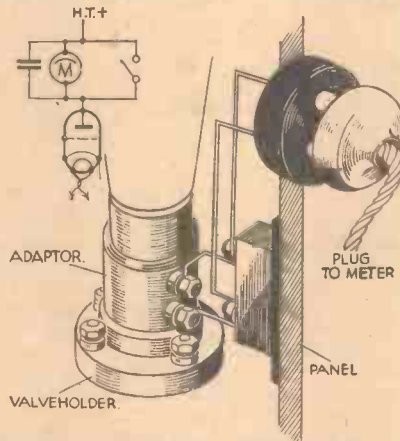
Every Reader of "PRACTICAL AND AMATEUR WIRELESS" must have originated some little dodge which would interest other readers. Why not pass it on to us? We pay £1-10-0 for the best wrinkle submitted, and for every other item published on this page we will pay half-a-guinea. Turn that idea of yours to account by sending it in to us addressed to the Editor, "PRACTICAL AND AMATEUR WIRELESS," George Newnes, Ltd., 8-11, 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 Wrinkle.

upright, fill with filings and include the piece of wire, as shown. Next pour in a quantity of pure celluloid cement allowing same to filter through, and when you are satisfied that the filings are saturated compress with another disc of wood at the top, and let the whole job dry, or "set."

Although this seems rather elaborate, actually it should only take a short time to make a really neat job. After the filings have set remove the wood discs, and seal as shown in the lower sketch.—W. R. HOBBS (Ilford).

Connecting a Milliammeter

IN order to ensure that the output valve of a receiver is not being overloaded, it is necessary to take frequent readings with a milliammeter in the anode circuit.



A useful arrangement for taking readings with a milliammeter.

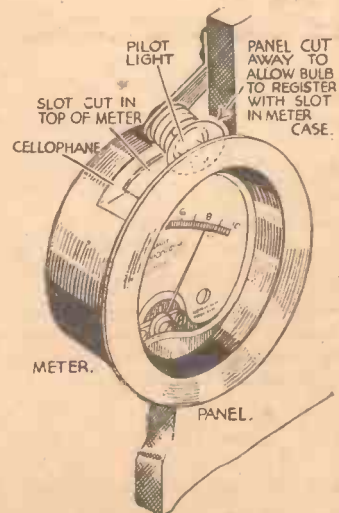
So that this reading may be taken with ease and safety, it is desirable to make permanent provision for connecting a milliammeter as shown in the accompanying theoretical circuit. Normally, the short-circuiting switch is closed, thus cutting out the milliammeter and the usual bypass condenser.

A very neat method of obtaining the desired result is illustrated. A split-anode adaptor is inserted between the valve and its holder. With this type of fitting it is necessary for connection to be made between the two external terminals before current can pass between the anode pin and corresponding sleeve in the valve

holder. These two terminals are connected to the socket of a two-pin plug, the bypass condenser being wired across the terminals. A plug with the pins shorted together is normally inserted in the socket, thus connecting the anode direct to the H.T. supply. When measurements are required, this plug is removed and another plug with milliammeter already connected, is inserted in its place, the meter and bypass condenser thus being brought into circuit. The location of the socket and condenser will naturally depend on the layout of the receiver, the leads being kept as short as possible to prevent unwanted capacity. The ideal arrangement is for the socket to be connected so that it is accessible from the outside of the cabinet. The extra height necessary to accommodate the split-anode adaptor may not always be available, and in this case, the H.T. lead is taken direct to the socket, the return from the latter going to the anode terminal of the valve holder.—C. MUSTILL (Leeds).

Illuminating Switchboard Meters

THE accompanying sketch shows a useful method of illuminating the dials of switchboard meters which, having the scale set back from the surface of the panel, are quite often difficult to read. A slot is cut across the top of the meter case with a flat file. The size of the slot will vary with the size of the meter, but may be from 1/4 in to 1/2 in. wide, and about 2 to 2 1/2 in. long. A small pilot light is mounted above this slot on a metal bracket, as shown, the panel being cut out, if necessary, to allow the lamp to come over the slot. It will be found that a smooth "floodlit" effect is obtained in the meter scale by this method. A small strip of cellophane should be glued over the slot to prevent the ingress of dust.—J. HADDON (Glasgow).



A method of illuminating the dial of a switchboard meter.

Practical Television

July 18th, 1936. Vol. 3. No. 11.

Television Scenery

THE B.B.C. television producer is already engaged on the question of the best type of scenery to be used for studio television broadcasts. At the moment preference is being shown for built-up sections as distinct from painted backcloths which are used so frequently on the stage, and a stage carpenter complete with "shop" has been installed at the Alexandra Palace. In addition, however, it is felt that a certain amount of back projection will come into use. For this purpose, at the back of the studio is placed a semi-transparent cinema-type screen together with a standard form of cinema projector. While the actors perform in front of this a film of the desired scenery is fed through the projector, thrown against the back of the screen, and becomes visible from the front. A far more realistic production is ensured in this way, for the scenery and actors can be made to blend correctly, while the extent and nature of the background picked up by the television scanner then in use is of a far more embracing character than would be the case with either painted backcloths or built up sets. In addition, considerable time is saved, for the scene is changed instantly without any co-operation from "stage hands."

Using One Receiver

A certain amount of prominence is being given in America to an engineer's invention with the aid of which it is claimed to simplify television reception, for both the sound and vision signals can be received on the one set. No details of the equipment are available except for the bare statement that no coils or condensers are incorporated, but several new and complex parts. With the present promised B.B.C. service two separate and distinct wavelengths are to be employed for the sound and vision signals. For the former 7.23 metres has been chosen, this corresponding to a carrier frequency of 41.5 megacycles, while the vision is to occupy a wavelength of 6.67 metres, that is, a carrier frequency of 45 megacycles. This frequency separation of 3.5 megacycles should prove ample for the initial service, but if any attempt is made to increase the degree of picture definition by adding to the lines of dissection, or alternatively increasing the number of pictures per second, then it is certain that a revision will be required if no form of overlap is to take place. At present it seems certain that two separate and distinct sets will be necessary—one for vision and one for sound—but these can be accommodated in the same cabinet. Furthermore, since the separation between the two carrier frequencies is a definite known quantity the tuning for the two sets can be effected from one control by ganging up the condensers. It is also conceivable that if the sets are of the superhet variety it may be possible to use a common oscillator, but these are details of design which will only be made manifest when the service starts, and both commercial and home-constructed receiver designs can be tested out under true reception conditions.

Screen Projection

The development of mechanical/optical methods for television reception will be carried a stage further by the Scophony Company, who sponsor this scheme, now that the capital of the company is to be more than doubled. As Thermion pointed out in a recent issue, it is difficult to see how any scheme other than a wholly electronic method (a cathode-ray tube) can lend itself to a rapid, simple and cheap changeover from one standard of transmission to another, as is required by the Baird and E.M.I. equipment at the Alexandra Palace. For big screen projection in cinemas, where the receiving apparatus is in the hands of skilled engineers, this system will no doubt be satisfactory, but until the home receiver has been demonstrated it is difficult to see how this handicap can be met.

Films for Television

It has become an accepted fact that the use of films as subject matter for television transmissions is sure to be very prominently in evidence with any television service for some time. On the other hand it is obvious that at the present stage of development every film now made is not suitable for the size and picture definition which is to be radiated for home use. This fact lends credence to the statement already published that a company is being formed for the sole purpose of producing exclusively the right type of film which can be televised. In any case the B.B.C. hope to be able to use selected excerpts from films produced by the large companies, just the same as on the broadcast programmes we have selections from plays or variety shows. Using the media of visual transparencies it is also possible to employ the intermediate-film scanner for portrayal of scenes only a few seconds after the actual enaction, while in those cases where time is not an important factor, rapid processing can be dispensed with, and the events shown some hours after they have taken place. Both these methods were used recently in a Paris television demonstration as, at the moment, it is felt in that country that the film method lends itself to more perfect results than the direct pick-up schemes now in use.

Yet Another Date

Endeavouring to secure a definite date for the inauguration of the high-definition television service from Alexandra Palace is a thankless task. The B.B.C. are careful not to commit themselves in any way, and the only successful efforts appear to be the outcome of questions asked in Parliament. Only the other day Sir W. Womersley, the



For special demonstration purposes over short distances the German Broadcasting Company make use of a 20-watt experimental ultra-short-wave transmitter for broadcasting their television programmes. It is intended further to develop this system and to use the low-power transmitter for relaying the programmes to the high-power transmitters, the aerials of which are situated at the top of the Berlin radio tower, which can be seen in the background of the above illustration. In the foreground can be seen the horizontal dipole aerial of the 20-watt station.

Assistant-Postmaster-General, stated in the House that the television equipment at the Alexandra Palace was still in process of installation, and it was not expected that the trial demonstrations would begin before the latter part of August. If such is the case then a situation may arise somewhat similar to that which occurred last year, just prior to the opening of Radiolympia. Placing a ban on television exhibits, the radio manufacturers hoped to divert the attention of the public from that subject, but the day before the Exhibition opened an official statement was issued by the Television Committee stating that, subject to certain minor conditions, orders had been given to both the Baird and E.M.I. companies for complete transmitting equipment for the new London television station. This quite naturally re-awakened public interest, and rather upset the plans of the defeatists.

Poland Prepares

Yet another European country has given tangible evidence of its interest in television matters. This time it is the department of Posts and Telegraphs in Poland which has decided to build a television transmitter, but it is not yet revealed which system of working is to be employed. Part of the equipment is already under construction at the Tele-Communication Institute in Warsaw, as they co-operated with Polskie Radio and the Ministry of Posts & Telegraphs in working out both the financial and technical details.

Building the "Midge" Portable

Full Constructional Details of the Novel Self-contained Receiver which is Shown on Our Cover This Week
By W. J. DELANEY



As mentioned last week, the "Midge" is an entirely self-contained three-valve receiver which may be used in any locality without the attachment of either aerial or earth. The main use of a portable receiver is to enable a listener to follow some particular item when absence from home prevents the use of the normal broadcast receiver, a condition which is met when picnicing, travelling, or even when it is desired to listen in some room in the house where it is impossible to use an extension point from the normal domestic receiver. Under these conditions, therefore, it is not essential that the portable shall be capable of providing many alternative programmes, and in the majority of cases it will indeed only be necessary to hear the local station. When, however, the portable is designed to provide alternative programmes its field of usefulness is greatly increased, and as I mentioned last week, the "Midge" was found sufficiently sensitive to provide no less than five separate stations without the use of the reaction control in North-West London, although it must be pointed out that in other parts of the country it may not be possible to repeat such a performance.

A Standard of Performance

It must be borne in mind that no guarantee can be given with any receiver concerning the performance which can be expected, owing to the peculiarities of local conditions, and therefore I am not going to say that you will hear any particular number of stations in any part of the country, although it should certainly be possible to guarantee that under all normal conditions the local stations as well as Droitwich should provide a perfectly good signal without the slightest difficulty, and this alone should be sufficient inducement to build the "Midge." The circuit has already been explained, and therefore we can proceed to the actual constructional work.

I designed the layout around the two batteries which are specified and thus these govern the principal dimensions of the cabinet. If the additional length of life of the accumulator is not an important point the overall dimensions may be reduced by using a smaller cell, but I felt that the listener would prefer a receiver in which batteries were incorporated which would provide some reasonable period of listening without the necessity of frequent

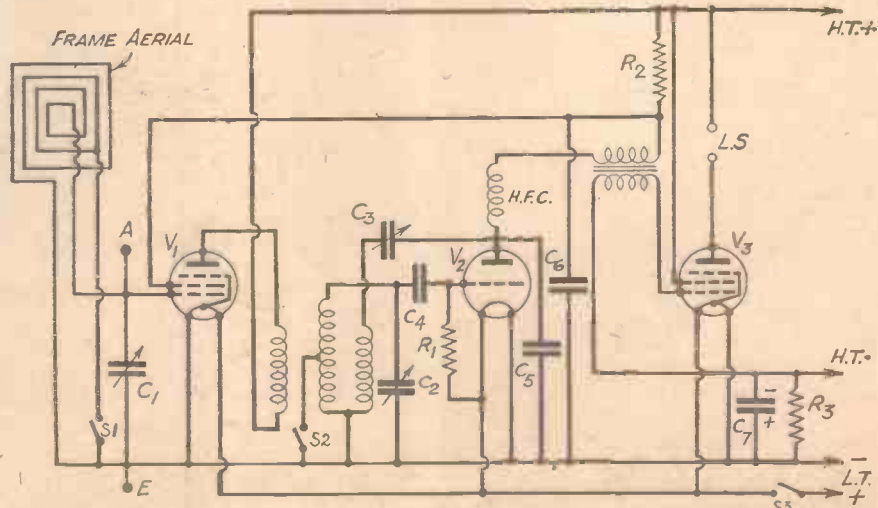
replacement or recharging. Miniature batteries will reduce both size and weight, but the inconvenience of replacements to my mind outweighs the slight additional benefit so obtained. I therefore recommend that the specified batteries be retained, in which case the internal dimensions of the cabinet will be as shown in Fig. 4. This in turn governs the size of the frame aerial and this is the first part of the receiver to be constructed.

