

THE AMATEUR TRANSMITTER—See page 260

Practical and Amateur Wireless

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Edited by F.J. CAMM

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Publication

Vol. 13. No. 323.
November 26th, 1938.

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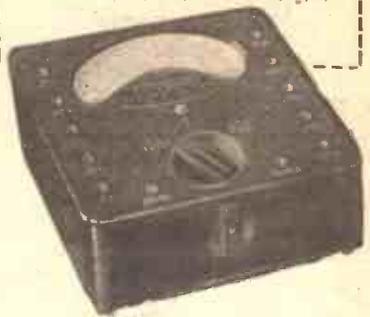
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THE CHOICE OF INSULATION—

See
Page 261



Practical and Amateur Wireless

Edited by F. J. CAMM

Technical Staff:
W. J. Detaney, H. J. Barton Chapple, Wh.Sch.,
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VOL. XIII. No. 323. November 26th, 1938.

ROUND *the* WORLD of WIRELESS

Amateur S.W. Receivers

IN response to many requests we give in this issue an introduction to a new receiver which has been designed primarily for the keen experimenter or amateur transmitter. The receiver was on view at Radiolympia and attracted considerable attention, embodying in a most compact form the majority of the features which are so desirable in this type of apparatus. The design as now presented is sufficiently comprehensive to enable the majority of listeners to use it for reliable short-wave reception, but there are some additional features which will be added in order that it may be used by transmitters and others who require the most useful type of receiver for their work. It is not suitable for ordinary broadcast reception, but may be used up to about 160 or 200 metres. The illustrations in this issue show the general appearance and some of the work which is needed in the construction, and many amateurs will undoubtedly find a receiver of this type of much greater interest in construction than the usual type of simple broadcast receiver. The set is ideal for Colonial use, and no doubt many Radio Clubs will find this a useful model to build for instructional and Club use.

Radio Normandie

SIGNALS which have recently been heard on 274 metres are stated to be those radiated during test transmissions from the new Radio Normandie transmitter at Louvetot. The tests have been carried out at various times during the day.

Burndept Reunion

MESSRS. BURNDEPT are arranging for a reunion of officials and employees of the original Burndept Company and its subsidiaries, to be held on Friday, January 20th next. Members of the works or office staffs (male or female) who wish to attend should communicate with Mr. H. W. Higgs, c/o 73, Madeira Avenue, Bromley, Kent.

Eire Wireless Reserve

AN organisation similar to our Civilian Wireless Reserve is proposed in Eire, and a special Committee of the Irish Radio Transmitters' Society has been formed to go into the question. It is stated that this will be closely linked with the Army Signal Corps.

Mayfair

THAT part of London contained within Oxford Street, Regent Street, Piccadilly and Park Lane is known as Mayfair, and on December 1st in the London Regional programme a feature programme based on the history of this famous district will be broadcast. At one time a fashionable part of London, it is now rapidly becoming the centre of big business.

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Melbourne Transmitter

THE Australian Broadcast Station at Melbourne uses two call-signs—before 6 p.m. it is VLR3 and after 6.15 p.m. it is VLR. These times are Australian Eastern Standard, which is 10 hours ahead of G.M.T. The wavelength used by VLR3 is 25.25 metres and by VLR it is 31.23 metres.

Jack London

JACK LONDON will be heard in a programme of syncopation on December 2nd in the Midland programme. He played the piano for Binnie Barnes in "Cavalcade" and has one of the leading parts in "Old Bones of the River," in which Will Hay is the star. As a sprinter he had held the 100

metres record. His first Midland broadcast was a talk on training for the Olympic Games. Born in British Guiana, Mr. London spent part of his schooldays in Birmingham.

In a Slate Quarry

THE outsider knows little about the life which goes on in a slate quarry, about the many funny incidents and humorous retorts which occur during a day's work. J. Ellis Williams, who knows the Festiniog Quarries well, has devised a programme in Welsh entitled "Chwerthin Chwarel" (Laughter from the Slate Quarries), which will be broadcast on November 29th. In this programme listeners will hear many interesting tales, stories of sad happenings, witty answers and old-time characters.

Victorian Composers

ON November 28th Dr. W. K. Stanton, Midland Region's Music Director, will conduct the B.B.C. Midland Singers and the B.B.C. Midland Orchestra in one of his programmes of "Music by Victorian Composers." The Orchestra will be heard in Sir Hubert Parry's Symphonic Variations, and the singers and orchestra in Stanford's setting of "The Revenge."

Count John McCormack for Radio

COUNT JOHN McCORMACK, the Irish tenor, whose rise to fame is one of the most remarkable stories in the history of music, has agreed to broadcast for the B.B.C. in "Scrapbook for 1903" on December 6th and 8th.

It will be the first time that he has ever made a studio broadcast in Britain—and it may even be the last, for he will come to the studios when his triumphal farewell tour of England, Scotland and Ireland has ended with a great concert at the Albert Hall. A few days after his broadcast he will sail away for South America.

Poland's Short-wave Network

IN addition to the 10-kilowatt SPW, Warsaw station on 22 m. (13.635 mc/s), and SPD (2 kW.) on 26.01 m. (11.535 mc/s), the Polskie Radio has now brought into its network the following transmitters: SP19, 19.94 m. (15.12 mc/s), 20 kW.; SP25, 25.65 m. (11.695 mc/s); SP31, 31.49 m. (9.52 mc/s), 5 kW., and SP48, 48.86 m. (6.14 mc/s), 5 kW.

ROUND the WORLD of WIRELESS (Continued)

Rome-Tokio Radio Telephone

A NEW radio-telephone service between Rome and Tokio was recently inaugurated. The great circle distance between these two cities is approximately 6,000 miles.

New French National Transmitter

WORK is progressing rapidly on the long-wave station which is being erected in the neighbourhood of Bourges (France), and it is hoped to have it ready by the early spring of next year. The transmitter is destined to replace Radio-Paris, and will eventually work on 1,648 m. (182 kc/s).

Greek Broadcasting System

SOME delay has taken place in the construction of the 100-kilowatt station which the Telefunken Company is installing near Athens, and it is not now considered likely that it will be in operation before the middle of 1939. In the meantime, the present 15-kilowatt station erected as a temporary installation will continue to broadcast on 499.2 m. (601 kc/s). Later, when the new transmitter is completed, the older plant will be transferred to Salonika, and a smaller 5-kW station erected on the island of Corfu. Athens will also possess a 10-kilowatt station for the radiation of programmes, in particular to the United States and Australia.

B.B.C. Foreign Broadcasts

IN reply to a question in the House of Commons, Major Tryon, Postmaster-General, said that it was proposed to continue the present broadcast news service in French, German, and Italian. Apart from these medium-wave transmissions and the short-wave broadcasts in Spanish, Portuguese and Arabic, no additions were contemplated.

"Music Hall" from Sheffield

ANOTHER broadcast from Sheffield to be heard by Northern listeners during the week beginning November 27th will be a variety programme from the Lyceum Theatre on December 1st.

Show-boat Days

HIRAM P. BAILEY, the speaker in the North's "Slices of Life" series of talks on November 30th, is a Hull man who has crowded plenty of adventure into his life. His experiences in America in-

INTERESTING and TOPICAL NEWS and NOTES

cluded a good deal of acting on river show-boats, and these are the days he will talk about in this, his first talk in the series. He is to broadcast a second one on December 6th.



Jack Sharp (right), a Blackpool dairy van-driver, and Harold Taylor, one of the dairy's milkmen, so impressed David Porter, one of the B.B.C. variety chiefs, with their "Songs at the Piano Act," that they appeared in the new feature "Spot Page" from the Manchester Studio. The two young men are members of the Blackpool Co-operative Society Dairy's Concert Party, which during the four years of its formation has contributed over £2,000 to charities.

Australian Short-wave Transmission Schedules (December, 1938).

VK2ME (Sydney), 31.28 m.; Sundays (Sydney time): 4 p.m.-6 p.m. (06.00-08.00 G.M.T.); 8 p.m.-midnight (10.00-14.00 G.M.T.); Mondays: Midnight-2 a.m. (14.00-16.00 G.M.T.).

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

VK6ME (Perth), 31.28 m. Nightly, Monday to Saturday (inclusive) (Perth time): 7 p.m.-9 p.m. (11.00-13.00 G.M.T.).

Cabaret from Southampton

DANCE Cabaret will be broadcast from the Polygon Hotel, Southampton, on December 3rd. This will be the first broadcast of cabaret from the hotel.

WLW's Youngest Broadcaster

THE Collins Kids, new WLW (Cincinnati) hillbilly harmony duo, are like the postman who goes for a walk on his day off—they like to listen to mountain music on the radio during their leisure time. The pair, who are brother and sister, form the youngest harmony act on the Nation's

Station. Edith is just 17, Sherman 18. Born in Hazard, Kentucky, they broke into radio by way of an amateur contest three years ago, and were heard over station WDDO, Chattanooga, where they played on several network programmes, before coming to WLW.

Christmas Day in Europe

"CHRISTMAS Over the Frontiers, 1938," is a new programme to be given on all Regional wavelengths at 5.40 p.m. on Christmas afternoon. Listeners will hear how the day has been spent by people in five or six northern and southern European countries. Moray McLaren and Laurence Gilliam left last week to make arrangements. The countries visited by the two producers will be France, Italy, Germany, Greece and Sweden.

The idea of the programme is a simple one—to let listeners in this country hear exactly how Christians and their families in other countries have spent the day. Not more than two speakers of each nationality—they may be men or women—will take part. Each will talk quite informally from his or her own country about their domestic celebrations. The talks will be linked together by music, commentary and recorded effects, which will take the form of an imaginative journey over Europe.

Orchestral Music

THE Sunday evening concert in a B.B.C. studio on November 27th (Regional) will be conducted by Constant Lambert, and Harriet Cohen will be the soloist in "Nights in the Garden of Spain," by Manuel de Falla. This programme will also include Berlioz' "Queen Mab" Scherzo, and Liszt's symphonic poem, "Hungaria." The Orchestral Hour on November 27th (National), consisting of favourite pieces played by the B.B.C. Orchestra, will be conducted by Anthony Collins.

SOLVE THIS!

PROBLEM No. 323

Jonson built a three-valve receiver employing an H.F. pentode, triode detector and pentode output stages. He was uncertain regarding the type of H.T. battery to get and therefore he included a milliammeter in each anode circuit in turn and added together the current readings thereby obtained. The total was just 10 mA and he therefore purchased an H.T. battery rated for a 10 mA load. He found, however, that this did not last as long as he expected. He was using the correct grid bias on the output valve. What had he overlooked? Three books will be awarded for the first three correct solutions opened. Address your envelopes to The Editor, PRACTICAL AND AMATEUR WIRELESS, Geo. Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. Envelopes must be marked Problem No. 323 in the top left-hand corner and must be posted to reach this office not later than the first post on Monday, November 28th, 1938.

Solution to Problem No. 322

As Jackson originally used a differential reaction condenser, one section of this would have acted as an anode by-pass condenser. This is an important component in the detector stage, and therefore when he used an ordinary condenser, this by-pass condenser was absent, which accounted for his trouble. The following three readers successfully solved Problem No. 321, and books have accordingly been forwarded to them: A. G. Derbyshire, Heathy Lea, Newbold Moor, Chesterfield; J. Richards, 51, Buckhurst Way, Buckhurst Hill, Essex; W. A. P. Young, "Fyldon," Hill Crest Park, Exeter, Devon.

A COMBINED H.T. AND L.T. UNIT

This Article Deals With Constructional and Operating Details of the Unit Described in Last Week's Issue

By THE TECHNICAL STAFF

THE rectifier used in the L.T. charger section is the L.T.7, which requires an A.C. input of 4 + 4 volts to give a D.C. output of 2 volts at 0.5 amps.

The circuit is quite simple, and need not present any difficulty over its satisfactory operation, as its output is designed for charging an average 2-volt accumulator, providing the cell is in a fully-charged condition when the unit is brought into use. The charging rate of .5 amps is not sufficiently high, unless the cell is left on for a considerable period, to bring a cell from a discharged state to fully charged, but it is sufficient to replace the current consumed by the average receiver during the normal listening hours.

An average three- or four-valve receiver takes approximately .4 amps to .5 amps for its filament circuit, therefore, if the charger is used for the same number of hours as those devoted to listening, the current consumed will be replaced, thus keeping the cell in a satisfactory condition. To be on the safe side, however, it is always advisable to give the charger the benefit of the doubt and keep it on for an extra hour or two.

The switch on the right-hand side of the panel breaks the rectifier circuit and it is always advisable to switch off when connecting or disconnecting the accumulator. In the same lead as the switch is wired, a small fixed resistance is embodied as this tends to maintain a constant current output, irrespective of the condition of the cell and prevents any damage to the rectifier in the event of an overload.

Although it is clearly indicated in the theoretical circuit, it must be remembered that the primary winding of the L.T. sections on the transformer is alive whenever the H.T. unit is switched on, so do not have trailing leads from the L.T. output terminals without making positive use of the switch mentioned above.

Constructional Details

All the components are mounted on a piece of five-ply or other suitable wood about 3/4 in. thick, the other dimensions being 10 in. by 9 in.