Winding the Frame Aerial

Four strips of thin three-ply, measuring 2½ ins. wide, should be lightly tacked together with brass pins at the corners, with reinforcing strips inside each corner, as shown in Fig. 2. These strips are not for strength, but for the subsequent attachment of the baffle which holds the loud-speaker, and thus they should be flush with the upper edge of the frame. Two small holes should now be drilled near the edge and towards one corner of the frame,

and the end of the Litz wire anchored by passing through both holes, leaving a length of about 1 in. projecting on the inside of the frame. The wire should now be wound round the frame, each turn lying close up to its neighbour, and by pulling the wire slightly at the corners it will sink into the grain of the wood and form a firm attachment. A total of fifteen turns should be wound, two more holes drilled in line with the previous pair, and the end of the wire anchored as before, cutting off the little surplus which will be left from the 25yd. reel. A length of 1 in. is all that need remain for connection purposes.

The stranded wire is now passed through this last pair of holes, again leaving 1 in. or so, and this wire is wound in exactly the same direction as the previous winding, and forty-one turns of this wire should be wound, the end being finished off as before by passing through two further holes. There will be left a fairly wide space upon the frame, but this is ignored as it permits the aerial to fit neatly inside the lid and to



C1 and C2, .0005 mfd. tuning condensers. C3, .0002 mfd. reaction condenser. C4, .0003 mfd. fixed condenser. C5, .0001 mfd. fixed condenser. C6, 1 mfd. fixed condenser. C7, 25 mfd. electrolytic condenser. R1, 1 megohm grid leak. R2, 5,000 ohm resistor. R3, 300 ohm resistor. S1 and S2, double-pole wave-change switch. S3, on/off switch. H.F.C., high-frequency choke. V1, Cossor 210 VPT; V2, 210 Det; and V3, 220 HPT. A and E are sockets for the connection of an external aerial and earth.

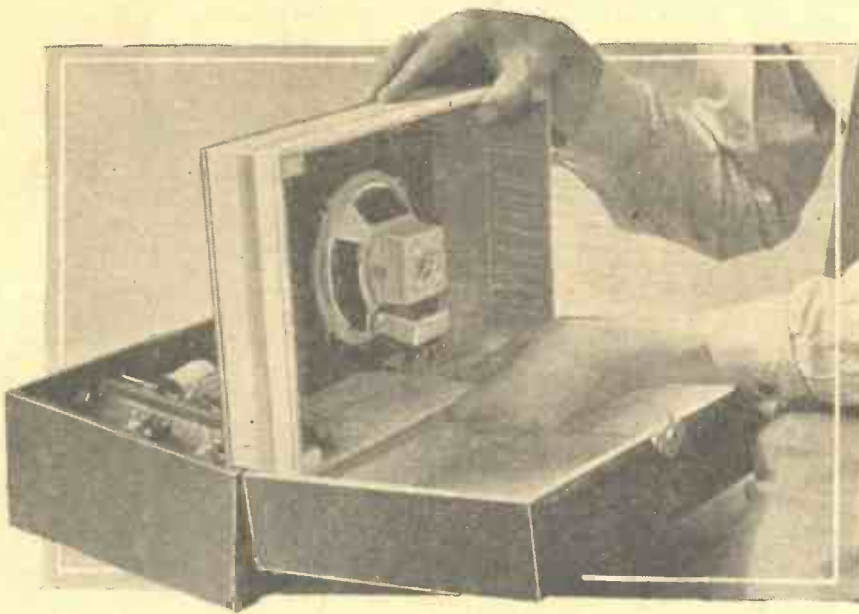


Fig. 1.—This illustration shows how the speaker is mounted, and how the frame aerial assembly fits into the lid of the carrying case.

accommodate without waste of space the loudspeaker which is specified.

The Cabinet

It will probably be found that the frame will pull out of square during this winding process, and the next step is therefore to cut the baffle, making the outside dimensions agree with the outside dimensions of the frame, but cutting it with the aid of a square so as to ensure a respectable finish to the cabinet work, as the remainder of the cabinet will be built round this part of the construction. The 5in. diameter hole for the speaker should now be cut,

and the baffle should be attached by screws into the corner pieces, and the sides and ends for the cabinet lid marked off from the frame and baffle assembly, noting particularly that the longer pieces should be just the length of the baffle, whilst the ends, or shorter pieces, are cut to such a length that they project to the thickness of the material employed. In the cabinet shown in the illustrations I used 1/2in. 5-ply, with lid, bottom, and baffle all in 4mm. ply. This enables the complete receiver, with batteries, to be kept down to approximately 15lbs., but if a slight additional weight is not important, and greater strength

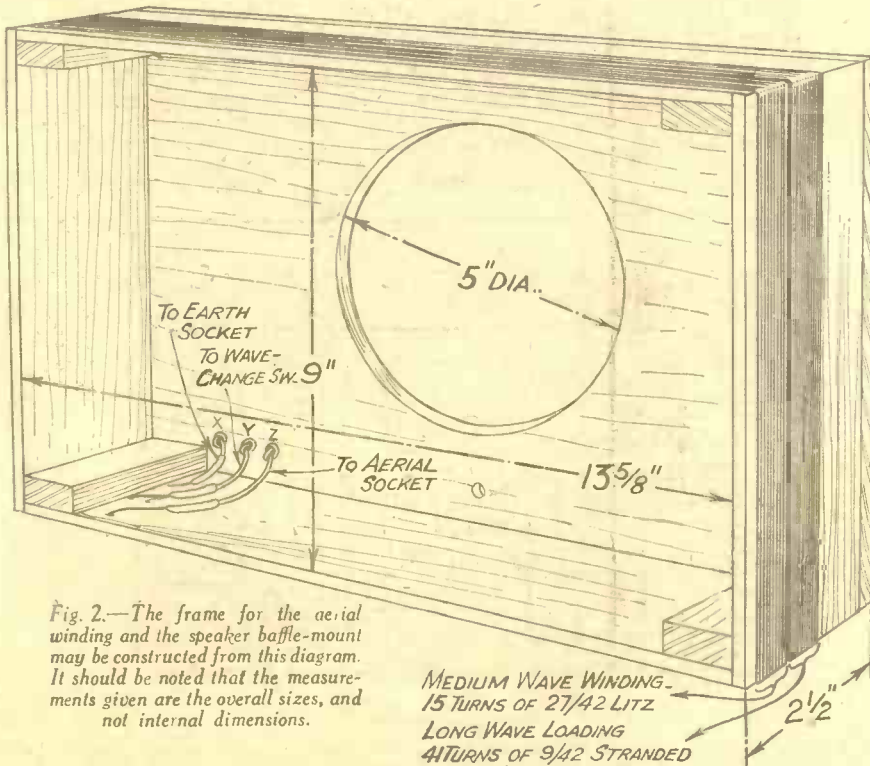


Fig. 2.—The frame for the aerial winding and the speaker baffle-mount may be constructed from this diagram. It should be noted that the measurements given are the overall sizes, and not internal dimensions.

MEDIUM WAVE WINDING -
15 TURNS OF 27/42 LITZ
LONG WAVE LOADING
4 TURNS OF 9/42 STRANDED

is required, a heavier material may be used for the cabinet.

Finishing the Cabinet Work

When the sides of the lid have been cut, they should be screwed together, using 1/2in. No. 3 brass screws, three to each corner, and the top of the lid attached, cutting this as with the baffle, with the aid of a square. The bottom of the cabinet should be similarly constructed, making quite certain that it is exactly the same size overall as the lid, but making it 1/4in. deep inside. The corners of the cabinet should be rounded off, and a covering of leatherette paper or better quality material attached with thin glue. The hinges, lock, and handle may be obtained from any local handicraft store and will complete the hardest part of the constructional work. For additional strength metal corner pieces may be employed if desired, and these also are stock items at handicraft stores.

The Receiver

The baseboard for the receiver is a simple piece of 5-ply measuring 9in. by 3 3/4in. and the valveholders, coil and L.F. transformer should be mounted in the positions shown in the wiring diagram. The H.F. choke should not be screwed down until the correct position has been found, as the tubular condenser must fit between this and the transformer, and this should be left until most of the wiring has been completed.

Holes will have to be drilled in the baseboard to enable the connecting wires to be passed from one side to the other, and all connections should be soldered to avoid risk of damage due to a wire becoming loose.

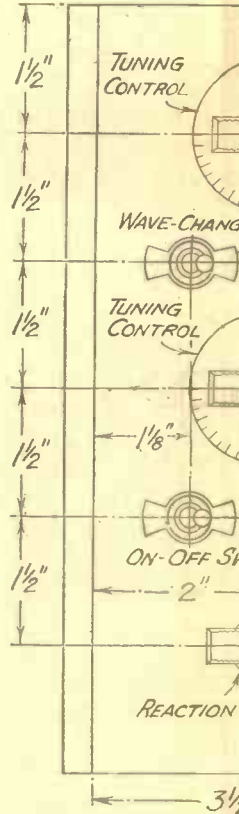


Fig. 3.—Drill the paxolin

LIST OF COMPONENTS FOR THE RECEIVER

- One "Uni-Gen" coil (Wearite).
- Two "Litlos" variable condensers, .0005 mfd. (C1 and C2) (Graham Farish).
- One "Litlos" .0002 mfd. (C3) (Graham Farish).
- One Type S.88 D.P. Switch (Bulgin).
- One Type S.80 on-off Switch (Bulgin).
- One Niclet 5-1 L.F. Transformer (Varley).
- Three Resistances, 300 ohms (R3), 5,000 ohms (R2), 1 megohm (R1) (Dubilier).
- Three Tubular condensers, .0001 mfd. (C5), .0003 mfd. (C4), .1 mfd. (C6) (T.C.C.).
- One Electrolytic Type A.T. 25 mfd. condenser (C7) (T.C.C.).
- One Vertical type valveholder (W.B.).
- One baseboard type 4-pin valveholder (W.B.).

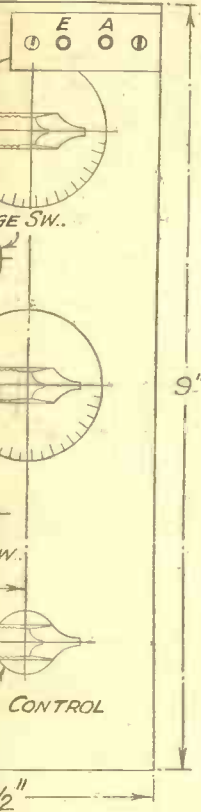
Carry out the filament wiring first, and then insert the resistors and fixed condensers as shown by the diagram, using the wire ends of these components to make the necessary connections. In every case the wire ends may be cut down to fit as they are much too long as supplied. When the 1-mfd. tubular is placed into position, the H.F. choke may be fitted, and the panel assembly undertaken

The Panel

A drilling diagram for the panel is given in Fig. 3 and a piece of thin paxolin is employed for this purpose. The three condensers and the two switches should be mounted, and the aerial and earth socket strip attached by drilling clearance holes

for the sockets and two smaller holes for the accommodation of bolts to retain it in position. It should be noted at this point that the condensers are supplied with an ordinary type knob, and there will thus be no indication regarding the setting of the controls for different stations. They should therefore be replaced by the knob and dial shown in the illustrations, and which are obtainable from Messrs. Stratton and Co. The dial is calibrated from 0 to 10, and the neat "key" type of knob has a pointer which provides good indication of the setting. No dial is necessary for the reaction control and the appearance of the panel is improved by omitting this.

The panel is attached to a strip of wood, screwed a short distance from the edge of the baseboard, so as to permit the controls to be sunk below the top edge of the cabinet and prevent an unnecessary increase



panel from this layout.

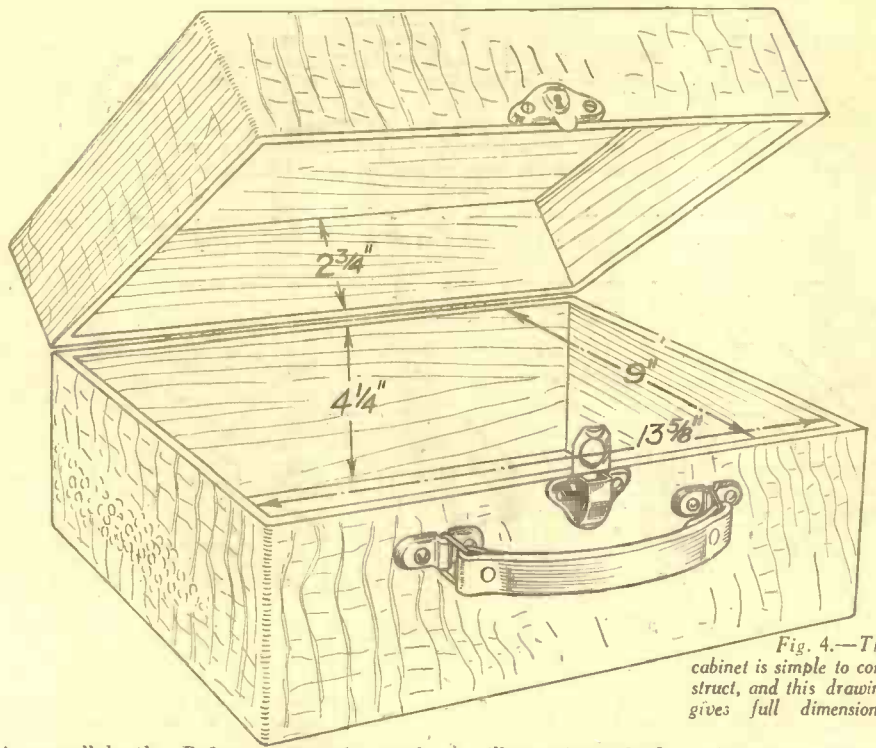


Fig. 4.—The cabinet is simple to construct, and this drawing gives full dimensions.

in overall depth. Before screwing the panel into position, attach lengths of connecting wire to all the various connecting points, as these will be inaccessible when the panel is mounted. Although not shown in the

illustrations, the batteries are covered by a thin sheet of ply or cardboard, covered with the same material as the cabinet, and this rests upon the top edge of the baseboard and a wooden strip attached to the

THE "MIDGE" PORTABLE 3

- One baseboard, 5-pin valveholder (W.B.).
- One A.E. Socket Strip (Clix).
- One Midget M/C speaker type 36M (W.B.).
- One Portable Type 17 H.T. battery (Ever Ready).
- One 2-volt type JWJ7 Accumulator (Exide).
- Two Wander Plugs, H.T.+ H.T.— (Midget Type) (Belling Lee).
- Two Spade Ends, L.T.+ L.T.— (Type 1025) (Belling Lee).
- Paxolin Panel, 9in. by 3 1/2 in. (Peto-Scott).
- 25yds. 27/42 Litz wire (Peto-Scott).
- 75yds. 9/42 stranded wire (Peto-Scott).
- One portable carrying case (see text).
- One 210 VPT, One 210 Det, one 220 HPT valve (Cossor).
- Connecting wire, screws, etc.
- Wooden baseboard, 9in. by 3 3/8 in.

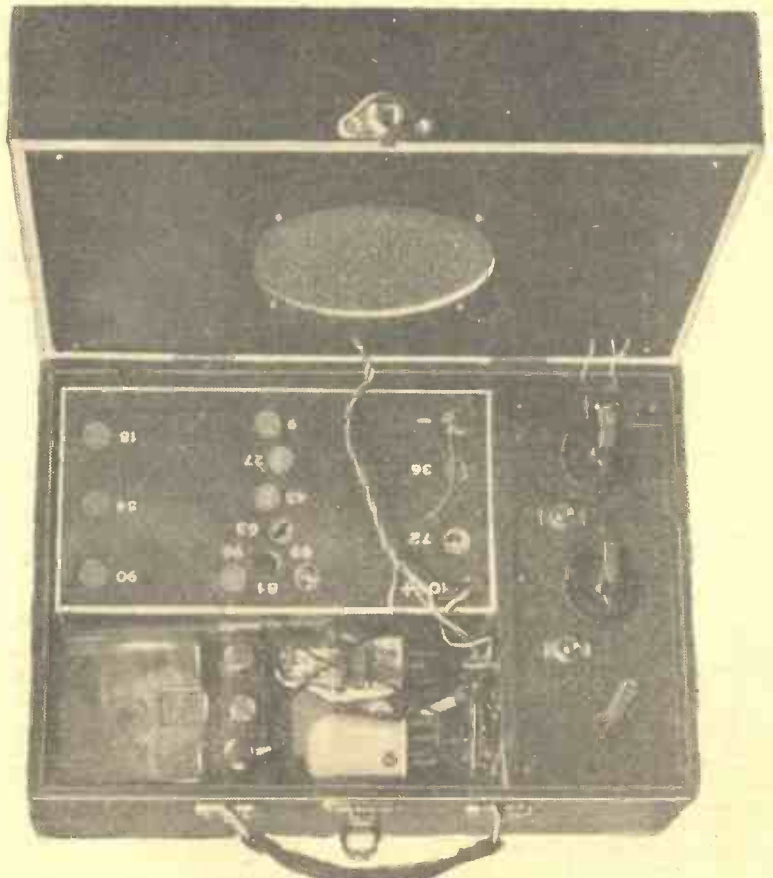


Fig. 15.—This bird's-eye view of the completed receiver shows the neat and compact layout of the batteries and detector and output stages.

inside of cabinet between the two batteries. Holes are drilled in this for the accommodation of the speaker and aerial leads.

Frame Aerial Connections

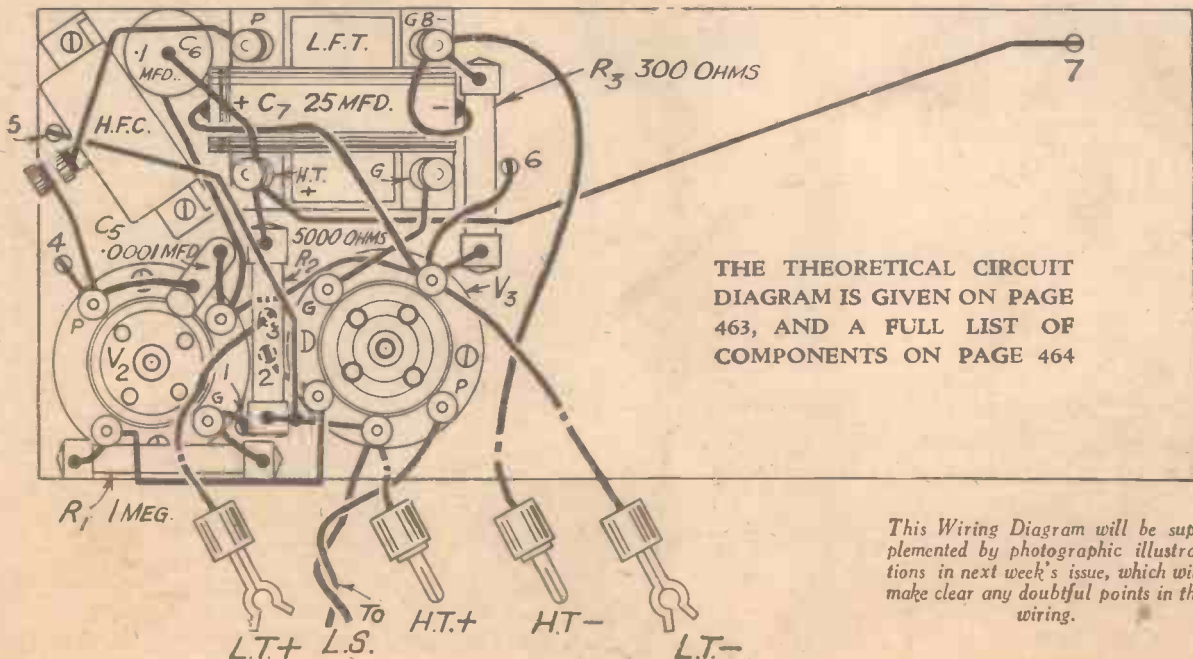
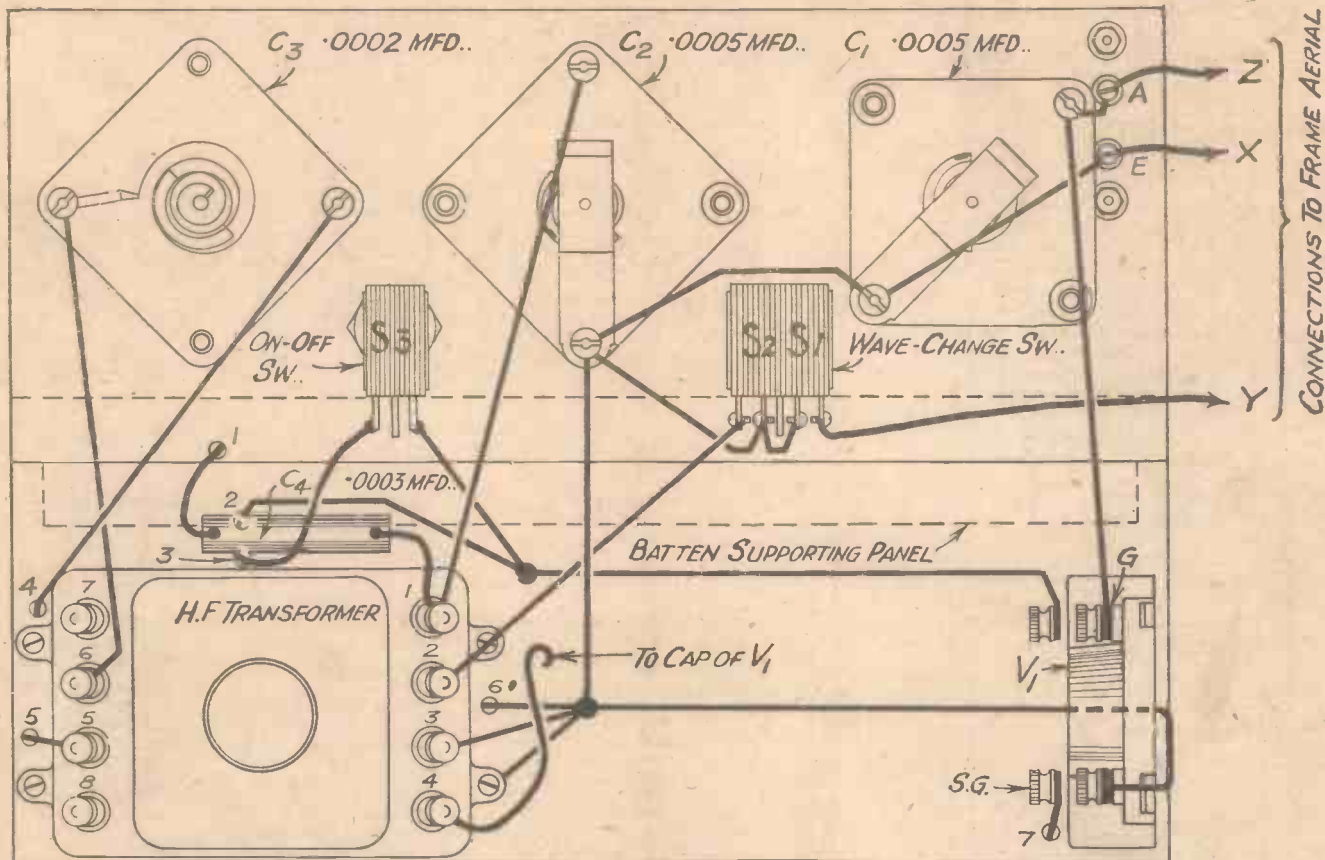
Three lengths of flex should now be soldered to the ends of the leads inside the frame aerial and they should be passed through three holes in the baffle, tying a knot in each lead to prevent them from

being pulled sufficiently hard to break the point of contact. By passing the centre connection (that is the junction of the medium and long-wave sections) through the centre hole, and the beginning of the medium-wave winding through the left-hand hole, the external connections may be simply made without mistake. The centre lead is attached to the wave-change switch, whilst the left-hand lead (beginning of the

medium-wave winding) is attached to the aerial socket. The remaining lead is attached to the earth socket.

The battery leads should then be attached, the loudspeaker screwed to the baffle, after covering with a piece of silk, and the two leads attached to the 0 and 75 terminals on the speaker terminal plate. These are then joined to the anode and suppressor grid terminals on the output valveholder.

WIRING DIAGRAM OF THE "MIDGE" PORTABLE



THE THEORETICAL CIRCUIT DIAGRAM IS GIVEN ON PAGE 463, AND A FULL LIST OF COMPONENTS ON PAGE 464

This Wiring Diagram will be supplemented by photographic illustrations in next week's issue, which will make clear any doubtful points in the wiring.

SHORT WAVE SECTION

SHORT-WAVE SET REFINEMENTS

Helpful Notes Concerning Additions and Modifications which can be Applied to a Simple Detector-L.F. Receiver with Beneficial Results
By FRANK PRESTON



ONE of the advantages of the simple "straight" type of short-wave receiver—which is still the most popular with constructors—is that it can be modified and improved stage by stage without altering the fundamental design. This means that there is ample scope for experiment of an inexpensive nature, involving the need for a few new components as the modifications progress. Another important point is that the very simplest type of "straight" short-waver is capable of providing excellent reception.

Simplest Circuit

These points will be more readily appreciated by examining the fundamental circuit of a Det.-Pentode two-valve circuit, where all superfluities and "frills" are omitted. Provided that a good coil is employed, and that reasonable care is taken in assembly, this elementary arrangement will enable the constructor to obtain loud-speaker reception of not a few European transmissions as well as good 'phone signals from America and other stations. The component layout may be ultra-simple,

the 19-metre broadcasting stations and for 20-metre amateurs, whilst the larger one gives reception of the 31-metre broadcasts and the 40-metre amateurs. It should also be observed that the .00016-mfd. tuning

alternative, which is the first refinement, is to include a variable resistance in series with the H.T. lead to the detector, as shown in Fig. 2. The variable resistance shown has a maximum value of 50,000 ohms,

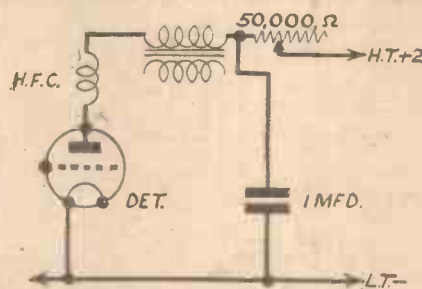


Fig. 2.—Reaction control can be improved by using a variable resistance in series with the detector H.T. lead.