The components should be laid out in the positions indicated in the practical wiring diagrams shown in the previous issue. Once their positions have been located all fixing holes should be pricked out with the aid of a bradawl and then the actual fixing can take place. It is advisable to mount the mains transformer and the two large 4-mfd. condensers first, following these with the two rectifiers, taking care to place them the correct way round, the smoothing choke, and finally the two electrolytic condensers in the cardboard containers. These are not provided with any means of fixing, so a small strip of aluminium or other metal should be cut, sufficiently long to bend over them and be held either

side by a 3/4 in. wood screw. A considerable amount of the wiring can be completed before the terminal and switch strip is assembled and mounted on the front edge of the baseboard. See that adequate insulation is provided on all connecting wires and that all connections are absolutely secure.

Terminal Strip

This can be made from ebonite bakelised sheet or any other suitable insulating material, to the dimensions shown in Fig. 1, and the terminals and switches mounted in

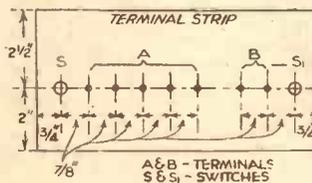


Fig. 1.—The drilling dimensions for the terminal mounting strip.

position. The strip is fixed to the baseboard by three screws along its bottom edge, and care should be taken that the screws used are sufficiently long to allow them to bite well into the baseboard.

The output side of the smoothing choke can now be connected to one of the 4-mfd. sections of the uppermost electrolytic condenser blocks, and continued to the power terminal. To the same terminal is joined one end of R1 and R4, the other ends of which are taken to the S.G. anode and detector anode terminals respectively. R2 and R3 can then be fixed in position, and the wiring completed by connecting the decoupling condensers, contained in the lower electrolytic block, as indicated on the wiring plan. Do not overlook the fact that the negative lead, i.e., the black one, of each condenser block must be taken to the common negative line which terminates at the H.T. negative terminal.

As mentioned before, it is absolutely essential to see that all the connections, especially those of the resistances, are perfectly tight, soldered for preference, otherwise strange crackling noises will be introduced into the receiver.

Covering Case

As with all mains equipment, some protecting cover must be used for the sake of safety, and to protect the components from dust and damage.

Many readers will experience no difficulty in making a suitable cover from metal sheet, stout perforated zinc or wood, but, for those who would like guidance in the matter, full dimensions are given in Fig. 2.

The material used in the original model was heavy-gauge perforated zinc, as it was found that this is not only easy to work and allows adequate ventilation, but a smart professional appearance can be obtained if a little care is taken. The ultimate finish can either be secured by suitable matt paint or enamel, or the metal can be burnished quite easily with very fine emery cloth.

Operation

Sufficient decoupling and smoothing is provided in the unit for satisfactory use with any average receiver, including short-wavers. If hum is experienced, attention should be given to the earth connection of the receiver, the mains plug should be reversed in its socket, and finally the unit should be placed farther away from the receiver.

As mentioned in the previous article, the resistances have been selected to provide certain voltages at definite current values, therefore, if less current is taken the voltages will rise, so measurement should be taken of the actual voltages being applied to the various parts of the circuit to make quite sure that they are not higher than that normally required.

If they should be on the high side, instability or distortion might be introduced, and these symptoms will necessitate higher resistance values in the unit, these being determined by the formulæ already given.

If it is decided to take advantage of the high output voltage available at the power terminal for, say, the output stage of a receiver or amplifier, do not forget to adjust the grid bias accordingly.

It will be noted that a spare lead has been left from the upper electrolytic condenser block and, as this represents a further 4 mfd., it will provide the necessary decoupling for any voltage dropping resistance which may be required in the power supply circuit.

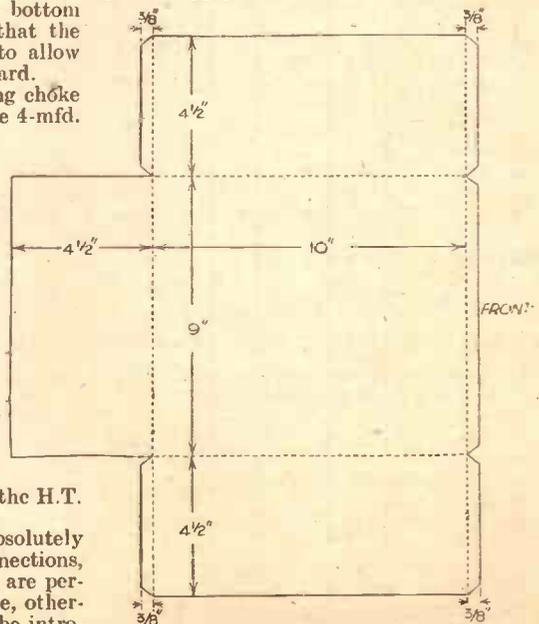


Fig. 2.—How to mark out the sheet of metal or perforated zinc for the cover.

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

The Amateur Transmitter

Further Details of P.A. Stage Operation and Adjustment, and Modifying the Oscillator Chassis to Include a Power Amplifier, are Dealt With in this Article By L. O. SPARKS

It was shown in the last article that a coil and a condenser combination in the anode circuit of the P.A. valve would, when tuned to the frequency concerned, present a high impedance to the R.F. currents and cause them to set up an oscillatory voltage across the coil.

To obtain the utmost efficiency, it was decided that the valve could operate off the straight portion of its characteristic curve as we were not concerned about the possible distortion due to harmonics.

For clearness sake, assume that the valve is biased to the "cut-off" point, and that

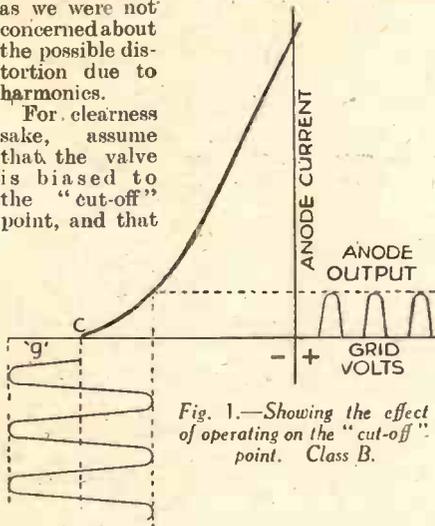


Fig. 1.—Showing the effect of operating on the "cut-off" point. Class B.

sufficient drive is available from the preceding valve to produce satisfactory operation. Under such circumstances, using the grid volts-anode current curve as in the previous article, the curve obtained from the anode output will no longer be a faithful reproduction of the input. In fact, it will take the form shown in Fig. 1. In case the reason for this is not too clear, it should be noted that only one half cycle of the input signal is operative. Consider the negative half cycle of the input signal; as the valve is already biased down to its "cut-off" point, this half cycle would only tend to make the grid more negative and reduce further the possibility of any anode current flowing.

When the positive half cycle comes into operation, however, the grid is rendered slightly less negative and anode current will flow over the duration of that period, and this is indicated in the anode output curves. It will be seen that the resultant output waveform is nothing more than a series of individual peaks, and it should be re-

membered that the greatest efficiency is obtained when these peaks or pulses are tall and narrow, or, in other words, very clearly defined. Under such circumstances the anode tank circuit, i.e., coil and variable condenser, receive these rather powerful impulses at the pre-determined frequency, and they are sufficient to maintain oscillations in that circuit. One can think of this method of operation in terms of a pendulum which is swinging at a certain rate and receiving kicks or impulses at definite periods.

Methods of Operation

As with the L.F. side of a receiver, there are several classes or methods of operation, each having its own individual name, such as Class A, Class B, and so on.

The method described last week, where the valve was operated on the straight portion of its curve, is known as Class A, while that mentioned above, where the valve is biased to its "cut-off" point, is known as Class B. Another method sometimes referred to as Class C is nothing more than the latter with the bias increased to twice that required to produce the "cut-off" point.

In this method the anode current only flows during a small part of the positive half cycle, and it is possible, therefore, to obtain a higher anode efficiency, but in view of the increased bias applied it must not be overlooked that the actual gain is relatively low as the input or drive

has to be increased to produce satisfactory operation.

Before proceeding further with the technical considerations of the P.A. stage, it would be advisable for actual experiments to be carried out and personal observations made.

Assuming that the crystal control has already been added to the oscillator chassis, certain modifications will now have to be made to make room for the additional valve and coil required by the most simple form of P.A. stage.

The coilholder on the left-hand side of the chassis, which was used originally for the grid circuit, must now become the oscillator anode coil. To the rear of it another valveholder must be fitted to carry the oscillator valve. The two holders

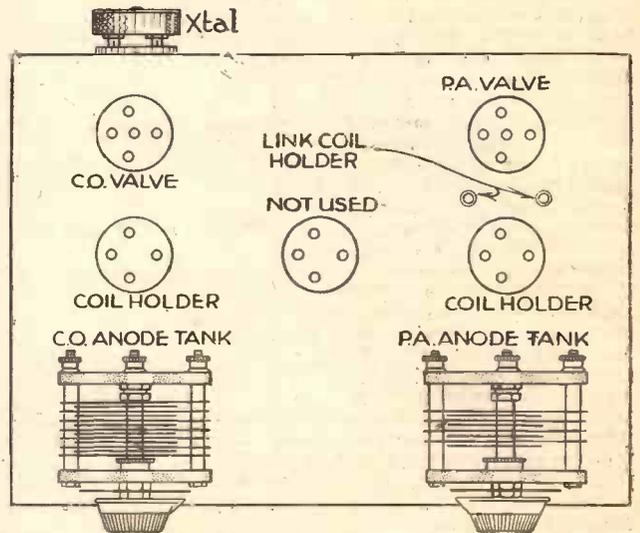


Fig. 2.—How the original oscillator chassis is modified to allow the P.A. stage to be added.

should be placed in line and reasonably close to each other so that the wiring to the left-hand tuning condenser, which now becomes the anode condenser, is kept reasonably short and direct.

The right-hand tuning condenser and coilholder have now to form the anode circuit of the P.A. valve, and for the valve itself another valveholder will have to be fitted behind the existing coilholder. This arrangement keeps the two circuits fairly well separated and this is an important point to watch, as on no account must any inductive couplings take place between the two tank circuits.

The modified layout for the chassis is shown in Fig. 2 and the complete theoretical circuit in Fig. 3.

In view of previous remarks about capacity coupling, it is possible that some criticism will be made regarding its use in this instance, but for the sake of simplicity, space and the desire to keep controls and components to the minimum, capacity coupling is best for our present purposes.

Two current meters are shown, but, if these are not available, some form of quick connection should be provided in each

(Continued on page 277)

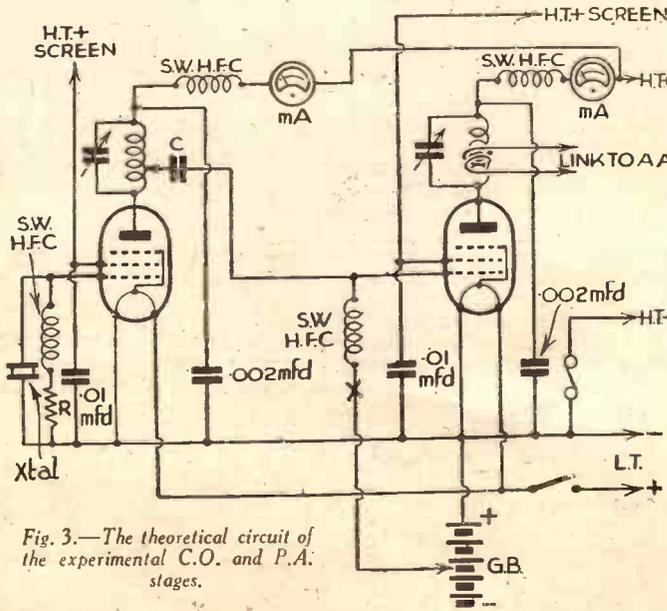
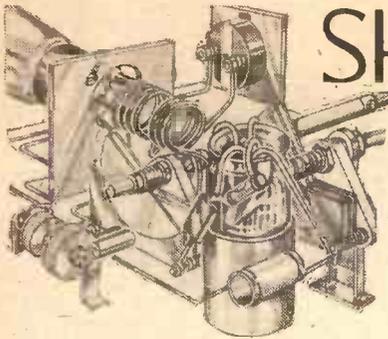


Fig. 3.—The theoretical circuit of the experimental C.O. and P.A. stages.



SHORT-WAVE SECTION

THE CHOICE OF INSULATION

The Importance of Insulation and Earth Returns in S.W. Receiver Design are Discussed in This Article

IN many short-wave "hook-ups" there is an abundance of ceramic or porcelain, and the question often arises as to whether, in many instances, this has not been overdone.

The majority of readers are now more or less conversant with the character of H.F. energy, but to find where dissipation takes place in the path of these signals proves at times a little difficult when considering external losses.

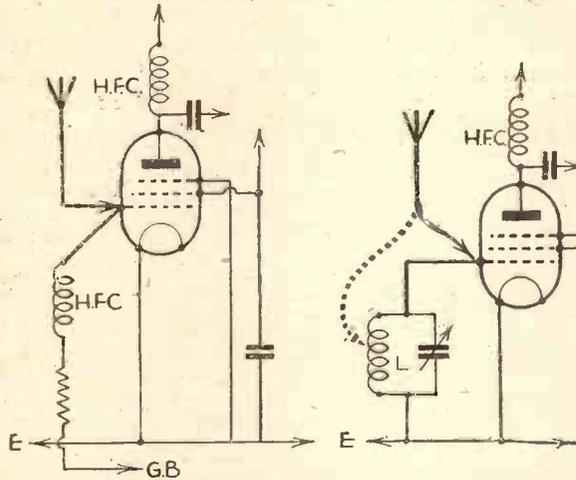
The very small incoming signal needs to be handled so that the injection grid of the first valve receives it with as small a depreciation in strength as the particular input tuning system allows, and although the use of series condensers, aperiodic coupling, and band-pass filtering must inevitably result in loss of signal strength, this is a condition which can at least be accounted for in the design of the tuning coils, or system.