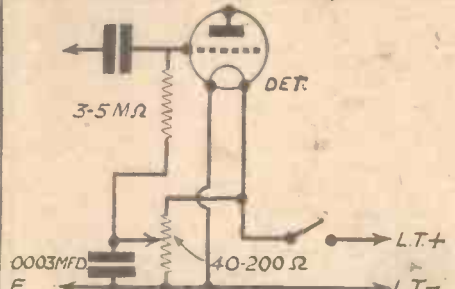


Fig. 3.—Another method of improving reaction control—by connecting the grid leak to a potentiometer across the L.T. supply.

condenser is provided with a slow-motion drive—it is not proposed to specify any particular makes.

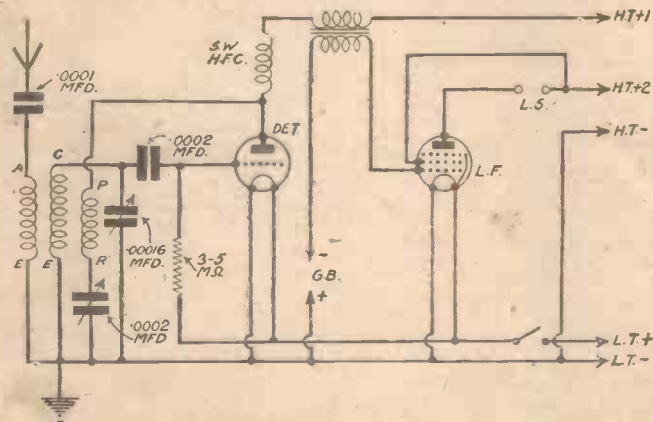
Detector H.T. Voltage

It is possible by carefully choosing the valve and adjusting the H.T. voltage to tapping H.T.+1 to obtain perfectly smooth reaction control, always provided that the coil is soundly designed, but this presents serious practical difficulties in many cases. An excellent

and is by-passed by a 1-mfd. fixed condenser. By careful adjustment of the resistance the ideal H.T. voltage can be found under working conditions, and the resistance can often be used as a form of vernier reaction control. When using this arrangement it is not necessary to use separate H.T. tappings, for both leads can be taken to the socket on the battery which gives the full voltage.

Grid-Leak Potentiometer

In Fig. 1 the grid leak (3-5 megohms) is shown as being returned to the positive side of the L.T. supply. This is satisfactory in most cases, but reaction control can often be improved—and the range



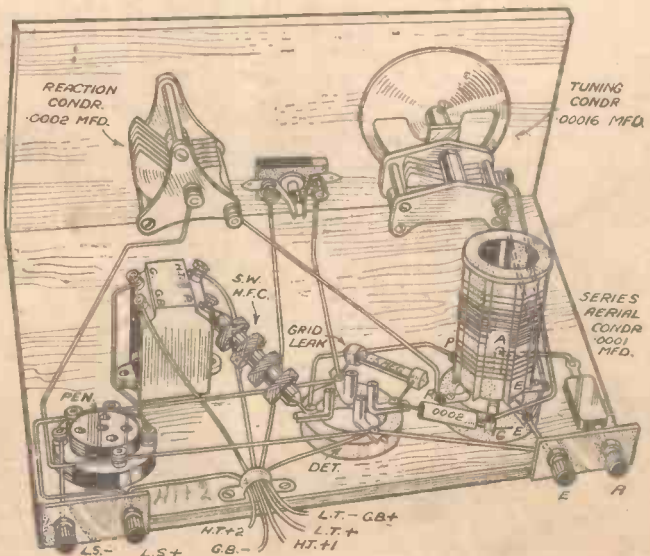
but the parts should be so disposed that all the leads are as short and direct as possible; a suggestion for a suitable baseboard-type layout is given in Fig. 4. A chassis could be used, of course, but this is not necessary and tends to make construction slightly more difficult in the present instance.

Plug-in Coils

It should be noted in Fig. 4 that a 6-pin plug-in coil is used, this being most satisfactory when the best possible results are desired. A couple of coils will cover the most-used wavebands, one for a "middle" wavelength of about 20 metres and the other for the 25 to 45-metre band. The smaller coil will serve for reception of

Fig. 1 (above).—The simplest type of Detector-L.F. short-waver.

Fig. 4 (right).—This illustration shows a practical arrangement of the circuit shown in Fig. 1.



thereby increased—by connecting the leak to a potentiometer joined between the L.T. terminals, as indicated in Fig. 3. The potentiometer can have any value between about 40 and 200 ohms, and may be a baseboard-mounting component, since it can be adjusted to the optimum position and then left alone. An alternative is to use a fixed potentiometer, of which several types are available with a tapping one-third of the distance from one end, that end being connected to L.T.+. In any case, a .0003-mfd. condenser should be wired between the leak and earth to act as a by-pass for H.F.

H.F. "Stopper"

When using a circuit such as that represented by Fig. 1, and possibly with the two modifications suggested, it is often found that a high-pitched whistle is inclined to be troublesome when making final and delicate reaction adjustments. It is often due to H.F. leaking from the detector anode circuit into the grid circuit of the output pentode. Incidentally, it is worth mentioning that this trouble is generally less in evidence when a triode is used in the low-frequency stage. However, the fault can usually be overcome by including a "stopper" resistance in the grid lead to L.F. stage. A value of about 100,000 ohms is correct, and the resistance must be of the non-inductive or grid-leak pattern.

It will be evident from what has been stated above that smooth reaction control is one of the most important essentials in a simple "straight" circuit which is intended to give good long-distance reception. This being the case, it need not be stressed that a reaction condenser with some form of reduction or slow-motion drive is desirable. A reduction ratio of about 10 to 1 is most convenient, and therefore the normal slow-motion drive is rather too slow. Eddystone, for one, however, make a special condenser with an integral 10 to 1 drive which suits the purpose admirably. A fairly satisfactory alternative to the slow-motion control is a very large reaction-condenser knob, for this makes delicate operation much simpler.

An Output Filter

A form of trouble which is sometimes experienced is a kind of hand-capacity effect which cannot be corrected by screening or by using an ideal earth lead—one which is short and of heavy-gauge stranded wire. It is generally due to H.F. leakage into the 'phone or loudspeaker leads, even when a "stopper" resistance is used, as advised above. The trouble is more in evidence when using 'phones, of course, and might be accentuated by bad component layout, or by arranging the wiring so that the leads to the speaker terminals run near to the coil or to the aerial lead. Generally, the matter can be corrected by inserting a short-wave H.F. choke between the anode of the output valve and the speaker terminal, placing the choke as near as possible to the valve holder. At the same time a .001-mfd. fixed condenser should be joined between the anode and earth. The idea of this filter system is that any H.F. currents which leak into the output stage are prevented from passing into the speaker, and are given an easy leakage path to earth. Additionally, any H.F. picked up by the 'phones or speaker leads is prevented from passing to the output valve.

H.F. Pentode Detector

It has become increasingly popular of late to use an H.F. pentode as a detector, since this gives greater amplification and often simplifies reaction control. The matter was referred to last week, so it is not proposed to make very much mention of it here. Instead, a two-valve circuit of the same general form as that shown in Fig. 1

is given in Fig. 5, but this includes all of the modifications suggested in the foregoing remarks, as well as an H.F. pentode detector. With regard to the latter it will be seen that, instead of varying the anode voltage by means of a fixed resistance, it is the screening-grid voltage which is controlled—by means of a 100,000-ohm potentiometer. A fixed 25,000-ohm resistance and decoupling condenser are included in the anode circuit. This circuit is probably as good for short-wave reception as any that could be devised using only two valves. It should be mentioned, however, that it is

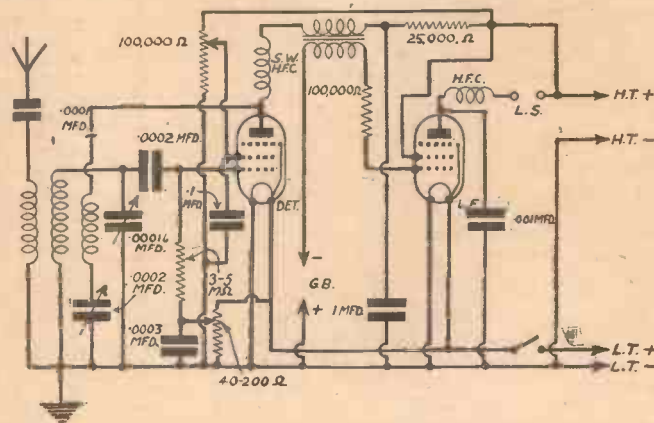


Fig. 5.—A circuit including all the refinements described.

not essential to include all of the refinements mentioned, but it is worth while to experiment with them in the order in which they have been described. Incidentally, when using an H.F. pentode as detector it is essential that the L.F. transformer should be a really good one with a ratio of about 1 : 5; buy the best that you can afford. Cheap transformers have a comparatively low primary impedance, and as the impedance of the pentode is high, best results can be obtained only by using a high-inductance transformer.

ATMOSPHERIC conditions during the greater part of June were, in general, very unfavourable for the reception of distant broadcasts; in fact, electrical disturbances during and since the solar eclipse, coupled with the ensuing storms, were so unpleasant that they affected in varying degree the entire waveband. During daylight hours, however, it was possible to secure on most occasions good signals on ultra-shorts, and many transmissions on the 13-, 19-, 20- and 25-metre bands were held for some considerable time with an almost silent background. From 40 metres and upwards mush and static were prevalent, and it was only in the early hours of the morning before sunrise that reception could be secured sufficiently clearly to be of practical value. Without doubt this is one of the most unfavourable periods of the year and much improvement, considering the weather conditions, may not be expected before the end of the summer holidays. On the other hand, as stated, electrical disturbances most fortunately do not affect equally and simultaneously the different wavebands, with the result that whereas on some evenings it is decidedly unpleasant to listen to broadcasts on the medium and long wave-bands, in most instances where a short-wave relay exists it is possible to secure the programme successfully through this channel. Assuredly,

Leaves from a Short-wave Log

this demonstrates without possible contradiction the advantage of possessing an all-wave or, at least, perhaps, what should be more correctly termed, a four-band receiver. It is a curious fact that notwithstanding adverse conditions, certain European and transatlantic transmissions still appear as a regular entry in the daily log. The Zeesen stations on 19, 25 and 31-odd metres provide excellent signals, as does Rome on 25.4 m. and 31.13 m. Skamlebaek (Denmark) and Jeløy (Norway) can also be relied upon, and it is impossible to miss Moscow on 25 metres. Of the U.S.A. transmitters W8XK, Pittsburgh, and W2XAD, Schenectady, may be captured without difficulty, irrespective of prevailing weather conditions, and from midnight onwards the ether teems with broadcasts from a number of Central and South Americans.

Japanese Stations

A new summer programme mainly destined to the United States of America

is now being made by the Nazaki (Tokio) stations JVN and JVP on respectively 23.14 m. (10,660 kc/s) and 39.95 m. (7,510 kc/s) on Tuesdays and Fridays from B.S.T. 20.00-21.00. Occasionally JVM on 27.93 m. (10,740 kc/s) broadcasts the same entertainment. JVN and JVP are also to be captured every Monday and Thursday between B.S.T. 22.00-23.00. Several friends have advised me that they have heard JVN calling on 10,740 kc/s; it is obvious that the station heard was JVM, and an explanation given to me appears to be the probable one. To save trouble and to facilitate the work of the male and female announcers, the call in several languages has been electrically recorded. This was used for JVN for some time and it seems that the same record is used for JVM, hence the mistake in the letters.

Listeners also report reception of Japanese transmissions on about 16.50 m. occasionally between B.S.T. 16.00-17.00, and state that they appear to be of an experimental nature as records are occasionally repeated. This might tally with JVB, advertised officially on 16.49 m. (18,190 kc/s), but so far it has only been used for commercial traffic. It seems likely, however, that during the summer months Japan may use a higher frequency than hitherto.

Facts and Figures

COMPONENTS TESTED IN OUR NEW LABORATORY

N.T.S. All-Wave Kit

WILL readers please note that owing to an error the new N.T.S. All-Wave kit was wrongly described in the advertisement on page 419 of our issue dated July 4th. The kit employs the standard Detector and 2 L.F. arrangement as stated in our review on page 423 of that issue, and not a screen-grid three circuit.

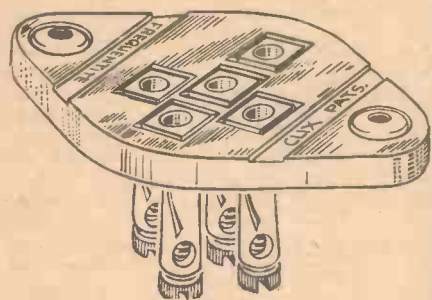
New Triode-Hexode

TUNGSRAM Electric Lamp Works announce that a new A.C. mains triode-hexode will shortly be made available. This is intended primarily for all-wave superhets, where the combination type of valve proves of greater value than the single type of multi-electrode valve. The heater is of the standard 4 volt 1 amp. type, and the anode and screen voltages for the hexode section are given as 300 and 70 volts respectively. The triode section should receive between 100 and 150 volts, and under normal working conditions the total

0 to .1 microfarads in six separate steps. This instrument is designed primarily for the use of service engineers and set designers and utilises the standard system of measurement by a resonance method at radio frequency (actually 230 kc/s). The actual capacity of the condenser under test is shown on a directly-calibrated scale. A meter gives indication of resonance, and the length of the meter deflection gives a comparative measure of the losses of the condenser under test. No external standards are required, and all measurements can be made to an accuracy of 2 m.mfds. for capacities up to 200 m.mfds., and to less than 1 per cent. up to 10,000 m.mfds. Two adjusters are provided, one to compensate for variations due to changes of atmospheric conditions, capacity of connecting leads, etc., and the other to set full scale deflection on the indicating meter. The additional power required for the meter is a 45-60 volt H.T. battery and a 2-volt accumulator, and a four-way cable is fitted for connection between the batteries and the instrument. The price is 20 gns. A special unit is available to enable A.C. or D.C. mains to be used.

Collaro Automatic Changer

A NEW model of the automatic record-changing mechanism is shortly to be introduced by Collaro, Ltd. This is designed for A.C. use and will play eight records (one side), 9, 10 or 12-inch discs in any order without the necessity of arranging for the differences in size. Furthermore, the change from one disc to another is entirely automatic, noiseless and foolproof in operation. The eight records are stacked on to a long spindle, and as each one finishes the next is lowered gently on to the turntable, where they form a pile. Controls are fitted to provide for starting, stopping, repeating and rejection of an unwanted disc, and the price of the complete unit, mounted on a rectangular plate, is 10 gns. The fittings include needle cups, and a Collaro 36 metal arm pick-up with rotating head. A special model is available for universal mains (A.C.-D.C.) use, price £11 16s. 3d.



The new Clix valveholder which was reviewed last week.

current load is 4 mA. for the triode, and 11.5 mA. for the anode and screen currents of the hexode portion. The price of the valve is 16s., and supplies will be available shortly.

Avo Capacity Meter

THE range of Avo testing instruments is being augmented by a capacity meter, designed to measure capacities from

This illustration shows the new Avo Capacity Meter, and the six-section calibrated dial may clearly be seen. This particular instrument is designed for battery operation.



PETO-SCOTT

Components, Kits, Receivers or Accessories for Cash or C.O.D. or on our own system of Easy Payments. C.O.D. Orders value over 10/- sent carriage and post charges paid (GT. BRITAIN ONLY).

MIDGE PORTABLE KIT "A" CASH OR C.O.D. CARRIAGE PAID. £2:2:0

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Enjoy your Radio programmes in every part of the home with a W.B. Cabinet Model Speaker. Handsome in appearance, the Cabinets are acoustically balanced and non-resonant, enabling the speaker to give "cleaner" reproduction with unmistakable naturalism impossible to imitate in any other way. Both models are supplied with adiabatic volume control, and match perfectly to any receiver, for use as an "extra" speaker or to any set or amplifier as principal reproducer.

Type 36S, in Cabinet, Cash or C.O.D., Carriage paid, £3/3/0 or 5/- down, balance in 11 monthly payments of 5/9. Chassis only, £2/2/0 or 2/6 down and 11 monthly payments of 4/-. TYPE 36J, in Cabinet, Cash or C.O.D., carriage paid, £2/9/6 or 5/- down, balance in 10 monthly payments of 5/-. Chassis only, £1/12/6 or 2/6 down, and 11 monthly payments of 3/-.



Peto-Scott ANTI-NOISE AERIAL KIT

Cuts out interference of man-made static and improves selectivity—on every waveband. Suitable for any set—A.C. or D.C. mains or battery. Complete outfit: Aerial Transformer, Insulators, Enamelled Stranded Aerial Wire, 60ft. special Transmission Line, Set Transformer with wave change switch. Fully illustrated instruction book. Cash or C.O.D. Carriage Paid. Or 5/- down and 3 monthly payments of 4/6. **17/6**

Full details on request.

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GARRARD A.C.6 Induction ELECTRIC MOTOR. A.C. Mains. 100/250 v., 50-60 cycles. 12in. turntable mounted on motor plate, with fully automatic start and stop. Cash or C.O.D. Carriage Paid, £2/2/6. Send **2/6** only
Balance in 11 monthly payments of 4/-.
COLLARO A.C.34 Induction ELECTRIC MOTOR. A.C. 100-130, 200-260 v., 50-60 cycles. 12in. turntable and fully automatic stop. Cash or C.O.D. Carriage Paid, £1/14/0. Send **2/6** only
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By JACE

Education Assistant for School Broadcasting

WE are informed that the Central Council for School Broadcasting has appointed Mr. R. C. Steele as its Senior Education Assistant on terms as recently advertised. Mr. Steele was educated at Eton and King's College, Cambridge, where he took first-class honours in History Tripos. Since 1933 he has been one of H.M. Inspectors of Schools. Mr. Steele will work under the direction of Mr. A. C. Cameron, Secretary to the Council, with special concern for research into the educational uses and developments of School Broadcasting and the preparation of material for the Programme Sub-Committees.

Mantovani's Beautiful Old Violin

NUMEROUS admirers of Mantovani and his Tipica Orchestra have often commented on the beautiful violin which Mantovani plays when on the stage, and when broadcasting. Its remarkable tone throws even the connoisseurs into ecstasies—and thereby hangs a tale. Whilst playing at Monte Carlo one year, *père* Mantovani had amongst his distinguished audience a Russian Princess, and as mythical as this story may sound this royal personage had Mantovani senior brought to her and frankly remarked that she did not like the tone of the instrument upon which he was playing at the time, and, whilst about to apologise, the Princess hushed him by presenting him with the most beautiful fiddle which is now nearly 200 years old. His son, however, had his eyes fixed enviously upon it, and, defying a certain commandment, he coveted that instrument more than anything, and after much persuasion his father agreed to present him with it when he, in his father's words, "could do justice to it." At length, after studying assiduously for a long period, he was able to play two very difficult and intricate concertos to his pater, whereupon he was promptly congratulated, and presented with the violin.

"Mr. Barley's Abroad"

A MUSICAL comedy written expressly for broadcasting will be given its first performances from the National on July 20th, and in the Regional programme on July 22nd. The composer, Geoffrey Henman, who will be remembered for his "High Street Suite," submitted the book of his proposed musical comedy to the B.B.C. some twelve months ago. It is amusing to trace the history of this now successful manuscript. After being jockeyed from pillar to post and from office to office, the script of "Mr. Barley's Abroad" eventually turned up in New York in the luggage of a B.B.C. official. He succeeded in reading and adapting the work during the few hours allowed him by his hospitable American hosts. The script eventually came back to Broadcasting

House, and was passed into the able hands of Tom Arnold, the author, and subsequently to Henrik Ege, who has adapted many musical stories for radio. Lyrics were added by Christopher Hassell, whose work can be heard in "Glamorous Night" and "Careless Rhapsody." The story is an amusing one, built around Mr. Barley's

habit, whenever the telephone rings in his London office, of instructing his secretary to say: "Mr. Barley's Abroad." It is of such solid stuff that musical-comedy stories are made. Mark Lubbock will conduct the Theatre Orchestra in Geoffrey Henman's music, which has been orchestrated by Haydn Wood. Bryan Michie, who is producing, has chosen a cast strong in humour. It includes Claude Dampier, Phoebe Hodson, Bobbie Comber and that brilliant comedienne Effie Atherton. Romance will be in



Mantovani and his 200-year-old violin.

the hands of Betty Huntley-Wright, who is coming over from Paris for this broadcast, and Bruce Carfax. Peggy Cochrane will play the piano, and the Radio Three will add their melodious harmony.

Pirate Hunting

ONE would have thought that the adventurous days of pirate hunting were over, but the wireless pirate still presents something of a problem to the Post Office, and the lives of Wireless Licence Enquiry Officers, whose duty is to detect the surreptitious aerial, are not without either humour or adventure. When the series of talks entitled "And how is it you live?" was introduced some months ago, it was not contemplated that the question would be addressed to anyone so intimately connected with broadcasting as a Wireless Licence Enquiry Officer; but the other day when a high official of the Post Office mentioned in conversation some of the adventures of his Enquiry Officers, Mr. E. W. M. Richardson, who is in charge of talks in Northern Ireland, conceived the idea of putting the question "And how is it you live?" to one of them formally. On July 22nd a W.L.E.O. is to give a talk on

how he lives, and tell listeners something about the adventures and the humorous incidents which he has encountered in a far from prosaic occupation. Pirates, however, need not expect to learn from this talk any secrets about the Post Office methods of detection which are likely to help them to continue ten shillings a year richer.

New Welsh Regional Director

THE B.B.C. announces that Mr. Rhys Hopkin Morris has been appointed Welsh Regional Director. Mr. Morris, who has been a Metropolitan Police Magistrate since 1932, was educated at the Universities of Wales and London. He was M.P. for Cardiganshire from 1923 to 1932 and is a Member of the Court of the University of Wales, and Governor of the National Library and National Museum of Wales. The date of his joining the B.B.C. will be announced later.

Surprise Presentation to Mr. G. W. Gregory

INSTEAD of making a formal presentation, members of the sales staff, outside representatives, and those of the "His Master's Voice" organisation at Clerkenwell Road who knew him so well, lured Mr. G. W. Godfrey (Sales Promotion Manager for "H.M.V.") from his office recently. On his return, Mr. Godfrey was surprised to find an attractive walnut bureau and chromium-plated combined ink-stand and lamp, also a card bearing the inscription: "With best wishes from your colleagues of 'His Master's Voice'."

Mr. Godfrey, as already stated in our columns, has left "H.M.V." to take up an important position with a firm outside the radio industry.

Richard Tauber

FOR the first time this year Richard Tauber will broadcast from the B.B.C. in the National programme on July 19th. This will also be his first public engagement since his recent marriage to Diana Napier, film actress. Mark Lubbock, who will conduct the Theatre Orchestra for Richard Tauber, has devised an interesting scene on which to form a programme. It consists of five manifestations of Tauber during his career. There is the Tauber of grand opera. To illustrate this period, Tauber will sing two of his favourite arias, in one of which he will be assisted by six male voices from the B.B.C. opera chorus. Then there is Tauber as a lieder singer. In this section he will sing two groups of lieder, accompanied by the piano. Next follows Tauber in operetta. Into this division of his life falls the famous "You are my heart's delight" from "Land of Smiles." Actually Tauber will sing three arias in the operetta group. There remain two further aspects of his life—Tauber as composer and as conductor. To illustrate these, he will conduct the Theatre Orchestra in his own compositions.

Tauber is a most meticulous rehearser. At the side of the orchestra, close to the leading violin, he has placed a large electrically illuminated music-stand. He stands directly to the left of the conductor. As he sings, he walks from his music-stand towards the conductor and by mime illustrates his interpretations. He then turns and walks to the front of the orchestra and signs to them, with expressive movements of the hands, indicating what type of support he would wish. His should be an interesting broadcast, which listeners who like the Tauber style should not miss.

MARCONI AIRCRAFT APPARATUS

MARCONI'S Wireless Telegraph Co., Ltd., whose aircraft and aerodrome wireless apparatus is used by the principal air transport organisations in over over thirty countries in all parts of the world, exhibited a wide range of wireless transmitting and receiving apparatus for aircraft services at the recent S.B.A.C. air display at Hatfield, including new designs for commercial, military and light transport aircraft; wireless direction-finding and "homing" devices; facilities for remote control of aircraft equipment; constant speed generators and aircraft wireless accessories.

The amount of space available was not sufficient to enable the Marconi-Adcock direction-finding installation to be exhibited, but photographs were included of this important item in air service organisation. The pre-eminence of the Marconi-Adcock direction-finding installation was indicated by the fact that more than sixty have been ordered for civil aerodromes throughout the Empire and foreign countries, including over thirty for use on the Empire Air route.

Empire Flying-boat Set

One of the principal sets exhibited was the new Marconi Type AD57/58 72 aircraft wireless transmitter and receiver specially designed for the Imperial Airways fleet of flying boats to be used on the British Empire services. This installation represents a development of all the most successful features incorporated hitherto in the Marconi equipment employed by Imperial Airways under the exacting conditions experienced on the long-distance Empire Air routes.

Direction Finder and Visual Indicator

The Marconi Aircraft Direction-Finding Receiver, Type AD5062B, with visual indicator, was also shown. The direction-finding receiver is designed for use either as a separate receiving installation on small commercial or private aircraft, or in conjunction with the normal Marconi medium-wave aircraft transmitters, such as Type AD41 or AD49, in which case it replaces the receiver usually installed with these sets. A visual indicator, Type 626, can be added if visual operation is required. The complete equipment permits of (a) normal reception using the fixed or trailing aerial, (b) "Homing" when using a fixed frame aerial in conjunction with the open aerial, and (c) complete direction-finding facilities, enabling the bearing of a ground transmitter to be taken when used with a rotatable screened frame aerial. For visual indication a small dashboard indicator is used, this being a dial instrument 3½ in. in diameter with a luminous pointer and markings. It is provided with central-course indication, deviation from the required course being indicated by the relative deflection of the pointer.

Short-wave Equipment

There was also a Marconi 20-watt Short-Wave Wireless Equipment, Type AD63/64, designed for telephone use on fighter and similar types of aircraft. This instrument is designed to cover a waverange of from 80 to 85 metres, and has only one tuning control.

Other standard Marconi installations, such as the well-known combined medium and short-wave installation, Type AD37/38, for large commercial, naval and military aircraft, were shown, with the usual accessories.

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LETTERS FROM READERS

The Editor does not necessarily agree with opinions expressed by his correspondents.



All letters must be accompanied by the name and address of the sender (not necessarily for publication).

On a Single-valver

SIR,—In answer to Mr. Casling's letter in the July 4th issue, challenging anyone to beat his short-wave log, I enclose mine. On the 19-metre band: W2XAD, GSF, HUJ, FYA, W2XE, W8XX, RKI, JVH, DZH, and SPW.