The only possible way of ensuring the full signal strength at the grid of the first valve is by either untuned H.F. amplification, where the lead-in wire actually goes direct to the grid; Figs. 1 and 2 depict these conditions theoretically.

The first consideration then is for providing adequate insulation against absorption

and possible flux residue is concerned, this method is efficient.

The wire connection between the insulating terminal head and the coil unit, or grid of the valve, should, where possible, be of thick copper wire, 16 S.W.G. is a happy medium, and it is preferable to employ tinned copper—not bare copper—as the H.F. signals, it will be remembered, pass along the surface of the wire, and copper



Figs. 1 and 2—Diagrams illustrating untuned and pre-tuned H.F. amplification respectively.

is apt to oxidise after a time.

From the aerial considerations we can pass to the question of earth, and exactly the same conditions apply here. The efficiency of the tuning system will depend largely on the method by which the leads to the respective tuning condensers, where necessary, and the rest of the input circuit, is carried out, in so far as the soldering and the lengths of wire are concerned. When a new set of tuning coils is being used

for the first time, there is always the possibility that certain stipulations laid down by the manufacturers are overlooked, with obvious detriment to the effective frequency range of that unit, in part or whole.

With plug-in coils it will be noticed that either valveholders may be used for the base, or the manufacturers supply a bakelite or moulded coil-base, having certain insulating properties. This gives rise to a rather interesting point concerning the discrimination between the losses which have to be faced in the actual valve wiring

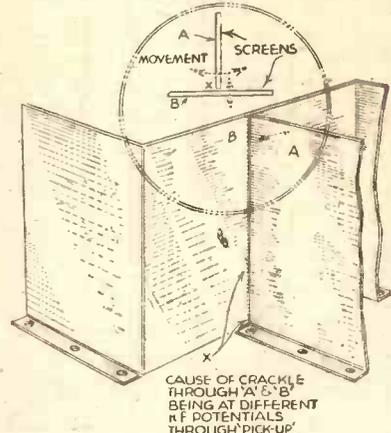


Fig. 4.—Illustrating one of the causes of crackle between screens.

and those at the point of tuning in the medium of the coil former and base insulation.

It will generally be found that in the choice of short-wave components, preference will invariably be given to those parts incorporating porcelain or ceramic, and in some cases this can be simply traced to the improved appearance against equally lossless dielectric mouldings having a bakelite or composition appearance, excepting, of course, the times when the dielectric constants prove a vitally important consideration.

Low-loss Valve Bases

Valve bases of low-loss frequentite or ceramic, for example, are essential for work on the ultra-high frequencies, since the power loss factor taken at frequencies in the neighbourhood of 20 to 50 megacycles, the question of glazing, condition of porosity, and such, have all to be taken into account, otherwise damping will occur, rendering difficulties in regeneration or amplification.

(Continued overleaf)

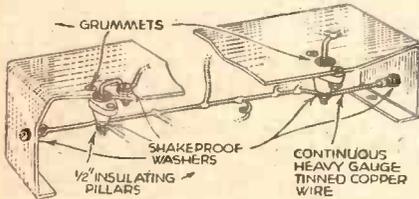


Fig. 3.—Bus-bar earth connections for an all-metal chassis.

effects in the path of the incoming high-frequency signals. It can be assumed that the actual aerial and lead-in to the point of connection with the receiver is proved efficient, so one must look now to the connections between the input terminal or socket and the tuning system.

Insulating Pillars

The use of insulating pillars is a sound way of maintaining the H.F. potentials, since it provides a means whereby the connecting lead from the terminal head is kept well clear of the chassis. Also, from a leakage point of view with regard to the insulation, and so far as accumulated dust

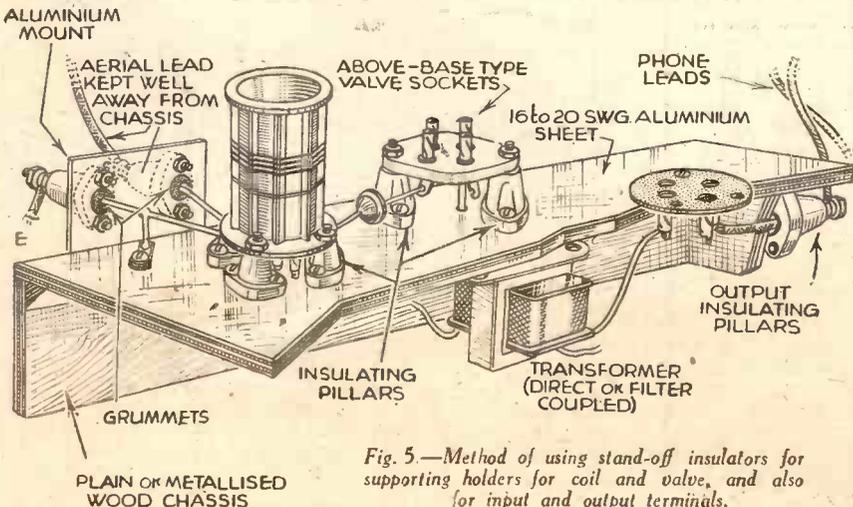


Fig. 5.—Method of using stand-off insulators for supporting holders for coil and valve, and also for input and output terminals.

SHORT WAVE SECTION

(Continued from previous page)

The object in the use of ultra-low-loss bases for coils and valves will be defeated if the associated components are treated without thought being given to these conditions, and in some cases it will be found advantageous to resort to the use of long insulating pillars, on to the terminal heads of which the valve or valves handling the H.F. signals can be mounted. This will permit shorter leads to be made whilst distinct earth returns can be arranged to ensure that each component, where necessary, receives a "common" earth, and not one "picked up" from a connecting wire which may travel half-way round the chassis.

Bus-bar Earth Return

For this reason the bus-bar principle of earth return is advocated and extensively used, and heavy gauge wire returns made at different points along the bus-bar, which may be either copper or brass, or simply a still heavier gauge of tinned copper wire connected at many points of the chassis.

To confine the earth potential for the purpose of "directing" the H.F. signals, it may prove a little surprising to some of the newcomers to this branch of radio to see a "direct earth line" system in an all metal chassis arranged so that the return wires are taken to a bus-bar "wire" supported on insulating pillars.

In Fig. 3 will be seen a typical example of this method, and it will be noticed how in this case only the chassis returns are made, with the apparatus or component leads being taken as direct as possible. By so doing, the passage of H.F. currents is confined, but the components are earthed together before the major return to chassis is made; this ensures an absolute minimum in the impedance which will normally result in the use of different gauges of earth return connections.

The degrees of H.F. amplification should be treated in exactly the same way as the pre-amplifier sections so far as the insulating properties are concerned, and if screening is employed freely between each successive stage, then inter-fitting screens require earthing together, and again to the chassis at as many points as possible, within

reason. Fig. 4 illustrates one of the many causes of crackle resulting in two screens being intermeshed without adequate rigidity and earthing.

Valveholders

The stages of L.F. amplification do not require ultra-low-loss valveholders, excepting for that valve immediately following the detector. Here is an example where the damping can result through too long a connection between the H.F. choke and the grid coupling condenser transformer, and it would be a wise plan to raise the valve base whenever necessary to ensure short connections in this respect. (See Fig. 5.)

With regard to the output stage, it is often advisable to resort again to insulating pillars, if only to keep the phone or speaker leads well away from the H.F. portions of the receiver, and as feed-back can occur with poor insulation at this point, a further asset will be realised in passing the output connections from the valve circuit up through the insulating pillar in similar fashion to the methods adopted with the aerial and earth connections.

Leaves from a Short-wave Log

Australia versus Panama

HIP5G, Panama City, so far a regular broadcaster on 25.47 m. (11.78 mc/s), may now be found in the late night hours invading the channel used by VLR, Melbourne (Victoria), namely, 25.25 m. (11.88 mc/s). Fortunately the stations do not work simultaneously, as the Australian transmitter, as a rule, is off the air by G.M.T. 22.00.

New Station Opens at Montevideo

CXA2, a new 5-kilowatt transmitter recently opened in the Uruguayan capital, broadcasts nightly from G.M.T. 22.00 on 50 m. (6 mc/s). The call is: *Continental Radio a Montevideo*. Address: Sres Racine y Caissiol, Estacion CXA2, Montevideo, Uruguay.

Programmes from Buenos Aires

ALTHOUGH, so far, the best and most interesting programmes from the Argentine Republic have been captured through LRX and LRU, the short-wave outlets of LRI, *Radio el Mundo*, Buenos Aires, it is worth while turning to LRA1, the 10-kilowatt transmitter working on 30.99 m. (9.68 mc/s), *Radio del Estado*, in that city. The schedule is as follows: G.M.T. 23.00-02.00 (Monday to Friday inclusive), with an extra transmission preceding the evening one on Fridays only (21.00-22.00). On Sundays, Mondays and holidays the station is on the ether from midnight to 02.00 G.M.T. *Elay-eray ah-ono*, *Radio del Estado* is the call heard as the studio opens.

Multi-channel Broadcasts

THE Prato Smeraldo (Italy) short-wave transmitters for their daily Arabic and other oriental broadcasts are now reinforced by the addition of two Rome-Torrenova commercial stations, namely, IRF, on 30.52 m. (9.83 mc/s) and IQY, 25.7 m. (11.676 mc/s). These are also used between G.M.T. 20.00-20.30. Occasionally IQN, Tripoli (North Africa), on 31.71 m. (9.46 mc/s), relays these transmissions, although this station is more frequently used for the

re-transmission of a Colonial concert to the Italian medium-wave network.

Mozambique on Three Frequencies

THE Lourenço Marques (Mozambique) transmissions are now carried out through CR7BH, 25.6 m. (11.72 mc/s); CR7AA, 48.88 m. (6.1375 mc/s), and through a new station CR7AB, on 85.92 m. (3.491 mc/s). CR7BH is found the most favourable for distant listeners and CR7AB



The Chairman and some of the members of the King's Lynn Short-wave Club.

for local broadcasts. Address: Caixa Postal, 954, Lourenço Marques, Mozambique, Portuguese East Africa.

La Voz De La Republica

WITH this call TI2XD, San José (Costa Rica), on 25.15 m. (11.93 mc/s), heralds the broadcast of a March which opens its daily transmissions. There are now two sessions, namely, from G.M.T. 16.00-18.30, and the main evening programme from G.M.T. 22.00-04.00. Address: Señor Jno. Gilbert Daly, Station TI2XD,

Apartado Postal, 1729, San José (Costa Rica).

Good Broadcasts from Mexico

THE 10-kilowatt Mexico City, XEWW, station on 31.58 m. (9.5 mc/s) operated by the Cadena Radiodifusora Mexicana (address: Apartado Postal, 2516) is now clearly received almost every night until about G.M.T. 05.00. The studio closes down with the call and a short message in Morse followed by a series of chimes: XEXR, XEXS and XEGW, Mexico City, working on 49.46 m. (6.065 mc/s), 48.39 m. (6.2 mc/s), and 49.1 m. (6.11 mc/s), have suspended their transmissions on these channels.

Competitors Amalgamate

NO longer do we hear two separate broadcasts from Georgetown (British Guiana), for the VP3MR and VP3BG stations have amalgamated, and now run one transmitter operated and owned by the British Guiana United Broadcasting Company. Under the call VP3BG, on 48.94 m. (6.13 mc/s), there is a daily weekday broadcast from G.M.T. 15.30-16.30, and from 21.00-01.45. On Sundays the transmitter comes on the ether at G.M.T. 12.45.

ON YOUR WAVELENGTH



By Thermion

A Good One from U.S.A.

A COUPLE of bright sparks attending the Northampton Polytechnic are so advanced in their studies that they manage to find time to send me an extract from a New York paper, which says that the programmes of the radio station WOR are broadcast from two 385ft. towers in East Rahway, N.J., and that as a result the home life of the people within half a mile radius has developed a pronounced peculiarity. When they switch off their radios, the programme, we are expected to believe, comes in through the plumbing, steam pipes and kitchen stove. The editor of this American publication is not content with reporting this phenomenon but actually goes on to explain it. He says: "The technical explanation is that any oxidised or rusty metal surface rectifies the powerful electro-magnetic waves, turning them into sound waves." The quotation further asserts that people are always visiting the towers to report that their cast-iron lawn mowers are giving out the Bulover Watch time, and that the news bulletins scream from their wire fences. One alert little boy has rigged up a copper aerial with which he collects sufficient power to supply a lighting system in his workshop.

America is the home of the leg-pull, and it is also the home of almost imbecilic credulity.

You can ascribe the foregoing story to whichever of these two alternatives you like.

A Cuttings File

ONE reader adopts an ingenious system for collecting from each issue of P. & A. W. the articles which appeal to him. He has a series of paper folders arranged alphabetically in which the articles are placed, thus under the letter R he has folders marked "Reaction, Rectification, Resistances," etc., and which contain all the information we have published on these subjects. They form a reference file of great usefulness, and it's an idea worth copying.

Back Issue Wanted

L. S. D., of Eastbourne, is anxious to obtain a copy of the *Wireless Magazine* for November, 1934. If any reader has a copy of this and cares

to lend a hand by sending it on, I will see that it is forwarded.