25-metre band: TFJ, DJD, FYA, GSD, W1XAL, RNE, GSE, and 2RO.

31-metre band: DJA, W2XAF, GSC, CT1AA, EAQ, 2RO, DZA, UK2ME, LKJ1 and HJ1ABP.

49-metre band: HVJ, W3XAL, HJ1ABE, W8XX, DJC and 2RO.

The amateur log, which includes sixty British, European and American stations on 20 and 40 metres, is too numerous to mention. I might add that my set is a home-constructed one-valver, using an outdoor aerial.—L. S. HOLMES (Bedford).

A Short-wave Superhet

SIR,—Re Mr. L. F. Parker's letter in the July 4th issue, I also would like to see such a set as he outlines, i.e., a S.W. superhet, but with switching for the medium- and long-wavebands.

I have been using a "Britain's Super" receiver ever since it was published, and have added, in a larger cabinet, a S.W. section, which, however, has definite limits.—P. BANCE (Woolston).

SIR,—Re your correspondent's request for a multi-valve S.W. superhet, I personally have also been waiting for a design to be published by you on the lines he indicates.

I agree with the suggested circuit, i.e., pre-H.F., frequency-changer, I.F., but am not particularly interested in c.w. work so that the inclusion of a beat oscillator doesn't much appeal to me. This could, however, be easily omitted by readers not requiring it.

May I suggest that as many of your readers who would be interested in such a circuit have many standard S.W. parts at hand, that the circuit, if published by you, should make use of standard S.W. tuning condensers which could be ganged together, rather than, for example, a 3-gang affair which but few of us would be likely to have available.

Similarly, the coils should be standard 4 or 6-pin types or, alternatively, something which could fairly easily be wound by amateurs. The inclusion of range switching would make the circuit somewhat comparable to the kind of set which is produced so cheaply by American makers, and is flooding most markets overseas.

The H.F. end of the circuit could be arranged by readers personally according to H.T. available, etc., the really important part of the circuit that I should be very interested to see published is the H.F. and tuning arrangements. The receiver should be battery-operated, as many of us (when abroad) have not the benefit of a mains supply.

There is no doubt that a straight set, even with tuned H.F. stage, is not sufficiently selective to separate many of the strong transmissions which are now radiated on the S.W. bands. The components used

should be of "tropical" specification.—D. SMITH (Weston-Super-Mare).

SIR,—As a regular reader of your excellent journal may I add my wishes to those of your correspondent, Mr. L. F. Parker, for a set such as he describes. I agree with him as regards the selectivity of o-v-1 and o-v-2 straight sets, particularly on the amateur bands, and I am sure many readers like myself would welcome a superhet.—C. THORNTON (Grimsby).

A Beginner's Log

SIR,—I am a newcomer to home construction, but I have been a regular reader of your journal since the beginner's issue of February 8th last. I must say that PRACTICAL AND AMATEUR WIRELESS is more helpful to me than any of its contemporaries, and very helpful is the information I have gained from its pages.

I have constructed an o-v-1 short-wave set, and my log includes the following stations: HVJ, RW59, OXY, OER2, CRCX, PRF5, LKJ1, W2XAF, W2XAD, W1XK, 2RO, CT1AA, EAQ, PMN, ORK, JVM, PHI, PCJ, W1XAL, W8XX, ET5, TFJ, SPW, HAS3, HBL and HBO. I have also logged the *Queen Mary*, and most of the Zeesen, Daventry, and Radio-Colonial (Paris) stations.—A. J. BENNETT (Dover).

CUT THIS OUT EACH WEEK.

Do you know

- THAT a separate Post Office Licence is not required for a portable receiver.
- THAT the lead from the receiver to the earth connection should be insulated in order to avoid erratic tuning difficulties.
- THAT a frame aerial must be turned so that it is in the plane of the signals it is desired to hear.
- THAT the above fact accounts for the utility of the frame aerial for direction-finding purposes.
- THAT unnecessary cabinet resonance may be overcome by cutting holes on the front of the baffle, and covering these with similar material to that employed for the main speaker opening.
- THAT in many cases the improved high-note effects so obtained will prove of great advantage.
- THAT where undue prominence is given to the lower notes an improvement may often be effected by removing the speaker a short distance behind the baffle instead of mounting it direct on the baffle.

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, Geo. Newnes, Ltd., 8-11, 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.

REPLIES IN BRIEF

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

W. D. (Walton). The tuning condenser will be perfectly satisfactory and no alterations will have to be made to the receiver. For full coil-winding data see our issue dated May 9th last, in which an article on short-wave coils appeared and dealt with the size of former given by you.

R. G. P. (Bangalore). We do not supply completely assembled receivers or kits of parts. These may be obtained from Messrs. Peto-Scott, whose advertisements appear in our pages, and from other firms who specialise in this type of business.

J. B. B. (Coulson). We cannot undertake to examine the receiver until you have made some attempt to locate the cause of the trouble. If you can give us some details of the performance and, if possible, some voltage and current measurements, we will endeavour to suggest the cause of the trouble. We only service our receivers when correspondence shows that the reader is unable to locate a fault or obtain satisfaction from the receiver.

F. K. M. (No Address). We do not think the type of set referred to would be very popular. In any case the Perfect or some similar set could be used, with plug-in coils for wave-changing and would meet your requirements. Alternatively, the Invincible, with a broadcast coil brought into circuit by means of a switch would cover four separate wavebands without coil changing.

T. G. (Rotherham). We cannot supply circuits of transmitters, nor give any other data. The queries raised by you should be answerable by you if you are capable of using the apparatus and obtaining the P.M.G. licence.

C. M. (Colne). It is not possible to state exactly what stations you will hear, as we have no details of local conditions. However, the simplest plan is to ask a good local radio dealer what results are generally obtained in your district with a three-valver of the type you intend to use and this will give you a good indication of what to expect. Alternatively a friend who lives in the district and has a three-valver may be able to give you the information.

A. P. (Manchester). The book in question is obtainable from any good newsagent price 2s. 6d. It may be obtained direct from this office price 2s. 10d. It is possible, however, that it will not be sufficiently up-to-date for your requirements, but we do not know to what stage you had advanced when you dropped the subject.

P. D. C. (Perth). The addition of the trickle charger will, of course, increase the usefulness of the device and enable you to dispense with the periodical visits to the charging station. There are many well-known makes from which to choose and your local dealer may be able to assist you in making your choice. When the L.T. lead is joined to the battery, if the switch is in the "on" position it simply sparks because the circuit is completed and current immediately flows. It does not indicate any fault.

W. B. (Peckham). We regret that we have no details of the Six-Sixty receiver and cannot therefore indicate the order of the valves, or give you any other details of the receiver. The manufacturers are no longer in business and we cannot help you in this particular case.

P. S. (Huddersfield). The only modification required to the circuit is to connect the grid leak between the grid and the L.T. positive side of the filament instead of across the condenser as shown by you. A simple reaction condenser could be employed in place of the differential component but a fixed condenser must then be joined between the anode and earth. It is preferable to retain the differential condenser in this particular circuit.

R. S. G. (Denmead). You will have to join together the two terminals marked Plate and Fil, and these will then be considered as the "con" terminal. The grid terminal is then joined to the Grid and the H.T. terminal will correspond to the E terminal. We cannot give alternative valves.

J. B. (Lym). We regret that we cannot trace the reference, but it would appear to be a centre-tapped output transformer. We suggest you communicate direct with the makers.

R. A. (Bishop Stortford). It should not be necessary to give up the eliminator, but it may be necessary to introduce decoupling circuits to the H.T. feeds. We presume that the H.T. is effectively smoothed and that the unit is not defective.

J. R. (Maghull). The noise is bound to be heard if the gram. switch is operated and no pick-up is connected, as in that position the grid is open-circuited. Does the noise occur when the pick-up is in circuit?

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RADIO CLUBS AND SOCIETIES

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

THE RADIO PHYSICAL AND TELEVISION SOCIETY

IT was with considerable interest that members of this society listened to a lecture by Mr. K. E. Alford (G2DX) on the construction and operation of Ostar Ganz valves at the last meeting of the society held on Friday, July 3rd. Mr. Alford explained with the aid of samples and photographs the method of construction involved in the heaters of these valves. The heaters must be so constructed as to stand the full mains voltage without undue heating. They must have a long life and must be efficient over a wide range of voltages. The heater is wound in a spiral in order to accommodate the large amount of high-resistance wire necessary to keep the heater wattage reasonably low. Various types of high-voltage valves were passed round for members' inspection, after which the lecturer answered various questions put to him by members.

Those who would like details of membership are requested to write to the Hon. Sec., Mr. E. Arnold, 12, Nassau Road, Barnes, S.W.13.

GOLDERS GREEN AND HENDON RADIO SCIENTIFIC SOCIETY

THE fourteenth Open Direction Finding Competition organised by the above society, and directed by Col. H. Ashley Scarlett, D.S.O., was held near Harpenden recently. The transmitting station was under the control of the President, Mr. D. N. Corfield, J.C.D. The wavelength this year was only 80 metres, and the returns showed that the skill and the amateur-constructed apparatus produced results of the same order of accuracy as when 150 metres was used.

Messrs. Maurice Child and Alex Black's groups, both of the Golders Green and Hendon Radio Society, were successful this year in winning from the Southall Radio Society the first two places. The results were very close, there being only 1 degree of error difference between the first three groups, and in one case the total error returned was less than 0.9 degree.

The objects were first to locate the direction of a transmitting station, and secondly, to actually discover its position. Four positions were taken up, each one having an entirely different characteristic.

This meeting was followed by a 5-metre day held near St. Albans. The day's work was most interest-

ing, as every type of weather was experienced, from extreme heat and sunshine until 14.00, followed in succession by dullness, terrific thunderstorms, and torrential rain until 17.00. Even under these tropical conditions 5CD kept the transmitting station working according to schedule.

It was noticed that there was a general falling off in signal strength between 12.0 and 2.0 p.m., also when a rain cloud passed over the aerial. The country was of a very enclosed nature, and the relative height of position was of the order of less than 100ft. Reliable reception was reported up to 9 miles.

The super regenerative 3-valve receiver still seemed the most popular type, but with increased stability of transmission and valves suitable for high-frequency amplification at these frequencies, the super heterodyne will eventually prove more suitable for this work and lead to possible real directional work.

Future 5-metre meetings will be held on September 13th, also an 80-metre DF meeting will be held at Bradwell-on-Sea, Essex, on July 26th. Readers interested are invited to write to the Hon. Sec., Mr. A. G. Griffiths, Hornebeams, Bentley Priory, Stanmore.

WIRRAL AMATEUR TRANSMITTING SHORT-WAVE CLUB

A MEETING of the above club was held on June 24th at the King's Square Café in Birkenhead. A very interesting talk was delivered by G2DC on "Radio in the Army." The next meeting will be held at the same place on Wednesday, July 29th, at 7.30 p.m. All inquiries should be sent to the Hon. Secretary, B. O'Brien (2BON), "Caldy," Inby Road, Heswall, Wirral.

BRITISH SHORT WAVE LEAGUE.

A SPECIAL programme, dedicated to the British Short Wave League, will be broadcast by EAQ, Madrid, "The Voice of Spain," on July 19th from 01.00 to 01.30 B.S.T., on a wavelength of 30.43 m. A special QSL card will be sent to all those sending correct reports and 1½d. stamp for postage, to F. A. Beane, British Short Wave League, Ridgewell, Essex.

THE WIRELESS ENCYCLOPAEDIA

CONSTRUCTOR'S BY F. J. CAMM (Editor of "Practical and Amateur Wireless") 4th Edition 5/- net
Wireless Construction, Terms and Definitions explained and illustrated in concise, clear language.

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CATALOGUES RECEIVED

BRIMAR VALVES

A FULL range of these valves is given in a list just issued by Standard Telephone and Cables, Ltd. Among the valves listed are a heptode frequency changer, R.F. variable-mu pentode, double diode triode, universal double diode, rectifiers, power pentodes and triodes, screened pentode, and hot cathode mercury vapour rectifier. The character curve and operating data is given for each valve, and at the end of the list a tabulated summary of the characteristics of the complete range of valves is given.

WESTINGHOUSE RECTIFIERS FOR PROJECTOR ARCS.

ALTHOUGH the Westinghouse metal rectifier is familiar to most radio amateurs there are some remarkably large versions of this rectifier available for special commercial purposes, and the latest Westinghouse list (DP.11G) details those designed for use in projectors. Current outputs as large as 12,000 amps have been attained, and the list gives full and comprehensive details of these special rectifiers.

BOOKS RECEIVED

WONDERFUL FILM ANNUAL.

AS a film lover you will find the "Screen Pictorial" Summer Annual the most wonderful book you can buy. Just published at 6d., it is printed throughout in beautiful photogravure, and contains everything that delights the filmgoer.

There is a lovely portrait album of glamorous and attractive stars; there is a souvenir supplement of "Mutiny on the Bounty," the film of the year. This souvenir gives you the complete story. Then there is the life story to date of Shirley Temple, and a special dancing lesson by Fred Astaire.

There are photographs from "Dangerous," the new film in which Bette Davis, who stars with Franchot Tone, has been awarded the official trophy for what is considered the outstanding performance of the year. There is also a special feature of films to watch for, a clever short story entitled "Film Fan," lovely pictures of the stars bathing, on holiday, and chasing the sun.