Readers' Small Ads.

THIS same reader makes the suggestion that it would be of great value to our readers if we introduced a system of miscellaneous advertisements at a cheaper rate for the interchange of wireless books, out-of-print issues, and wireless components. The trouble is that such a system is likely to be abused by people who are not readers of the paper, and it would be necessary to ensure that the scheme is used only by readers if coupons, say, from three consecutive issues were appended to each advertisement. There is always the risk, too, that some artful dealer will endeavour to obtain a cheap form of advertising for his junk sets and components. Perhaps my readers might care to devise some system to ensure that such an advertising scheme, if we adopted it, is not misused in this way.

A Scotsman's Revenge

K. T. H., of Birkenhead, who, when I dare to pour contumely on the heads of inventors, sends me a fusillade of words defending them, has been stung to the quick, touched on the raw; in fact, thoroughly annoyed by my recent reference to hoots and hohs from Skitland. He has written, indited, inscribed, or composed the following piece of doggerel:

"MAC-PHERSON'S REVENGE"
A Prood Son o' Bonny Auld
Scotland replies tae yon puir daft
buddy callit Thermion.

Hohs and hoots frae "Skitland"
The bagpipes loudly skir-r-r-l,
When Thermion tries tae mak a
joak
Puir Sawndy's in a whur-r-r-ll;

Forbye if Thermion is right
In his latest obsair-r-r-vation,
Puir Sawndy canna see a joak
Without an opair-r-r-ation.
But that's juist Eenglish jealousy,
Ah'll stake ma veery life;
Daft Thermion, hae ye never-r-r-
hear-r-d

O' Lauder-r-r and Wull Fyffe,
Wha's joaks are kept a' roond the
wur-r-r-ld

Tae mak the Eenglish laugh?
Forbye ye've never-r-r hear-r-d-d
o' them,

Gae speir amangst yer-r-r stauff,
For there ye'll find some mem-
ber-r-r-s o'

The glorious "Parritch" clan
Wha've come tae Eengland tae
asseest

The stupid Eenglishman,
Wha's like us, as we often awsk,
Dom few, an' they're aw dead.
Ye canna see a joak yer-r-r-sels,
Ye wisna haggis fed;
Tak Awber-r-deen an twal miles
roond,

We'll gie ye a' the rest,
Except "Auld Reekie," whaur 'tis
kent

The br-r-rains are o' the best.
Puir boddy, dinna fashi yer-r-sel;
Staunds Scotland whaur it did?
Sic silly blether-r-ings as yours
Braw Scotsmen winna kid.

Sae haund me doon ma tar-r-r-tan
kilt,

Ma spor-r-an and ma snood,
An Ah'll awa tae Lunnun Toon
An hae yon Ther-r-r-mion's bluid.

Dealers in India

MY criticisms of some of the radio dealers in this country should, it seems, have been made to apply to other countries. Listen to what C. P. M., of India, has to say:

"Having cast my peepers on the epistle submitted by R. H., of Kingswood, in the PRACTICAL AND AMATEUR WIRELESS issue dated August 13th on the problem of radio dealers, I am now going to propound on the same situation in India.

"I presume that dealers in England can still speak English (they could when I was home last). This presents our first difficulty in this sun-scorched, one-eyed blob on the map!

For example: Scene, a small radio dealer's somewhere in India's

bazaars. Enter a white gent to inquire for some small part obtainable anywhere but in India. He receives the reply: 'Ham ko malum ne' Sahib' (i.e., 'I do not understand, sir'). Thereafter ensues a struggle of tongues, the white gent trying to speak Hindustani and the brown gent trying to speak English. Eventually, their vocabularies exhausted, the former proceeds to search the shop, and after much sweating and not a little swearing, closes the scene by stamping out of the shop, determined to write to Thermion, as I am doing. Having now satiated my desire to grouse, I should like to take this opportunity to tell you that, although the issues of PRACTICAL AND AMATEUR WIRELESS are three weeks old when delivered, your articles are still fully appreciated, so carry on with the good work!"

A Club for Bournemouth?

H. L. M., of 95, Corhampton Road, Bournemouth, sends out an SOS for all local enthusiasts to get into touch with him. He wishes to form a club in that district, and the nearest is at Poole, three miles away. It is somewhat astonishing that a town of the size of Bournemouth does not possess a radio club. There are many other towns without radio clubs, and I do hope to see this season the formation of many more. If the constructor public were better organised lots of things could be done for them. Here is a chance for Bournemouth fans to make good the omission in that district.

Some New Terms

JUST so that you can keep your knowledge up to date, herewith a group of new technical terms which you can cut out and paste in the front of the "Wireless Constructor's Encyclopædia."

Oscilloscope.—A cathode-ray tube for oscillograph work.

Teletron.—A cathode-ray tube for television work.

Phasmajector.—Meaning image emitter or a tube which provides a standard video signal source to aid television experimentation.

Electromalux.—Meaning electric eye or a photo-electric mosaic pick-up tube for television camera work.

Radiosondage.—A word agreed upon internationally for this method of investigating the upper atmosphere by means of small balloons equipped with apparatus (literally translated from the French this means "Radio-sounding").

"Water Rats" Plan Own Production

I UNDERSTAND that one of the most remarkable variety broadcasts ever scheduled for production

Notes from the Test Bench

Combined Controls

IN some modern receivers two or more controls are often combined in a single unit, and when these become faulty it is generally found that one part only has broken down. A typical instance is the combined on/off and volume control, where the switch section may break down. In such a case there is no need to scrap the entire unit. The leads joined to the switch section may be disconnected and joined to an ordinary on/off switch mounted in a convenient position and the volume control left to operate in the usual manner. Similarly, where the switch is of the multi-contact type and it develops a fault it may be possible to make use of certain contacts in combination, to avoid the necessity of replacing the entire unit. A little examination and thought will often enable such difficulties to be overcome.

Test Circuits

MANY constructors are interested in trying out different circuits and components, and in some cases the difficulty of disconnecting one and mounting another, with the necessary interconnecting leads, results in many experiments being passed over. It is a good plan to build a rough baseboard or chassis, wired for, say, a three-stage receiver. The various essential components may then be placed in rough position and small bases with plugs provided in place of them. If these are wired, a component may be removed and a substitution made, in many cases without the need for altering a single connecting wire. L.F. transformers, H.F. and L.F. chokes, and similar items are particularly adaptable to this idea.

Cleaning Crystals

ONE or two amateurs who have commenced transmitting activities have written to ask how a crystal should be cleaned. It should be pointed out that the crystal should not be handled unless absolutely necessary. The slightest damage will alter its characteristics, and grease, which will be transferred from the cleanest pair of hands, will reduce efficiency. When it is necessary to clean a crystal, carbon-tetrachloride should be used. Some proprietary "dry cleaning" chemicals are made from this and will suffice for the purpose. It may, of course, also be used for cleaning the crystals used in an ordinary crystal receiver, where grease can also prove detrimental to the performance.

from B.B.C. studios will next month bring to the microphone at least thirty men whose names top the bills of music-hall shows all over the country.

It will be an hour's programme on the Regional wavelength on Monday, December 5th, and will be given by the famous fraternity of variety artists, The Grand Order of Water Rats, which celebrates its fiftieth anniversary next year.

John Sharman, B.B.C. Variety producer, who, already an officer of the Order, has been elected next year's "Test Rat"—one of the highest honours—will be responsible for the production.

Normally, a "bill" with the army of stars that he is planning would cost well over a thousand pounds. As it is, the whole of the fee—it is not a small one—is being handed over by the Order to its Charity—a charity to keep fellow artists who have fallen on hard times.

Though it is not yet possible to give the names of all those who will appear, I am told that the cast will possibly include such artists as Will Fyffe, Will Hay, Charlie Kunz, George Doonan, Wee Georgie Wood, Tommy Trinder, Jack Barty, Claude Dampier, Marriott Edgar, Bud Flanagan, Chesney Allen, G. S. Melvin, Jimmy Nervo, G. H. Elliott, Teddy Knox, Ronald Frankau, Talbot O'Farrell and Clarkson Rose.

A number of acts are giving up a whole week's engagement on the halls in order to be free for the broadcast; others are rearranging dates. Many variety stars who are members of the Order are under contract to Mr. George Black and he has generously given permission for any of them to take part in the show.

"Rats to You" is the title of the show, which will be in the nature of an hour's survey of the past fifty years of music-hall. The script is being devised by Past King Rat Georgie Wood and written by him in collaboration with three other Past King Rats—Will Hay, Will Fyffe and Fred Russell.

John Sharman told me, "I'm hoping that the show will be the best I have presented in the fifteen years I have been with the B.B.C."

"There won't, of course, be time for all the stars to do their normal music-hall acts; but they're all showing a wonderful spirit. Some will even form the chorus; others will just have a couple of lines in the script.

"We shall open with a 'flashback' to fifty years ago, when the Order was founded by Dan Leno, Joe Elvin, and Wal Pink, and close on the same note."

**WORKSHOP CALCULATIONS,
TABLES AND FORMULAE**
3/6, by post 3/10 from
George Neumes, Ltd.,
Tower House, Southampton St., Strand, W.C.2

A Mobile Repair Unit

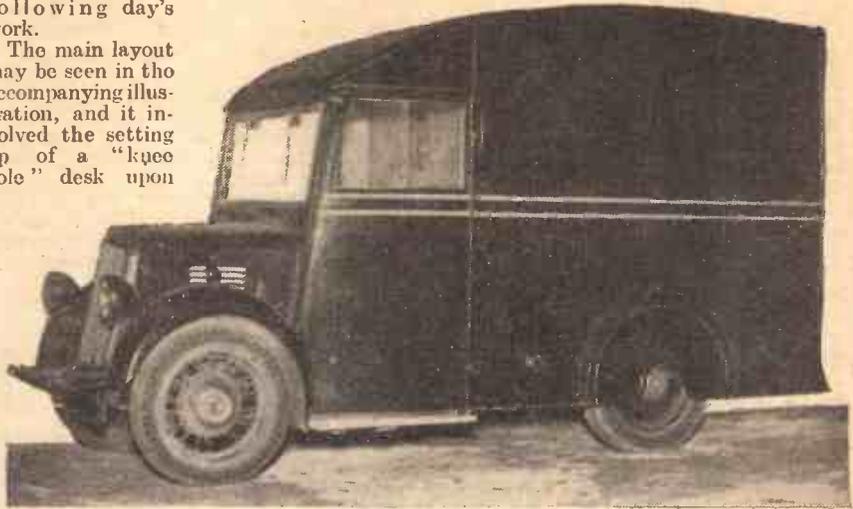
WHAT is believed to be the first mobile radio repair unit ever placed into service in this or any other country, has recently been fitted in a most comprehensive manner and sent on the road for service to all types of radio listeners in the area of London and the Home Counties, capable of catering for the requirements of listeners, from those with midget receivers to those fortunate enough to possess some of the largest of the high quality, high-fidelity, continuously automatic radio gramophones and amplifiers.

Much experience has been gained during the past four years by the organisation responsible for the inception of this unique unit, in that most of the troubles which are associated with radio equipment can be traced and cleared on the spot if suitable instruments are available to the engineer handling the matter. Usually, private cars are allocated for this purpose, but their accommodation is limited to the amount of the instruments they can conveniently carry, and in any case always involve the setting up as such, with whatever combination is required, with the exception of those of hand portability.

The procedure to be adopted with the mobile unit under discussion is to drive as near to the residence as it is possible to get, so that little delay is involved in the distance required to transport the set. Table model receivers are handled direct and dismantled in the van. The van is proofed against weather, and under inclement conditions can be entirely closed, when the engineer can work in the utmost comfort. Radiograms are handled by the removal of radio chassis and speaker from the cabinet only.

engineer 15 hours' supply "all-out," or 30 hours' continuous or single working, which, however, is very unlikely normally to be required. The arrangements are such that when the van is garaged for the night the accumulators are replenished overnight, and ready for the following day's work.

The main layout may be seen in the accompanying illustration, and it involved the setting up of a "knee hole" desk upon



The van carries no advertising material, or name.

which is placed into position and fastened an all-steel cabinet, composed of two square-shaped cupboards, held apart by two steel shelves of suitable length to occupy the full width of the van.



The interior of the repair van, showing the neat arrangement of the various accessories.

Mains Supply

A.C. mains supply is provided in duplicate from electronic converters from duplicate 12 volt 150 amp-hour accumulators, and 125 watts of supply can be obtained from each. This will give to the operating

Loudspeaker Section

The right-hand compartment is made up of the following: Loudspeaker section, with neon pilot light, gramophone test unit fitted with auto-start and stop and pick-up, socket section with seven pairs, and

main switch, sockets being allocated as follows:

- 230 volts A.C. (electric soldering iron).
- 230 volts A.C. (valve tester).
- 230 volts A.C. (radio chassis under test).
- 230 volts A.C. (signal generator).

Pick-up (from gram. turntable for audio test).

Hi-Imp (from output transformer on loudspeaker for testing).

Lo-Imp (from voice coil circuit on loud-speaker).

The door of this compartment is fastened back permanently and has racks for various tools and spare valves for testing purposes, and valve cards.

The left-hand compartment is of similar shape, but its upper section holds a full selection of service manuals for most types of receivers sent out during the past five years, while the lower section holds stocks of new valves in cartons ready for replacement in those receivers requiring this service. The socket section again is fitted with seven pairs of sockets and neon pilot light, and main switch and is allocated as follows:

- 230 volts (for oscillograph).
- 230 volts A.C. (for frequency modulator).
- 230 volts A.C. (spare).
- 2 volts D.C. (battery receivers—tapped off 12 volts).
- 6 volts D.C. (car radios—tapped off 12 volts).
- 12 volts D.C. (car radios—tapped full 12 volts).

A and E (to outside aerial and earth to chassis of van).

The door is similar to and fastened back in the same way as that of the right-hand compartment.

Component Spares

The drawers of the "knee-hole" desk are sectioned off into compartments to hold various types and sizes of condenser replacements, and also various values and wattages of resistance replacements, as well as a variety of the smaller parts that are always in demand, such as plugs, sockets, valve caps, fuses, etc.

In the spaces under the drawers are held stocks of the various types of short-wave doublets, anti-static aerials, and noise suppression devices, together with supplies

(Continued on page 271)



Practical Television

November 26th, 1938. Vol. 3. No. 127.

Television's Development

WHENEVER the Chief Engineer of the B.B.C., Sir Noel Ashbridge, can be persuaded to say anything regarding television his remarks are, quite naturally, listened to with the keenest interest. Obviously, he has to be very guarded in his comments, for as a member of the television advisory committee he is kept au fait with the exact position, and knows intimately the deliberations of that committee which, as we have commented on before in these columns, seems very loath to make any public statement which will acquaint viewer and manufacturer alike with future policy. In any case, when Sir Noel gave the Thomas Hawksley Lecture at the Institution of Mechanical Engineers recently, he said quite plainly that it may be readily anticipated that the two services of broadcast sound and television will ultimately merge. What time must elapse before this happens was left to conjecture, but keen observers have been convinced for some time that this policy was inevitable. It seems quite uneconomic for the two B.B.C. services to be in any way watertight in their provision of programme material to the public, and already there have been several instances where a combined effort would have saved money, and pleased both sections of the viewing and listening public. During the course of his address he went on to say that the range of future stations must to a large extent be dependent on the maximum power it would be possible for the ultra-short-wave transmitters to use. Already the French station and the proposed American station have aerial power ratings well in excess of the Alexandra Palace, particularly so in regard to the plans for New York. Coupled with this are the important features of the nature and configuration of the area which has to be served by the signals, and the wavelength channels available for radiating both the vision and sound signals.

Range Extension

IT was pointed out that there was no real technical reason why any new station that may be contemplated should not have a power which was at least three or four times that of the present London one, which is rated at 17 kilowatts peak aerial power. That would mean that at any given distance from the station, assuming no adverse screening effects, the strength of the received signal would be about double that now possible. This would bring about a very material increase in the range covered, but more important still it would ensure that anyone normally prone to an adverse signal-to-interference ratio, because of nearby ignition systems of cars or other electrical devices, would be sure of getting quite satisfactory results. The resulting sales increase would thereby be of quite a substantial character, and in this way justify any expenditure of the Government in order to foster a growing industry in which this country has already established a very important lead. It is fully realised

that the densely populated areas of the provinces are for the most part situated in rather hilly districts, and for this reason it was not possible to estimate the performance factor of any new station because of the adverse effect which hills have upon the propagation properties of any ultra-short-wave carrier. Furthermore, it was necessary to select very carefully the wavelengths for new stations to ensure adequate separation of the carrier frequencies, and so prevent any heterodyning in those districts where more than one station can be received. Several cases of this nature



Gracie Fields rehearsing before the television cameras, prior to appearance in the recent all-star television cabaret.

have already arisen on the extreme South Coast towns, due to the television broadcasts from the Eiffel Tower. Sir Noel also made it clear that in his opinion there was little likelihood of any form of international standardisation in regard to picture definition or picture frequency standards, or even with the nature of the modulated signal or methods of synchronising. This is very unfortunate, for it very definitely places a restriction on the number of possible alternative programmes which a potential viewer can enjoy. Perhaps at some later date wiser counsels will prevail,

for there is no doubt that the prospect of two or more programme sources would be an added incentive for more people to take up television reception.

Overcoming a Camera Difficulty

AS readers know, in the normal type of iconoscope storage camera for generating television signals, the photosensitive mosaic is directly facing the optical lens system, but the scanning beam of electrons has to strike this plate obliquely in order to supply electrons for neutralising the acquired elemental picture charges. This naturally complicates the picture scan, for if no correction were introduced the picture would be trapezium shaped. The line-scanning pulses produced by the time-base generator must therefore be progressively adjusted as they pass up or down the mosaic, so as to preserve the picture's rectilinear formation. There have been many ingenious suggestions for overcoming this difficulty, and the most important have been described in these columns. From Germany comes another scheme which appears to be quite satisfactory. The mosaic screen is in a plane at right angles to the light rays from the lens system, but instead of being oblique to the screen the scanning beam of electrons emerges from the usual type of electrode assembly in a plane which is parallel to the signal plate. On reaching the position of the plate, however, instead of shooting past, a strong magnetic field from an external source deflects the beam through a complete right angle, so that the impact of the beam on the mosaic is exactly in a normal direction. The scanning can thus be effected rectilinearly, and no electrical compensation is required. The value of the scheme hinges entirely on the efficiency of the magnetic deflecting field, and provided no distortion arises at this juncture then the idea should prove a satisfactory one in practice.

Russia's Turn

IN the days of low-definition television which provided the amateur experimenter with so much fun by using his home-built thirty-line receiver, it was by no means an uncommon thing to tune in a Russian television station, and watch the pictures radiated by that country. The direction of scanning, and also the picture ratio, was different from the English standard, but adjustments to the receiver made it possible to get intelligent results in spite of the distance separating receiving and transmitting stations. Whether the same thing will happen with their high-definition service, however, is a very moot point.

A PAGE OF PRACTICAL HINTS

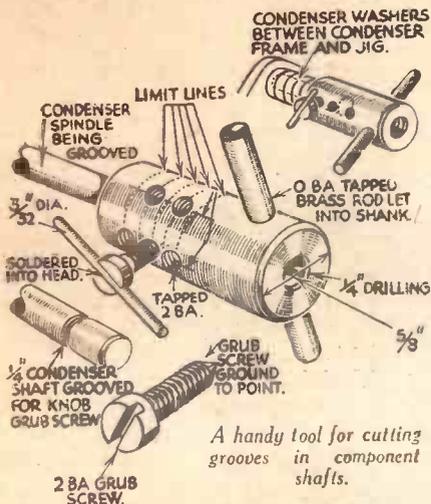
SUBMIT YOUR IDEA

READERS WRINKLES

THE HALF-GUINEA PAGE

A Grooving Jig for Component Shafts

WITH this simple jig it is possible to groove, to any reasonable depth, any 1/4 in. shafting, provided, of course, that you use a steel screw for the



A handy tool for cutting grooves in component shafts.

cutter. For the shank I used an old disc-type condenser scale bush, and this being of brass, it proved easy for drilling and tapping. From the illustration it will be noticed how a comparatively fine adjustment can be obtained by providing the tapped holes at carefully located centres so that a fractional difference results in stepping the grub screw up or down.

To prevent the jig from "drifting," I used some old condenser vane spacer washes, and slid these on the component shaft, as shown; thus, by increasing the pressure on the cutting grub screw, a definite groove is obtained without slip.

In the model I use, I have provided for five grub screw settings, as depicted, but there is, of course, no limit to the number of setting holes, and the length of the shank. Average conditions will not require any extensive alteration to the design submitted.—W. CORRS (Ilford).

A Neat Meter Shunt Assembly

I AM building a new test meter and instead of including the necessary shunts for conversion of the current range, I have decided to adopt the plug and socket method illustrated in the accompanying sketch. So far I have made up two of these, and have found that for constant use it is advisable to give each one a coat of colourless varnish to preserve the windings when handling. Although I have given the actual measurements of the brass strip used for cleating the two plugs, requirements under various conditions of use may call for different over-all dimensions to allow for adequate spacing between the turns of resistance wire. The "A, B" pieces are soldered to the shank of the cleat, and two holes are required, as illustrated.

THAT DODGE OF YOURS!

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

SPECIAL NOTICE.

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

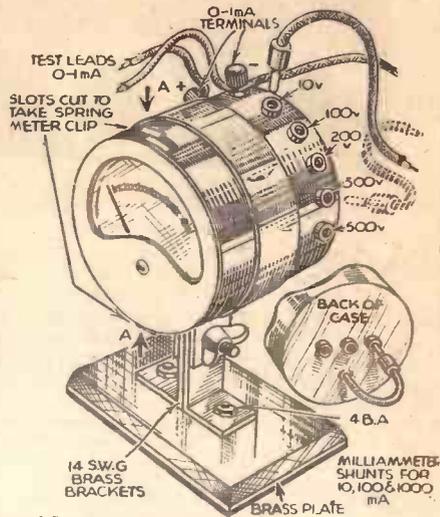
The types of wander plugs used in my case have long shanks, and these had to be drilled to take the brass cleat fixing screws; thus, clearance holes of 1/4 in. diameter were necessary both in these plugs and the rounded portions of the cleat (X). To ensure a rigid fixture, I included under the heads of the two 6 BA bolts the shakeproof washers, as shown, and these were chosen with internal teeth to prevent catching one's fingers when using.—A. D. ROGER (Kidderminster).

An Adjustable Meter Stand

THE balance of my 0-1mA meter is so good that I obtain an "error" in zero setting with different positions of use. This condition called for a suitable adjustable mount so that for critical readings re-setting was not necessary.

To make a neat job of this I commissioned an old variable condenser "dust cover" made of ebonite, and beautifully finished. Two slots were cut near the periphery, as illustrated in the accompanying sketch, and with a little persuasion the rear fixing spring fitment could be made to engage in these slots, and so securely hold the meter in position, whilst removal was just as easily effected when necessary. The series resistances for scale conversion to

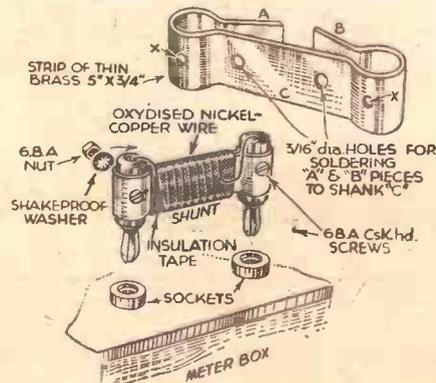
volts, and the shunt resistances for extension of the current range, were easily accommodated inside the ebonite case, and the sockets arranged as depicted. To permit "elevation" adjustment, I resorted to the



REMOVAL AND INSERTION OF METER REQUIRES SLIGHT PRESSURE ON CLIP ENDS TO CLEAR SLOTS

A simple adjustable meter stand.

use of a simple wing nut fitment embodying a cleat band of 16 S.W.G. aluminium, and two brass angle pieces, these brass pieces being secured to an ebonite base or mount, detailed as shown.—F. S. LANWOOD (East Ham).



A neat method of arranging a meter shunt.

Join Newnes' Practical Group!

PRACTICAL MOTORIST

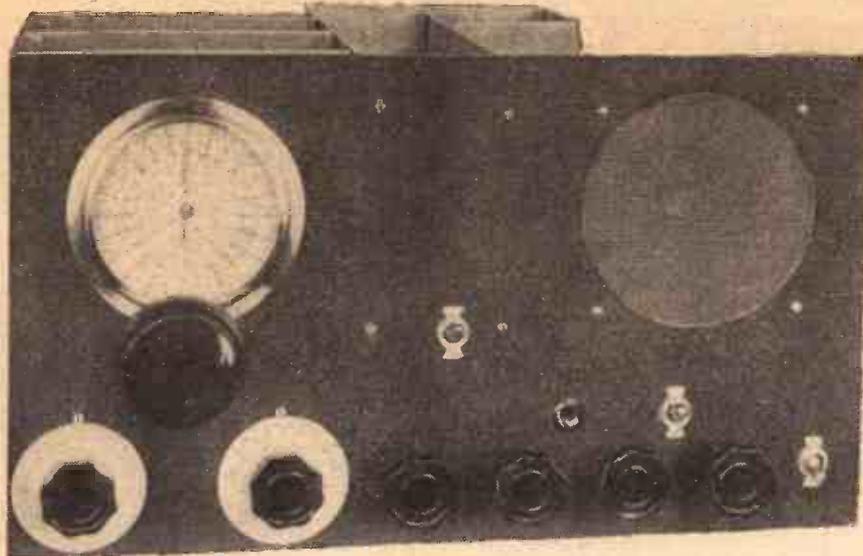
The owner-driver's journal which tells you how to repair, overhaul and obtain the best performance from your car.
3d.—Every Friday.

PRACTICAL MECHANICS

The only English journal of its type. It deals with every branch of Science, Mechanics, Invention, Model-making, Chemistry, Astronomy, Photography, Television.
6d.—Every Month.

THE CYCLIST

The leading weekly for every Cyclist. Clubman, Utility Cyclist or Tourist. Join "The Cyclist" Road Club and also take advantage of the FREE Insurance.
2d.—Every Wednesday.