Be sure to get "Screen Pictorial" Summer Annual from your newsagent to-day before it is sold out. It costs 6d. only.

★ "Popular Flying" is produced for everyone interested in Flying—whether you belong to a Club or take a "flip" at a flying display. Every number contains interesting articles on flying, intriguing photographs, flying experiences, and news of the latest aircraft.

Principal Contents of the July POPULAR FLYING include:
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- Flying Luck, by G. D. Fleming
- New Equipment, by Howard Leigh
- Devotion to Duty, by "McScotch"
- Other People's Air Forces, by Howard Leigh
- Development of Formation Flying in the German Air Force, by J. Hook
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Four-range Super Mag Two (D, Pen)	11.8.34	PW36B
Three-valve: Blueprints, 1s. each.		
Selectone Battery Three (D, 2 LF (trans.))	—	PW10
Sixty-Shilling Three (D, 2 LF (R.C. & trans.))	2.12.33	PW34A
Leader Three (SG, D, Pow.)	—	PW35
Summit Three (HF Pen, D, Pen)	18.8.34	PW37
All-Pentode Three (HF Pen, D (pen.), Pen.)	22.9.34	PW39
Hall-Mark Three (SG, D, Pow.)	—	PW41
Hall-Mark Cadet (D, LF Pen, (R.C.))	16.3.35	PW48
F. J. Camm's Silver Souvenir (HF Pen, D (pen), Pen) (All-Wave Three)	13.4.35	PW49
Genet Midget (D, 2 LF (trans.))	June '35	PM2
Cameo Midget Three (D, 2 LF (trans.))	8.6.35	PW51
1936 Sonotone Three-Four (HF Pen, HF Pen, Westector, Pen)	17.8.35	PW53
Battery All-Wave Three (D, 2 LF (R.C.))	31.8.35	PW55
The Monitor (HF Pen, D, Pen)	8.2.36	PW61
The Tutor Three (HF Pen, D, Pen)	21.3.36	PW62
The Centaur Three (SG, D, P)	—	PW64

Mains Operated.

Two-valve: Blueprints, 1s. each.		
A.C. Twin (D (pen), Pen)	—	PW18
A.G. D.C. Two (SG, Power)	7.10.33	PW31
Selectone, A.C. Radiogram Two (D, Pow.)	—	PW10
Three-valve: Blueprints, 1s. each.		
Double-Diode-Triode Three (HF Pen, D.D.T., Pen)	10.6.33	PW23
D.C. Ace (SG, D, Pen)	15.7.33	PW25
A.C. Three (SG, D, Pen)	—	PW29
A.C. Leader (HF Pen, D, Power)	7.4.34	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)	18.8.34	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, 2LF (R.C.))	17.8.35	PW54
A.C. 1936 Sonotone (HF Pen, HF Pen, Westector, Pen)	31.8.35	PW36

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)	—	PW45
Universal Hall-Mark (HF Pen, D, Push-Pull)	9.2.35	PW47

SUPERHETS.

Battery Sets: Blueprints, 1s. each.		
£5 Superhet (Three valve)	—	PW40
F. J. Camm's 2-valve Superhet (two-valve)	13.7.35	PW52
F. J. Camm's £4 Superhet	—	PW58
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	—	PW59
F. J. Camm's Universal £4 Superhet 4	11.1.36	PW60

SHORT-WAVE SETS.

Two-valve: Blueprints, 1s. each.		
Midget Short-Wave Two (D, Pen)	15.9.34	PW33A
Three-valve: Blueprints, 1s. each.		
Experimenter's Short-wave Three (SG, D, Power)	—	PW30A
The Prefect 3 (D, 2LF, RC and Trans.)	8.2.36	PW63

PORTABLES.

Three-valve: Blueprints, 1s. each.		
F. J. Camm's ELF Three-valve Portable. (HF Pen, D, Pen)	16.5.36	PW65
Four-valve: Blueprints, 1s. each.		
Featherweight Portable Four (SG, D, LF, Cl. B)	—	PW12

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	—	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 Loud-speaker One-valver (Class B)	—	AW449

Two-valve: Blueprints, 1s. each.

Melody Ranger Two (D, Trans)	—	AW388
Full-volume Two (SG, Det, Pen)	—	AW392
Iron-core Two (D, Trans)	—	AW395
Iron-core Two (D, QPP)	5.8.33	AW396
B.B.C. National Two with Lucerne Coil (D, Trans)	—	AW377A
Big-power Melody Two with Lucerne Coil (SG, Trans)	—	AW388A
Lucerne Minor (D, Pen)	—	AW426

Three-valve: Blueprints, 1s. each.

Class-B Three (D, Trans, Class B)	2.4.33	AW386
New Britain's Favourite Three (D, Trans, Class B)	15.7.33	AW394
Home-Built Coil Three (SG, D, Trans)	—	AW404
Fan and Family Three (D, Trans, Class B)	25.11.33	AW410
£5 5s. S.G.3 (SG, D, Trans)	2.12.33	AW412
1934 Ether Searcher: Baseboard Model (SG, D, Pen)	20.1.34	AW417
1934 Ether Searcher: Chassis Model (SG, D, Pen)	—	AW419
Lucerne Ranger (SG, D, Trans)	—	AW422
Cosmor Melody Maker with Lucerne Coils	—	AW423
P.W.H. Mascot with Lucerne Coils (D, RC, Trans)	—	AW337A
Mullard Master Three with Lucerne Coils	—	AW424
£5 5s. Three: De Luxe Version (SG, D, Trans)	19.5.34	AW435
Lucerne Straight Three (D, RC, Trans)	—	AW437
All Britain Three (HF Pen, D, Pen)	—	AW448
"Wireless League" Three (HF Pen, D, Pen)	3.11.34	AW451
Transportable Three (SG, D, Pen)	—	WM271
£6 6s. Radiogram (D, RC, Trans)	—	WM318
Simple tune Three (SG, D, Pen)	June '33	WM327
Economy-pentode Three (SG, D, Pen)	Oct. '33	WM337
"W.M." 1934 Standard Three (SG, D, Pen)	—	WM351
£3 3s. Three (SG, D, Trans)	Mar. '34	WM354
Iron-core Band-pass Three (SG, D, QP21)	June '34	WM362
1935 £6 6s. Battery Three (SG, D, Pen)	—	WM371
Graduating to a Low-frequency Stage (D, 2LF)	—	WM378
P.T.P. Three (Pen, D, Pen)	June '35	WM389
Certainty Three (SG, D, Pen)	Sept. '35	WM393
Minute Three (SG, D, Trans)	Oct. '35	WM396
All-wave Winning Three (SG, D, Pen)	Dec. '35	WM400

Four-valve: Blueprints, 1s. 6d. each.

65-Four (SG, D, RC, Trans)	—	AW370
"A.W." Ideal Four (2SG, D, Pen)	16.9.33	AW402
2 H.F. Four (2SG, D, Pen)	—	AW421
Crusaders' A.V.C. 4 (2HF, D, QP21)	18.8.34	AW445
(Pentode and Class-B Outputs for above: blueprints 6d. each)	25.8.34	AW445A
Self-contained Four (SG, D, LF, Class B)	Aug. '33	WM331
Lucerne Straight Four (SG, D, LF, Trans)	—	WM350
£5 5s. Battery Four (HF, D, 2LF)	Feb. '35	WM381
The H.K. Four	Mar. '35	WM384

Five-valve: Blueprints, 1s. 6d. each.

Super-quality Five (2HF, D, RC, Trans)	May '33	WM320
New Class-B Five (2SG, D, LF, Class B)	Nov. '33	WM340
Class-B Quadradyne (2SG, D, LF, Class B)	Dec. '33	WM344
1935 Super Five (Battery Superhet)	—	WM379

These blueprints are full size. Copies of appropriate issues containing descriptions of these sets can in most cases be obtained as follows:—
 "Practical Wireless" at 4d., "Amateur Wireless" at 4d., "Practical Mechanics" at 7d., and "Wireless Magazine" at 1/3d., post paid. Index letters "P.W." refer to "Practical Wireless" sets, "P.M." to "Practical Mechanics" sets, and "A.W." refer to "Amateur Wireless" sets, and "W.M." to "Wireless Magazine" sets. Send (preferably) a postal order (stamps over sixpence unacceptable) to "Practical and Amateur Wireless" Blueprint Dept., Geo. Newnes, Ltd., 8-11, Southampton Street Strand, W.C.2.

Mains Operated.

Two-valve: Blueprints, 1s. each.		
Consoelectric Two (D, Pen) A.C.	23.9.33	AW403
Economy A.C. Two (D, Trans) A.C.	—	WM286
Unicorn A.C./D.C. Two (D, Pen)	Sept. '35	WM394

Three-valve: Blueprints, 1s. each.

Home-lover's New All-electric Three (SG, D, Trans) A.C.	—	AW383
S.G. Three (SG, D, Pen) A.C.	—	AW390
A.C. Triodyne (SG, D, Pen) A.C.	19.8.33	AW399
A.C. Pentaquester (HF, Pen, D, Pen) A.C.	23.6.34	AW430
Mantovani A.C. Three (HF, Pen, D, Pen) A.C.	—	WM374
£15 15s. 1936 A.C. Radiogram (HF, D, Pen)	Jan. '36	WM401

Four-valve: Blueprints, 1s. 6d. each.

All Metal Four (2 SG, D, Pen)	July '33	WM329
Harris Jubilee Radiogram	May '35	WM386

SUPERHETS.

Battery Sets: Blueprints, 1s. 6d. each.

Modern Super Senior	—	WM375
Varsity Four	Oct. '35	WM395

Mains Sets: Blueprints, 1s. 6d. each.

1934 A.C. Century Super A.C.	10.3.34	AW425
Heptode Super Three A.C.	May '34	WM359
"W.M." Radiogram Super A.C.	—	WM366
1935 A.C. Stenode	Apr. '35	WM385

Four-valve: Blueprints, 1s. 6d. each.

Midget Class-B Portable (SG, D, LF, Class B)	20.5.33	AW380
Holiday Portable (SG, D, LF, Class B)	1.7.33	AW393
Family Portable (HF, D, RC, Trans)	22.9.34	AW447
Two H.F. Portable (2 SG, D, QP21)	June '34	WM363
Tyers Portable (SG, D, 2 Trans)	Aug. '34	WM367

SHORT-WAVERS—Battery operated.

One-valve: Blueprints, 1s. each.		
S.W. One-valve converter (price 6d.)	—	AW329
S.W. One-valve for America	—	AW420
Roma Short-waver	—	AW452

Two-valve: Blueprints, 1s. each.

Ultra-short Battery Two (SG det, Pen)	Feb. '36	WM402
Home-made Coil Two (D, Pen)	—	AW440

Three-valve: Blueprints, 1s. each.

World-ranger Short-wave 3 (D, RC, Trans)	—	AW355
Experimenter's 5-metre Set (D, Trans, Super-regen)	30.6.34	AW433
Experimenter's Short-waver	Jan. 19, '35	AW468
The Carrier Short-waver	July '35	WM390

Four-valve: Blueprints, 1s. 6d. each.

A.W. Short-wave World Beater (HF, Pen, D, RC, Trans)	—	AW436
Empire Short-waver (SG, D, RC, Trans)	—	WM313
Standard Four-valve Short-waver	Mar. '35	WM383

Superhet: Blueprint, 1s. 6d.

Simplified Short-wave Super	Nov. '35	WM397
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Mains Operated.

Two-valve: Blueprints, 1s. each.		
Two-valve Mains Short-waver (D, Pen) A.C.	—	AW453
"W.M." Band-spreading Short-waver (D, Pen) A.C./D.C.	Aug. '34	WM368
"W.M." Long-wave Converter	—	WM380

Three-valve: Blueprint, 1s.

Emigrator (SG, D, Pen) A.C.	—	WM352
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Four-valve: Blueprint, 1s. 6d.

Standard Four-valve A.C. Short-waver (SG, D, RC, Trans)	Aug. '35	WM391
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MISCELLANEOUS.

Enthusiast's Power Amplifier (1/6)	June '35	WM387
Listener's 5-watt A.C. Amplifier (1/6)	Sept. '35	WM392
Radio Unit (2v.) for WM392 (1s.)	Nov. '35	WM398
Harris Electrogram (battery amplifier)	Dec. '35	WM399
De-Luxe Concert A.C. Electrogram	Mar. '36	WM403
New style Short-wave Adapter (1s.)	June '35	WM388
Trickle Charger (6d.)	Jan. 5, '35	AW462
Short-wave Adapter	Dec. 1, '34	AW456
Superhet Converter	Dec. 1, '34	AW467



QUERIES and ENQUIRIES

Measuring A.C.

"I have a good milliammeter and have tried to take some measurements in my mains receiver, but cannot get any reading. I cannot see why this should be so as current must flow and perhaps you can explain this to me."—S. F. (Bodmin).

IF the supply you are endeavouring to check is A.C., this means that it is continually changing its direction or polarity, and therefore before the needle has time to pass across the scale it is driven in the opposite direction and owing to the frequency of the supply the needle does not move—at least only over a very small part of the scale. If only a very small current is to be measured a simple moving-iron meter will suffice, but otherwise you must modify the meter by including a rectifier so that the current to be measured is converted into a uni-directional current.