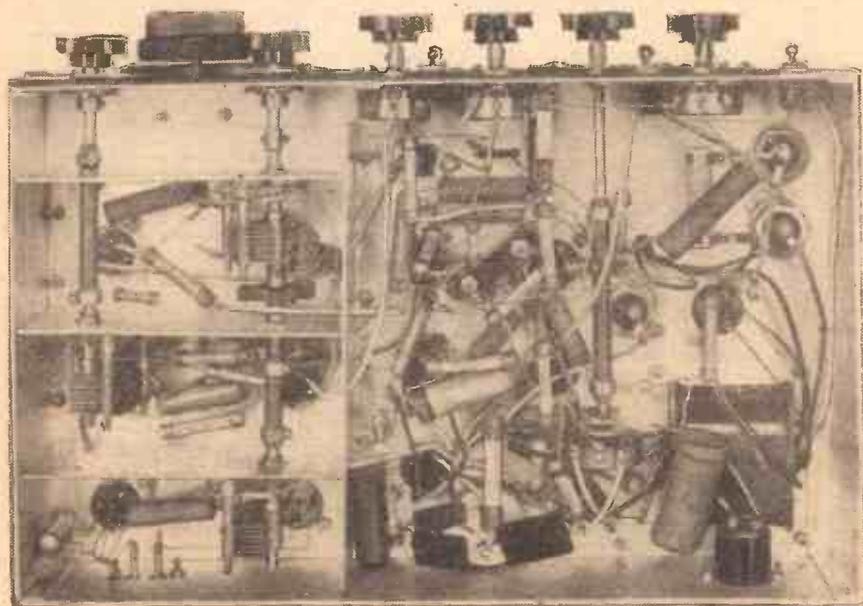
The panel layout presents a neat appearance, and controls are arranged in logical operating order.

WE have received many requests for an amateur short-wave receiver of the type which is common in America, but which does not appear to have received the popularity which it deserves in this country. Amateur transmitters, and advanced experimenters, find it very necessary when listening on the short waves to use a receiver which is not only very powerful but which is adaptable to the particular conditions under which listening is taking place. For instance, selectivity is the prime factor, but added to this must be some form of adjustable selectivity so that when music is desired it may be obtained with reasonable quality. Similarly, if CW signals are required some circuit change must be quickly made, as the ordinary superhet

who require this type of amateur receiver. The design now introduced has been in use for some time and has proved very useful, but it should be pointed out that as now offered, it is in its simplest form. Modifications, to bring it into line with the latest and most efficient type of amateur receiver, will be introduced at a later date. The finished receiver was on view on our stand at Radiolympia and was the centre of considerable attention, and we have no doubt that it will meet a long-felt want.

Principles of Design

Before going into a study of the design, and ultimate construction, it may be pointed out right away that this is not a receiver for the beginner. Apart from the intricate and involved constructional work



Underside of chassis, showing the band-setters and method of screening.

(which must be used to obtain the desired selectivity) will not receive CW. There are many other factors which enter into the design of the type of set indicated, and all of these will be familiar to those

—some idea of which may be gained by reference to the illustrations—the operation of a receiver of this type requires some study. You must not expect to sit down at the controls directly the set is finished

THE "AIR-I"

An Amateur Short-wave made Plug-in Coils and 9 to 160 Metres

and tune-in every amateur on the air. The seven controls all need intelligent handling, and in certain cases a very careful balance of certain controls has to be obtained, but when the receiver has been in use for a week or so it will be found exceedingly simple to make the desired adjustments to meet the requirements obtaining when the set is in use. As may be seen from the theoretical circuit, an H.F. stage precedes the frequency-changer, and for this a combination of pentagrid and separate oscillator is employed. The most important feature here is the regenerative circuit employed in the frequency-changer, electron-coupling being adopted in both the pentagrid and the oscillator stage, and the pentagrid may be made to oscillate by adjusting the voltage on the screens. This is a wonderful aid to selectivity and was adopted after several selectivity devices had been tried out.

Variable Selectivity

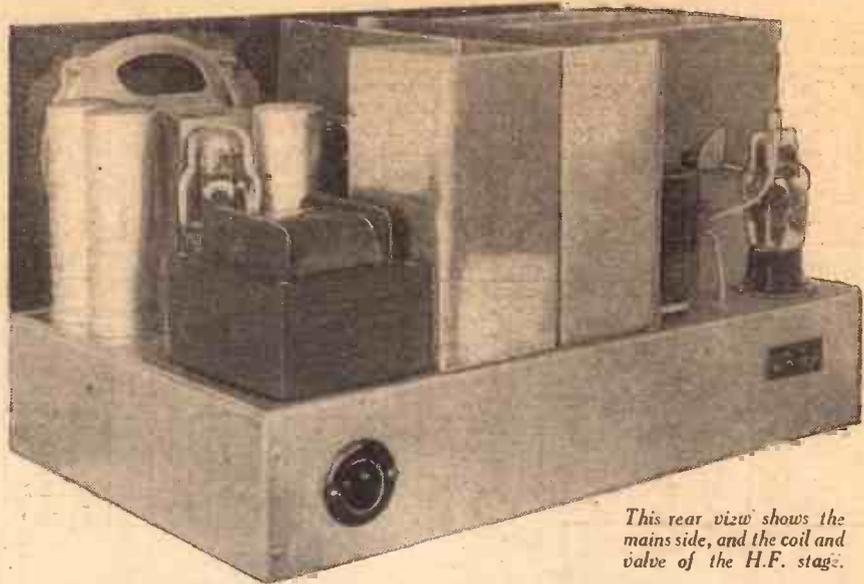
Coupling between the pentagrid and I.F. stage is by means of a special I.F. transformer which has a novel selectivity device incorporated and this may be used in addition to the regeneration control. Furthermore, this valve is provided with a variable-mu volume control which is also

LIST OF COMPONENTS FOR

- One aluminium chassis, 16 S.W.G., 16in. x 10in. x 3in. (Peto-Scott.) 15.0/0
- One aluminium panel, 14 S.W.G., 16in. x 9in. (Peto-Scott.)
- One full-vision dual-speed drive, type 1070. (Eddystone.) 8s. 9d. 8.9/0
- Three couplers, type No. 1009. (Eddystone.) 4s. 6d. 4.6/0
- Three extension controls, No. 1008. (Eddystone.) 3s. 9d. 3.9/0
- One 6-pin coil holder, type 964. (Eddystone.) 1s. 3d. 1.3/0
- One ceramic preset (30 mrafd.) type No. 1023. (Eddystone.) 1s. 0d. 1.0/0
- Two miniature dials, No. 1099. (Eddystone.) 4s. 0d. 4.0/0
- Two stand-off insulators, No. 1028. (Eddystone.) 1s. 0d. 1.0/0
- Set of coil formers, 4 and 6-pin. (Eddystone.) 4s. 0d. 4.0/0
- Three switches (types S.80.T, S.80.T and S.81.T). (Bulgin.) 4s. 9d. 4.9/0
- One mains connector, type P.20. (Bulgin.) 2s. 0d. 2.0/0
- One midjet H.F. choke, type H.F.8. (Bulgin.) 2s. 9d. 2.9/0
- Four top-cap shielded connectors, type P.103. (Bulgin.) 2s. 0d. 2.0/0
- Three top-cap connectors, type P.96. (Bulgin.) 2d. 0.2/0
- One shaft coupler, No. 2005. (Bulgin.) 3d. 0.3/0
- One B.F.O. type P. coil. (Wright and Weaire.) 1s. 6d. 1.6/0
- Two 4-pin ceramic valveholders. (B.T.S.) 1s. 6d. 1.6/0
- One component-mounting bracket. (B.T.S.) 4d. 0.4/0
- Nine octal valveholders. (Clix.) 7s. 6d. 7.6/0
- One A.E. socket strip. (Clix.) 6d. 0.6/0
- Three .00016 mfd. trolital condensers, type Tro. 160. (Premier.) 6s. 9d. 6.9/0
- Three .000015 mfd. trolital condensers, type Tro.15. (Premier.) 4s. 6d. 4.6/0
- Two epicyclic drives. (Premier.) 4s. 6d. 4.6/0
- One mains transformer, type AC.9 (Premier.) 14s. 6d. 14.6/0

"HAWK" 9

Receiver Using Home-
covering the Range from
- By W. J. DELANEY



This rear view shows the mains side, and the coil and valve of the H.F. stage.

employed in conjunction with the regeneration control for selectivity purposes. A straight I.F. transformer is used to feed the second detector, which is connected as an anode-bend rectifier, this having been adopted after grid-leak and diode circuits had been tried and rejected. Resistance-capacity coupling to a high-gain triode enables a fair degree of amplification to be obtained for 'phone working, and furthermore enables a simple form of volume control to be adopted on the L.F. side. The output valve is then coupled through a further resistance-capacity network, and a jack enables this last valve to be cut out when required for 'phone working. A beat-frequency oscillator is coupled to the second detector stage, and all valves, with the exception of the rectifier, first L.F. and frequency-changer are of the latest tetrode type—actually, Osram Internationals.

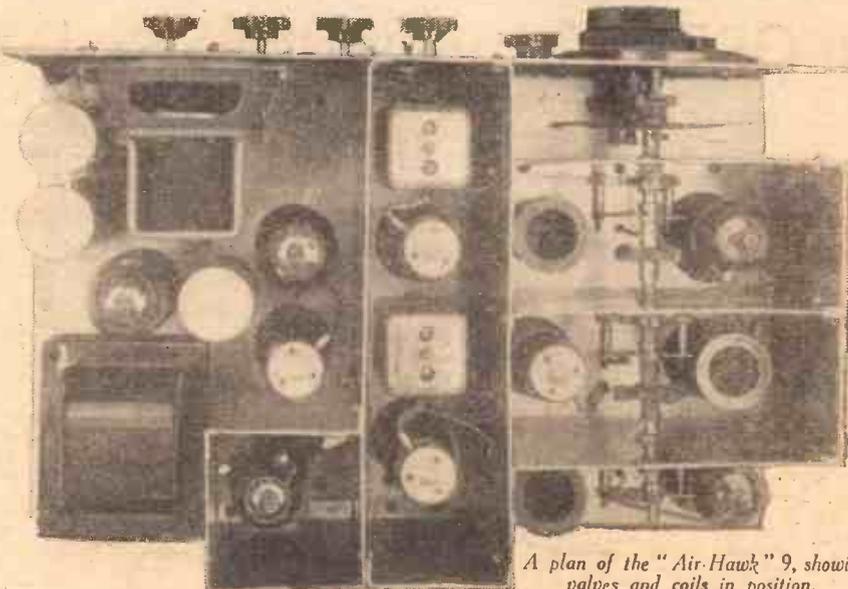
Home-made (or modified commercial) coils are utilised for tuning, and a word of explanation may be offered regarding the controls which have been used in this part of the circuit. As there are three tuned circuits it is obviously desirable to gang the tuning, but to enable simple and accurate tuning control to be obtained band-spreading must be incorporated. This means six tuning condensers in two sets of three. It is difficult to make all three

circuits of exactly the same value and thus some error is bound to creep in which will make ganged tuning of little value. Accordingly, some of the controls must be split up. In the experimental receiver several combinations were tried and the method finally adopted was to gang the three bandspreaders as these have a maximum capacity of only .000015 mfd. and thus any slight error will not affect reception. The band-setters were split into two units, the aerial (which will naturally be rather flat) and the oscillator being tuned by a pair of .00016 mfd. condensers, and the frequency-changer by a single condenser. This avoids the difficulties met with when a separate oscillator tuner is employed—this giving rise to double tuning points and similar troubles.

toggle switch controls the two degrees of selectivity on the I.F. transformer, the next switch brings into circuit the B.F.O. stage (by completing the H.T. feed to the anode) and the switch on the extreme right merely completes the H.T. circuit. By means of this latter switch the receiver may be switched off whilst a transmitter is being used, and the heaters are kept glowing. Thus, when it is desired to listen, the switch is merely depressed and the set is instantly in action. It is perfectly stable, and the receiver may be tuned to a 7 mc/s amateur, switched off for any length of time, and when switched on again the station will still be found dead on tune if it is still working. Smoothing in the H.T. supply is effected through a mains-energised loud-speaker, in series with which is a 300-ohm resistor to drop the total H.T. available to a suitable figure for easy adjustment in certain of the stages. This resistor is

The Controls

Thus, the controls as seen in the panel



A plan of the "Air-Hawk" 9, showing valves and coils in position.

THE "AIR-HAWK" 9

Two I.F. transformers, BP.123 and BP.124. (Varley.) 16s. 3d.

Four Lab-type volume controls, 10,000 ohms, 20,000 ohms, 50,000 ohms and .5 megohm. (Eric.) 12s. 0d.

Twenty-eight fixed resistors:

- One 100 ohms 1-watt type
- Two 300 ohms do.
- One 500 ohms do.
- One 600 ohms do.
- One 2,000 ohms do.
- One 5,000 ohms do.
- Three 10,000 ohms do.
- One 15,000 ohms do.
- Two 20,000 ohms do. (Dubilier) 28s. 0d.
- One 25,000 ohms do.
- Two 30,000 ohms do.
- Five 50,000 ohms do.
- Five 100,000 ohms do.
- One 200,000 ohms do.
- One 500,000 ohms do.

One 500-ohm "Spirohm" resistance. (Dubilier.) 3s. 0d.

Twenty-eight fixed condensers (Dubilier):

- Six .0001 mfd., type 690W 4s. 0d.
- Eight .1 mfd., type 4603/S 10s. 8d.
- Three 1 mfd., type 4609/S 7s. 6d.
- One .04 mfd., type 4601/S 1s. 0d.
- Three .05 mfd., type 4602/S 3s. 9d.
- Two .01 mfd., type 4601/S and 691W 3s. 0d.
- Two 25 mfd., type 3016 3s. 0d.
- Three 8 mfd., type O281 13s. 6d.

Nine valves:

- One X.64
 - Three W.63
 - Two Z.63
 - One H.63
 - One KT.63
 - One U.50
- Osram International range.

One special energised loudspeaker, 1,600 ohm field, type A.C.9. (W.B.)

One plug and jack.

Connecting wire, nuts, bolts, shakeproof washers, flex and screening sleeving (Peto-Scott.)

Supply of 16 S.W.G. aluminium sheet for screens.

view of the receiver are main tuning (effected through an Eddystone dual-ratio slow-motion drive), band-setters for H.F. and frequency-changer, H.F. gain, I.F. gain, L.F. gain, and tone-control. The top

actually a 500-ohm Dubilier component with the end clip slipped along slightly, and this is adjusted when the receiver is first put into commission.

(Continued on next page)

(Continued from previous page)

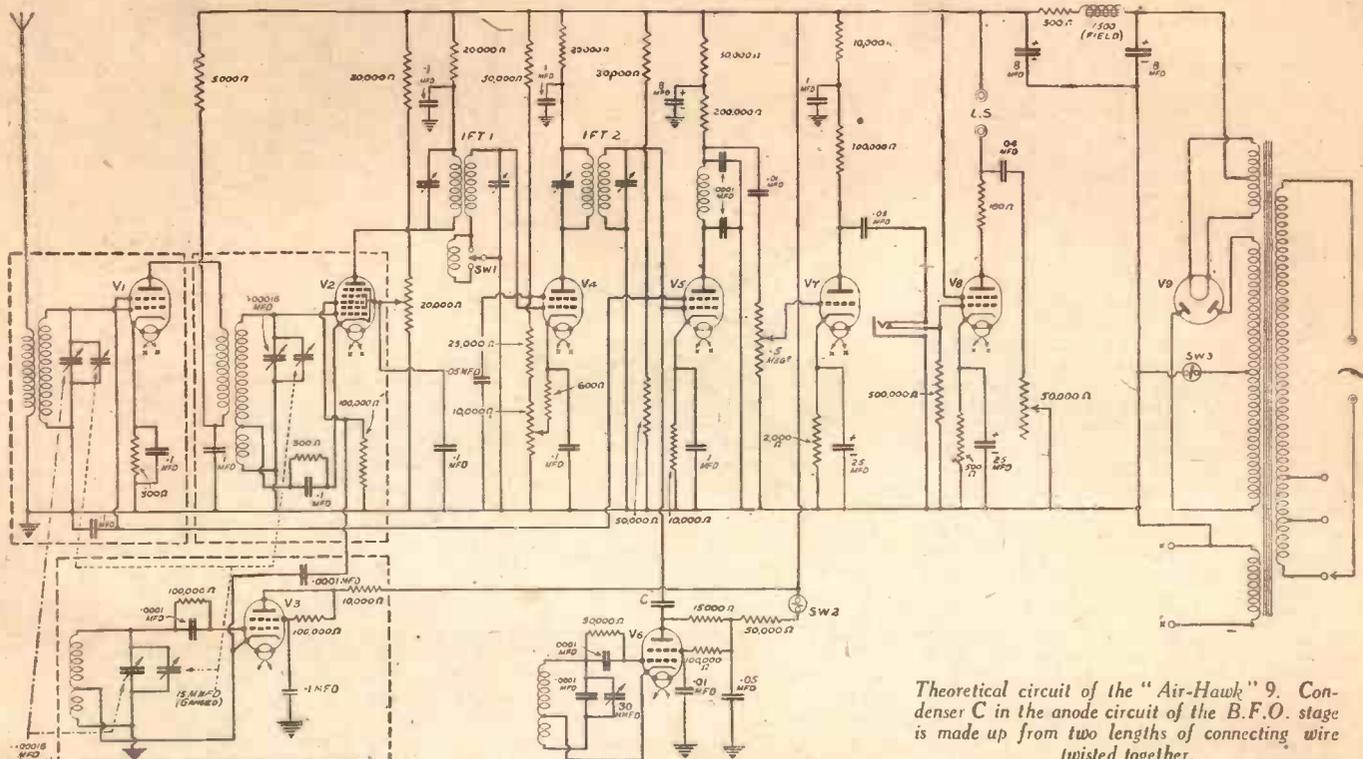
Additional Features

Incidental details in the main design are the use of special 6 to 1 slow-motion drives for the band-spreaders for which standard epicyclic drives, combined with Eddystone precision dials, are used, and the adoption of extension controls which are cut and adapted to the special requirements of this receiver. The chassis and all metal screening partitions are carried out in 16 S.W.G. aluminium, whilst the panel

is 14 S.W.G. material finished in black crackle. The receiver is perfectly rigid if made with these gauges, but if anything thinner is employed it will probably be found that the chassis will become distorted if it is turned about much during testing and short-circuits may result. To avoid any risk of the latter trouble, even with the thick material, two insulating pillars have been mounted on the underside of the chassis, and the H.T. positive lead is of bare wire anchored between these two pillars, with all H.T. points connected to

this at the nearest available point. When not required for use, the receiver should, of course, be switched off at the mains, and it is assumed that the mains lead from the set will thus be connected to a point provided with a suitable switch. Alternatively, an ordinary toggle switch may be mounted on the rear runner of the chassis, close to the mains input socket.

A list of components is attached, and full constructional details will be given in next week's issue.



Theoretical circuit of the "Air-Hawk" 9. Condenser C in the anode circuit of the B.F.O. stage is made up from two lengths of connecting wire twisted together.

IMPORTANT BROADCASTS OF THE WEEK

NATIONAL (261.1 m. and 1,500 m.)
 Wednesday, November 23rd.—Symphony Concert from the Queen's Hall, London.
 Thursday, Nov. 24th.—My Music: programme selected from music dedicated to Joseph Lewis.

Friday, November 25th.—I Pagliacci: opera by Leoncavallo; new English translation by Proctor Gregg.
 Saturday, November 26th.—Manchester November Handicap; a commentary on the race from Castle Irwell, Manchester.

REGIONAL (342.1 m.)
 Wednesday, November 23rd.—Dance Cabaret from the Grand Hotel, Torquay.
 Thursday, Nov. 24th.—Dance Band programme.
 Friday, November 25th.—Famous Music Halls: The Scotia, Glasgow.
 Saturday, November 26th.—Choral programme.

MIDLAND (297.2 m.)
 Wednesday, November 23rd.—Paul Temple and The Front Page Men, a serial thriller: Episode 4, Paul Temple receives a warning.
 Thursday, November 24th.—Advent Carols and Hymns from St. James' Church, Handsworth, Birmingham.

Friday, November 25th.—Brass Band Question Time.
 Saturday, November 26th.—The Microphone at Large: the ancient wool-stapling town of Fairford.

WEST OF ENGLAND (285.7 m.)
 Wednesday, November 23rd.—The Use of the Land: The Position To-day—a discussion.
 Thursday, November 24th.—Instrumental programme.
 Friday, November 25th.—A Visit to the Quarterly Meeting of the Federation of West Country Farmers; this imaginary body will discuss Milk and Milk Marketing.
 Saturday, November 26th.—Soldiers' Tales—1, some anecdotes of soldiering experiences in India and Ireland in the days of the Black and Tans.

WELSH (373.1 m.)
 Wednesday November 23rd.—Opening of the Temple of Peace in Cathays Park, Cardiff.
 Thursday, November 24th.—Llenyddiaeth a Bywyd Cymru Heddiw. (Addresses on Modern Welsh Life and Literature, from a special meeting of the Honourable

Society of Cymmrodorion in London, "Young Wales" Hall, Mecklenburgh Square, London.)
 Friday, November 25th.—Choral programme from New Siloh, Landore.
 Saturday, November 26th.—Richard Savage, a play by Gwyn Jones.

NORTHERN (449.1 m.)
 Wednesday, November 23rd.—Dance Band programme.
 Thursday, November 24th.—A Northumbrian Kern Supper (a Harvest-home supper).
 Friday, November 25th.—Captain Murderer, an essay in the Macabre.
 Saturday, November 26th.—Songs from the North-east Amateur Shows.

SCOTTISH (391.1 m.)
 Wednesday, November 23rd.—Aberdeen Orchestral Music Club, from the Music Hall, Aberdeen.
 Thursday, November 24th.—Reid Symphony Concert from the Usher Hall, Edinburgh.
 Friday, November 25th.—Scottish Dance Music.
 Saturday, November 26th.—Out of the Blue, a featurette of blue melodies.

"If I Were Director-General of the B.B.C."

The following are the Prize-winning Letters in Thermion's Competition

More "Low-brow" Material

MY first task would be to examine programmes broadcast during the past year. Present-day programmes (with special reference to brighter Sunday entertainment) are still wide open to public criticism. Consequently, the result of my examination would give me the reason why! In the past, considerable comment and varied opinions have been expressed through the Press about certain material or items broadcast. These items I will term High-brow. Throughout the daily broadcast, this type of music and other entertainment of the same kind has to be endured by all listeners whether they like it or not. The only alternative for those that dislike it is to switch off or tune to a foreign station. As this happens frequently it proves to me that the programmes are not arranged to suit all classes.

Why? That is the next question I must solve.

Answer. Because I or the different departments concerned with programme arranging are either restricted or not able to select programmes to suit all tastes.

Assuming departments are at fault, my duty would be to reorganise them and devise a system fair to all listeners. First of all, I would divide the listeners into three classes, namely:

1. High-brow; 2. Low-brow; 3. Intermediate.

No. 1 needs no introduction, No. 3 enjoys listening either to one or the other, so that No. 2 remains to be investigated.

I feel sure that a searching inquiry into the habits, recreation and choice of wireless entertainment of this class of listener would provide a solution to the whole problem.

To get in touch with them I would engage persons who have spent their lives amongst them and are fully conversant with their mode of living.

From these persons I would select representatives to take the places of those not qualified to represent this section of the public.—A. VINCENT (Ossett).

Comprehensive Plans

I WOULD concentrate attention on the following:

Finance: Limit number of broadcasting stations as follows: England two, and one each for Wales, Scotland and Northern Ireland, all higher powered than at present, so as to bring all within range of all listeners owning reasonable receivers. Lessen number of relay stations and hand them over to be State controlled per P.M.G., for which service he would be granted a slightly increased percentage of the wireless revenue. These factors would allow me increased revenue for B.B.C., 80 per cent. of which would be divided equally between the five stations. Remunerations in all departments would be on a sliding scale.

Staff: The director of each station would be responsible for his station's broadcast. I would make the early acquaintance of directors and staff, emphasising that all make their job a whole-time job.

The heads of certain departments would meet two days each month to collaborate in their respective productions.

Organisation: Each Director would be encouraged to introduce "controlled local option" into his programme. Each station would be closed one evening weekly at 6.30 p.m. The 6 p.m. "News" would be General Relay. No two stations be allowed to broadcast similar type programme at the same time after 4 p.m. General relays



Mr. F. W. Ogilvie, the present Director-General of the B.B.C.

would be granted in matter of national importance only. Items must be strictly timed so as to discontinue "fading out."

Broadcast Personnel: Audition granted, and approved or otherwise upon joint recommendation of member of General Staff and member of local staff of the particular department. All broadcasting personnel throughout the country to be on collateral sliding scale of pay.

Staff disagreement, or artistes' grievances at any one station, to be "stated" to a meeting of directors of the other stations and nominee of Director-General.—D. E. JONES (Wrexham).

No "Jazz"

IN the extraordinary event of my becoming Director-General of the B.B.C. I would introduce the following changes. I would mix as much as possible with ordinary "listening" people and attempt to extract their criticisms of the programmes, also encouraging listeners to send in their ideas

and criticisms. I should first start by improving the Sunday transmissions by including light comedy now and then or a drama by a well-known writer. I would have a couple of the Regional transmitters broadcasting alternative programmes to those of church services which are broadcast. I maintain that a person who is really wholehearted and genuine about his religion will actually go to a church and not just listen in. (I presume that the majority of listeners are able-bodied and are not invalids.) A fair amount of light and also serious music would be heard on Sunday. I would try to arrange the timing of the programmes from the different Regional and National transmitters better on week-days. As I look at the *Radio Times* at this moment (Wednesday, October 26th) I see that from National at 8.15 there is a B.B.C. symphony concert and at the same time from London Regional, "Band Waggon" is on the air, both of which items I particularly desired to hear. This is a frequent fault on the part of the B.B.C. Next, I would cut out the clanging, tolling, noisy interval bells and either introduce some system of musical notes as some of the Continental stations do, or else have dead silence; or I might introduce the playing of "Rule Britannia," which would be much preferable to the bells. More "local" talent and colour would be heard in the Midland, Scottish and N. Ireland, etc., Regional transmitters instead of tapping the programme mainly from London Regional. The last, and one of the most important changes, would be to bar so much crooning and jazz from variety programmes and for that matter from much of the programmes. After all, one can obtain such, if one desires it, at any time of the day, but comedy and variety cannot be heard nearly so frequently and it annoys one, when sitting down to enjoy some fun, to be offended by a husky, effeminate, half-baked, uneducated crooner who moans and sobs into the long-enduring "mike."

I am a schoolboy of sixteen years of age and I jump with joy every week when I read your comments on the swing-music "musicians"!!!! etc.—G. H. MAHOOD (Belfast).

Sunday Programmes Again

IF I were fortunate enough to secure the position of Director-General of the B.B.C., I would make a series of reforms.