A Wattage Calculation

"I have been reading your article on resistors in the June 20th issue, and there is one point which puzzles me. You give the calculation of the wattage rating of the resistor as 'current squared times resistance in ohms.' I am not very good at mathematics, and it seems rather confusing to me why it should be necessary to square the value of the current which is flowing. Surely the rating of the resistor should be dependent only upon the current which is flowing and not upon a value which is so much higher as mentioned. Perhaps you can explain this little point to me, and it may also be of help to others who find this same difficulty."—B. U. A. (Worcester).

THE wattage is, as you state, dependent only upon the current which is flowing through the resistor and not upon any higher value. The reason why the square of the current is used in the formula is bound up in the fact that the wattage is dependent upon the voltage as well as on the current which is flowing, and in the particular formula referred to only the current and the value of the resistor are given. Therefore, to ascertain the wattage, which is the product of the voltage and current, the voltage must be first ascertained. According to Ohm's Law, voltage is the product of current and resistance, or to use the standard symbols, E equals $R \times I$. Wattage equals $E \times I$, and therefore by substitution wattage must equal $R \times I \times I$ (which equals E) multiplied by I . When two similar terms are multiplied together they are expressed thus: a^2 (a squared), and therefore in the above formula $R \times I \times I$ we can take out the two terms I and express them thus: I^2 . Therefore the formula becomes $I^2 \times R$, and this explains the reason why the square of the current has to be employed when only the current and resistance values are given.

A Deaf Aid Hint

"I have made up a small amplifier with midget components and fitted with a microphone for use as a deaf aid, as I am very hard of hearing. Whilst this works

quite well in some respects, I find that there is a bad sort of background which I might describe as a general liveliness, such as rushing and general traffic noises, with the result that the voice of anyone comes through with a lot of accompaniments which are detrimental. The microphone does not seem unduly sensitive, but I should like to improve on its performance, and perhaps you can suggest something."—F. C. (Edgware).

WE have carried out a number of experiments with a view to designing a deaf aid, and the trouble mentioned has certainly been experienced by us. An insensitive mike overcomes the difficulty, but makes it necessary for the speaker to be close against the microphone, and this reduces the general utility of the aid. A very good idea, which results in a "directional" effect, is to mount the microphone at the end of a "trumpet" built into the cabinet and made of non-resonant material. This concentrates all the sounds in front of the instrument, and brings them to the microphone, and by suitable choice of the material from which the trumpet is made the general background may be filtered out. A very successful scheme was a square section trumpet of ordinary alpaca, with a similar trumpet roughly two inches larger in all directions, and the two were mounted one inside the other with the intervening space packed tight with ordinary cotton wool.

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.

Please note also, that queries must be limited to two per reader, and all sketches and drawings which are sent to us should bear the name and address of the sender.

If a postal reply is desired, a stamped addressed envelope must be enclosed. Send your queries to the Editor, PRACTICAL AND AMATEUR WIRELESS, George Newnes, Ltd., 8-11, Southampton Street, Strand, London, W.C.2.

Repairing a Valve

"One of the valves in my set has become loose round the point where the glass enters the bakelite base. The glass bulb can be pushed down until it is fairly well held, but I wonder if this results in any inferior performance. Does this constitute a fault which would come under the maker's guarantee and which could enable me to get a free replacement?"—F. B. (Wood Green).

WE do not think the trouble can legitimately be called a manufacturing fault, and it may be due to the way the valve has been handled in inserting and removing it from the valveholder, or undue heat due to the proximity of another valve, etc. The valve should always be held by the bakelite base when inserting or removing from the holder, and the looseness will not affect results provided the

glass bulb is not rotated. If this is done, there will be a possibility of either breaking the leading-in wires or of creating a short-circuit between them. To avoid this, and to refix the bulb, ordinary Chatterton's Compound may be run round the junction of the base and glass, or a strip of ordinary insulation tape fixed round it. A fairly wide band may be cut from small diameter rubber tubing and slipped over the base so as to overlap the two parts and hold them firmly.

Transformer Details

"I have a home-made mains transformer having an eight turns per volt primary. The primary is wound with 36 S.W.G. enamelled wire. I wish to wind two secondaries to give 4 volts at 2.5 amps. for rectifier, and 4 volts 3 amps. Could you please give me details of these windings, e.g., gauge of wire, number of turns? Is the primary wound with sufficiently thick wire to carry the current?"—L. N. S. (Birmingham 11).

FOR the 4-volt windings 32 turns will be required, as the basis of your windings is 4 turns per volt. The gauge of wire for both windings may be 18 S.W.G. These two additional turns will provide a further load of 22 watts upon the transformer, but you do not state the H.T. secondary loading, and therefore we cannot advise you whether or not the primary winding is suitable. The 36 gauge primary may be considered to take a maximum current of .1 amp.

Hercules Midget Accumulator

"Could you please tell me where I can purchase a 'Hercules' midget accumulator? I have seen a reference to these in several of your issues, but cannot trace the firm. Also, could you tell me how far away from a broadcasting station a midget set would work?"—A. L. H. (West Lavington, near Devizes).

THE Hercules Accumulator Company appear to have gone out of business, as no replies can be received from their only known address at Shepperton. If, however, they are still in existence and see this reference, perhaps they will communicate with us, as we have had a number of enquiries concerning their midget accumulators. We cannot give you any indication of the range of a midget receiver, as this depends upon local conditions, type of circuit, etc.

Background Noises

"I have built a short-wave set from some old parts which I had by me, and whilst the range seems quite satisfactory, and I can rope in dozens of stations, there is one thing which disappoints me. When I tune in there are loud rushing or rasping noises and I find that these can be caused by pressing the panel. Also, even when tuning is finished, there is a kind of general noisiness much louder than on a standard broadcast receiver. Is this a peculiarity of the short-waves or does it denote a broken-down or faulty part in the set?"—G. R. A. (St. Albans).

THE trouble is no doubt due to the types of component you are using. Standard broadcast components, especially of old design, are not entirely suitable for short-wave work, and friction contacts especially can give rise to the troubles mentioned. An article in our issue dated March 28th last, dealt with this subject, and we refer you to this.

The coupon on cover iii must be attached to every query.

Miscellaneous Advertisements

Advertisements are accepted for these columns at the rate of 3d. per word. Words in black face and/or capitals are charged double this rate (minimum charge 3/- per paragraph). Display lines are charged at 6/- per line. All advertisements must be prepaid. All communications should be addressed to the Advertisement Manager, "Practical and Amateur Wireless", 8, Southampton Street, Strand, London.

RECEIVERS, COMPONENTS AND ACCESSORIES

Surplus, Clearance, or Secondhand, etc.

SOUTHERN RADIO'S WIRELESS BARGAINS.

ALL GOODS GUARANTEED AND SENT POST PAID.

SPECIAL SUMMER BARGAIN-PRICE SALE.

SPEAKERS.—Celestion Soundex Permanent Magnet, 10/-; Telsin Permanent Magnet with ten-ratio transformer, 12/6; Blue Spot 90P.M. Extension Speaker, 20/-; 45P.M. Extension Speaker, 17/6; Telsin Loud Speaker Unit, 2/6; all new and boxed.

RECEIVERS.—G.E.C. A.C. D.C. Mains Three-valve sets. Complete with 3 Osram Valves, in exquisite Bakelite cabinet with Osram M.C. Speaker. Ready to plug in to any mains. Fully guaranteed. New, in sealed cartons, £3/5 (list £7/15).

MULLARD M.B.3 three-valve battery sets. Complete with batteries, accumulator, M.C. Speaker. Three Mullard Pentode valves in beautiful walnut cabinet. Brand new, in sealed cartons, £1/10 (list £8/8).

TELSEN A.C. D.C. MULTIMETERS (latest 1936 type).—5-range for every conceivable test for radio and domestic electrical appliances, 8/6 each.

COILS.—TESEN (1936). Iron-Cored Coils, Type W340, midsize, 4/-; type W478 (1win), 9/- pair; type W477 (triple), 10/-; type W476 (triple superhet selector and oscillator), 10/- set. All Ganged Coils are Mounted on Base with switch. I.F. Transformer Coils W492, 5/-; Telsin Dual Range Coil with variable series condenser W76, 4/-; Varley Square Peak Coils Bp5, 2/-.

ELIMINATORS.—Regentone (1936) Type W5a with trickle charger, 37/6; Type W1a (loss trickle charger), 32/6.

HOUSE TELEPHONES. A SPECIAL BARGAIN. BRAND NEW ONE-HAND TELEPHONES. Complete on stand, with or without Automatic Dials. Cost £1 each to manufacture, 10/- each.

MICROPHONES.—Ace (P.O.) Microphones, complete with transformer, perfect with any type of receiver, 4/6.

TRU-OHM RESISTANCES.—1 Watt. Wire ends colour coded and marked; 36 assorted capacities on card, 6/-.

AMERICAN VALVES.—A full range of valves for all American Sets at 7/- each. Brand new, guaranteed.

BARGAIN PARCELS.—Parcel of Assorted Components, including resistances, condensers, wire, etc., etc.; all new and useful, value, 20/-; 4/6 per parcel.

SOUTHERN RADIO BRANCHES.—271/275, High Road, Willesden Green, N.W.10; 46, Lisle Street, W.C.2. All mail orders to 323, Euston Rd., N.W.1.

SOUTHERN RADIO, 323, Euston Rd., London, S.W.1. (near Warren Street Tube). 'Phone: Museum 6324.

ALL goods previously advertised are standard lines, still available. Post card for list free.

VAUXHALL UTILITIES. 163a, Strand, W.C.2. Over Denny's the Booksellers, Temple Bar 9339.

ALL lines advertised last week still available.—**RADIO CLEARANCE,** 63, High Holborn, W.C.1. Tel.: Holborn 4631.

RADIOGRAPHIC offer all types American Valves 3/- each. Largest stockists in Gt. Britain of National Union and Triad valves. Write for list.

RADIOGRAPHIC have stocks R.C.A. Acorn tubes 955, 30/- each, 954 40/- each. Remember all merchandise carries our usual guarantee of satisfaction or money refunded. Orders 10/- or over carriage paid. Radiographic Ltd., 66, Osborne Street, Glasgow, C.1.

LOUDSPEAKER REPAIRS

REPAIRS to Moving Coil Speakers, Cones and Coils fitted or rewound. Fields altered. Prices Quoted including Eliminators, Loud-speakers Repaired, 4/-; L.F. and Speech Transformers, 4/- Post Free. Trade invited. Guaranteed. Satisfaction. Prompt Service. Estimates Free. L.S. Repair Service, 5, Balham Grove, London, S.W.12. Battersea 1321.

REPAIRS.—Transformers, Chokes, Speakers, Motors, Rewinding. Quotations free.—Jackson, 20, Donnington Road, Worcester Park, Surrey.

PREMIER SUPPLY STORES

ALL POST-ORDERS should be addressed to—**JUBILEE WORKS, 167, LOWER CLAPTON RD., LONDON, E.5.**

'Phone Amhurst 2833 (Private Branch Exchange). Callers, as usual, to 20-22, HIGH ST., CLAPHAM, S.W.4. (Macaulay 2381.)

and 165 and 165a, Fleet St., E.C.4 (next to Andertons Hotel). (Central 2833.)

NOW READY! Send 4d. in stamps for **NEW ILLUSTRATED GIANT CATALOGUE AND VALVE LIST.**

SHORT WAVES.

SHORT-WAVE COILS 4 to 6-pin types. 13-26, 22-47, 41-94, 78-170 metres, 1/9 each with circuit. Special set of 8 S.W. Coils, 14-150 metres, 4/- with circuit. Prender 3-band S.W. Coil, 11-25, 19-43, 38-80 metres. Simplifies S.W. receiver construction, suitable any type circuit, 2/-.

COIL FORMERS, in finest plastic materials. 1 1/2 in. low-loss ribbed 4- or 6-pin, 1/- each.

CONDENSERS, super ceramic S.L.F. .00010, .0001, 2/9 each; double-spaced .00015, .00025, .0005, 3/- each. All brass with integral slow-motion. .00015 tuning, 3/9; .00015 reaction, 2/9.

SHORT-WAVE KIT for 1 valve receiver or adaptor, complete with chassis, 3 coils 14-150 metres, condensers, circuit, and all parts, 12/6. **VALVE GIVEN FREE.**

2-VALVE S.W. KIT, complete with valves, 19/6.

BAND-PASS KIT, 14/6 the lot. Lissen 3-gang coil unit. Utility 3-gang condenser and disc drive, 4 valve-holders, chassis and blueprint.

SUPERHET KIT, 15/6 the lot. Telsin Band-Pass Superhet Coils, I.F.'s, 3-Gang Condenser, Disc Drive and chassis.

SPEAKERS, K.B. 5" P.M.s 9/6, Goodman 7" P.M.s, 9/6, Rola 7" P.M.s, 10/-.

MAINS TRANSFORMERS. Premier wire-end type with screened primaries. H.T.8 & 9 or H.T.10 with 4v. 4a C.T. and 4v. 1a C.T., 8/6.

250-250v. 60 ma., 4v. 1a., 4v. 2a. and 4v. 4a., all C.T., 8/6.

350-350v. 120 ma., 4v. 1a., 4v. 2a. and 4v. 4a., all C.T., 10/6.

500-500v. 150 ma., 4v. 2-3a., 4v. 2-3a., 4v. 2-3a., 4v. 3-4a., all C.T., 19/6.

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