The first would concern the length of the daily transmissions. I feel sure that a little light entertainment would be appreciated by all those who go daily to work. Hence the morning broadcast would begin at 8 a.m., following, of course, with the Church service at 10.15 a.m. If this involved more expenditure, I am sure that nobody would grumble at a small increase in the licence, for a few more hours of entertainment each day.

I also consider that the Sunday programmes do need improving. By improvement, I do not mean transforming Sunday into a day of "ridm," but a programme containing such items as interesting plays, modified variety, and outside broadcasts (of a rural kind).

New talent also needs greater encourage-

(Continued on page 274)

AMAZING N.T.S. RADIO BARGAINS

POST ORDERS

ALL ORDERS SENT BY RETURN. CARRIAGE AND C.O.D. CHARGES PAID OVER 10%. PLEASE REGISTER CURRENCY AND CROSS P.O.s.

• RIGHT PRICE XMAS OFFERS • REPLACE YOUR OLD SET
• SELL AGAIN AT A PROFIT • SECURE NOW A SECOND RADIO AT A BARGAIN PRICE • ALL ORDERS COVERED BY USUAL N.T.S. COMPLETE SATISFACTION GUARANTEE.

CALLERS

ALL ADVERTISED LINES AVAILABLE FROM OUR LONDON ADDRESS. CALL IN FOR LISTS.

NEW 1938 4-Valve A.C. S.G. Bandpass RECEIVER

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Latest 4-valve S.G. bandpass circuit. Amazing station-getter with exceptional selectivity.

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BARGAIN, 52/6, or yours for 5/- down and 11 Mains Speakers offered, quite suitable.

SHORT-WAVE BARGAINS. See previous announcements and send for the new and revised N.T.S. SHORT-WAVE BOOK. Tell your friends also about this special page of N.T.S. RIGHT PRICE RADIO OFFERS. COMPLETE ILLUSTRATED LISTS FREE.

POWERFUL CLASS "B4" ALL-WAVE CHASSIS Complete with Valves

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or 5/- down, balance in 15 monthly payments of 6/-.

A snip not to be missed. Volume and range equal to a mains set. 3 wavebands, 18-2,100 metres. Efficient S.G. Bandpass circuit.

Station-name dial. Screened coils. Chassis size 11½ins. wide, 9½ins. high, 8½ins. deep. Complete with 4 matched valves. Guaranteed, fully tested. Available with matched moving-coil speaker, cash or C.O.D., £4.10.6, or 5/- down and 18 monthly payments of 6/3



ONLY A FEW LEFT

S.G.3 BATTERY ALL-WAVE CHASSIS

Appearance as Class "B" illustration above. Highly efficient V.M., H.P. Pentode, Det. and distortionless output pentode circuit. World-wide reception. Waverange 18-2,100 metres station-name dial. Wonderful volume. Low H.T. consumption. Complete with 3 valves, knobs and escutcheon. Brand new, rigidly tested before despatch.

LIST VALUE £6:6:0

BARGAIN 69/6

or 5/- secures, balance in 15 monthly payments of 5/-

B.T.S. ADABAND FURTHER AMAZING PURCHASE



YOUR SET SIMPLY RESTS ON TOP

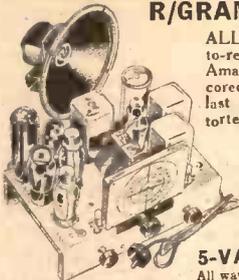
13-74 metres. Connect the Adaband to

your battery set and tune in the pick of the world's short-wave broadcasts. External connections only. Complete with valves Brand new, fully tested. Yours for 5/- down and 11 monthly payments of 4/-.

LIST VALUE £5:5:0

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BRAND-NEW 1939 CHASSIS 6-Valve ALL-MAINS S/HET R/GRAM CHASSIS with VALVES and CELESTION SPEAKER



ALL WAVES, 16-2,000 metres. Easy-to-read station-name illuminated dial. Amazingly efficient 6-stage circuit with iron-cored I.F. transformer. Pentode valve in last stage providing over 3 watts undistorted output. A.V.C. and volume control.

A thermal controlled resistance valve automatically controls supply voltage. Chassis size 11ins. wide, 7½ins. deep, 8½ins. high. Supplied complete with specially matched Celestion speaker with 8in. cone, giving wonderfully natural reproduction right up to the full output. Despatched with all valves, knobs and escutcheon. Guaranteed fully tested for A.C. or D.C. supplies 200-250 volts. Yours for 5/- down and 18 monthly payments of 7/11.

LIST VALUE £9.19.6

BARGAIN 6 GNS.

5/- DOWN.

5-VALVE A.C. ALL-WAVE S/HET 7-stage s/het circuit. All waves 18-2,000 metres. Station-name dial! A.V.C. and tone control. 3 Watts output.

Complete with 5 valves, knobs and escutcheon, less speaker. List value £8.18.0. **BARGAIN 52/17.6**. Yours for 5/- down balance in 18 monthly payments of 6/3. To tour the world is simple on this amazingly efficient all-wave superhet. Wonderful selectivity and quality reproduction. P.U. sockets. No-trouble wave-change and gram switching. Chassis size, 11½ins. wide, 8½ins. high, 9½ins. deep. Ready to play: for A.C. mains only, 200/250 v. With specially matched Rola moving-coil speaker, Cash or C.O.D., £6.5.0, or 5/- down and 18 monthly payments of 7/11.

1939 SETS LESS THAN COST PRICE FAMOUS-NAME ALL-WAVERS



N.T.S. SATISFACTION GUARANTEE. Ready to play.

4-Valve A.C. S/HET

List value £8.19.6

BARGAIN 5 GNS.

Yours for 5/- down and 18 monthly payments of 7/-.

This modern-to-the-minute handsome, highly efficient famous-name All-wave A.C. high receiver is yet another example of the marvellous value only obtainable from N.T.S. Simple to tune. Wave-range 18-2,100 metres. Exceedingly high order of sensitivity for world-wide reception and wonderful selectivity. Calibrated dial, metres and station names. Three-watts output. Sensitivity and volume control. High fidelity moving-coil speaker. Superb walnut veneered cabinet. Illustrated, size 18½" h., 14" w., 10" deep. For A.C. mains only, 200/250 v., 40/100 cycles. In sealed carton, guaranteed, fully tested.

5/- DOWN

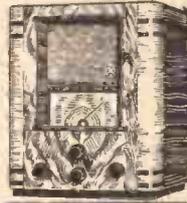
BATTERY SUPER S.G.3

This superb receiver, as illustrated below, will give you programmes from all over the world. Circuit comprises V.M.H.F. Pentode, High Efficiency Detector and Harries distortionless output Pentode. 4 Wave-ranges. 14-2,100 metres. Station-name dial. Exquisite walnut cabinet measuring 19½ins. high, 16ins. wide, 11ins. deep. Tone-compensated moving-coil speaker fitted. YOU MUST HURRY TO SECURE THIS BARGAIN.

List value £8:15:0

BARGAIN £4:19:6

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4-VALVE SUPER BANDPASS BATTERY and A.C. CHASSIS

- Amazing selectivity and sensitivity
- Wide choice of foreign stations
- Efficient S.G. Bandpass Circuit
- Illuminated station name dial



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BATTERY MODEL. Powerful and efficient 4-valve circuit comprising V.M.H.F. Pentode, Det., Class "B" driver and Class "B" output stages. Volume equal to mains set (very low H.T. consumption). Waverange 200-2,000 metres. Chassis size 11½ w., 7½ h., 9" deep. Fully tested, complete with 4 valves, less speaker.

List Value **BARGAIN 55/- OR 5/- DOWN** balance in 12 monthly payments of 5/-.

A.C. MODEL. Amazing offer [which should not be missed]. Highly efficient S.G. Bandpass arrangement providing over 3-watts output. Marvellous station-getter on 200-2,100 metres P.U. sockets. Size as above. Fully tested, complete with 4 valves. For A.C. mains 200/250 volts. Less speaker.

List Value **BARGAIN 55/-** £5:15:0

balance in 12 monthly payments of 5/-.

5/- DOWN

SEE BARGAIN SPEAKERS BELOW

ALL-WAVE A.C. 4-VALVE BANDPASS S.G. CHASSIS BRAND NEW—COMPLETE with 4 Valves

LIST VALUE £6:10:0

SPECIAL BARGAIN 79/6

Yours for 5/- down and 15 monthly payments of 6/-.

4-Valve A.C. Chassis with 3 wave ranges 18-2,000 metres. Bandpass tuning. Air-plane illuminated dial (stations and wavelengths) with slow-motion drive. Low-capacity switch with silver-plated contacts ensuring trouble-free switching. 4 British valves comprise: Variable mu H.P. pentode, screened grid detector, high efficiency output pentode and rectifier. Sensitivity and volume controls. 3-Watts undistorted output. Gramophone pick-up sockets. Size 11½ in. wide, 8½ in. high, 9 in. deep. Complete with valves and knobs. Guaranteed fully tested. ORDER EARLY AND AVOID DISAPPOINTMENT.

BATTERY MODEL 4 WAVEBANDS: 14-31, 28-62, 200-550, 900-1,200 metres. Slow-motion drive, 8-1 and 100-1: Low capacity switch; Airplane dial (stations and wavelengths); Provides reception from all parts of the world. Variable Selectivity. Stove enamelled steel chassis, size 11½ in. w., 9 in. h., 9 in. deep. Screened coils. Low H.T. Consumption. Each chassis supplied complete with Screen Grid, Detector and Pentode output valves. Fully tested on all wavebands before despatch. An excellent bargain you must not miss. LIST VALUE 6 gns. Yours for 5/- down and 15 monthly payments of 5/-.

SPECIAL BARGAIN 65/- CASH, C.O.D. CARR. PAID.

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BARGAIN MOVING-COIL SPEAKERS

Famous name makes forming part of above special set and classic purchases. High fidelity matched P.M.'s and mains energized types for battery and A.C. receivers offered above. **12/6 ALL ONE PRICE**

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"IF I WERE DIRECTOR-GENERAL OF THE B.B.C."

(Continued from page 272)

ment. I do not think that anybody would object to a programme given each week to new voices. This, as well as being interesting to the listeners, would give opportunities to the many actors who are struggling to gain fame.

Nowadays, there is a wireless set in nearly every home, and radio "pirates" are far too common. If I were the head of the B.B.C., I would try to make every purchaser of a wireless set produce a licence before doing so. Also, as well as an increase in wireless vans for detecting these pests, a special man would make a periodical visit to every home to see the licence. I am sure that the honest folk would not object to this, if it helped to abolish a radio "menace."

Finally, listeners' letters of criticism would be considered carefully, and these would be encouraged, as the B.B.C. is for the public's pleasure.

Thus I would endeavour to justify my position as head of the B.B.C.—H. W. GRIFFITHS (Manchester).

No Back-scratching!

AFTER listening to the haphazard ramblings of Continental broadcasting, and the high-pressure salesmanship of sponsored programmes, it is hard to find a genuine grievance against the B.B.C.

They have a difficult job to do and, in my estimation, are doing it as well as it is possible, to please most of the listeners most of the time. Obviously it is impossible to please all the listeners all the time, and although we all grumble at the B.B.C. at different times, we must admit that as entertainment we get very good value for our ten bob.

The only thing that irritates me is the continual praising of their own producers, composers, etc., whereas the independent producers or composers receive hardly a mention, and then only grudgingly.

So were I Director-General, I would make it my first job to cut out this policy of "I'll scratch your back if you'll scratch mine." Then perhaps we will be able to hear some really good productions, without the orgy of bouquet throwing and back slapping which now seem to be the main reasons behind most programmes.

Only a little thing you might say. So it is, but it will grow and grow until eventually it will entirely suppress outside talent.

Yes, I think the D.G.'s first job is quite clear.—PETER B. CREEGAN (Swansea).

A Language Problem

YOUR announcer is the elocutionist of to-day, and his speech must be perfect, and splendid English.

Why press into your announcer's sheet a compendious news report when his speech has to be reproduced? In its transmission it is magnified, electrified and rectified, and when it reaches the listeners' ears it is not so quickly picked up as pure speech with its gestures. Even in unreproduced speech the speaker must regulate the frequency of his speech to make it intelligible.

Speech that is hurried with the object of packing into it voluminosity is often scurrilously rendered and is badly articulated—to the chagrin of the listener.

Educate the people to the beauty of your language. To anticipate the tastes and predilections of your listeners is a high calling. To be masters of the arts is the requisite of all broadcasters. Even in the humble contributors one traces sublimity.

Supply your prospective broadcasters with a memorandum of the art, emphasising the measure, and rhythm, best adapted to the microphone.

Lend a little of your linguistic acquirements to your listeners. Linguistic knowledge is sought by many. Give the accent of foreign places in their native expression, with explanation where the word is spoken differently in English.

Let no people misunderstand us. Send out to them in their own language the trend of our affairs, and the dispositions of our people on world affairs.

To pay fabulous sums to half-witted comedians' alleyings; to subsidise croakers, who croon only to themselves; to allow stance to renderings of compositions which by their flat dissonance are a travesty of melody, is a fantasy of an enlightened age.

Protect your appreciative listeners by loosening your tiger-rag when they are securely ensconced in their beds.

To cater for all; but let your programmes be dominated by the fair arts of all interests. Hallow the Sabbath day; let the eloquence of inspiring speech and music lilt on their minds, to restore them to the tasks facing them.—W. E. PALMER (Leicester).

Those readers whose letters are reproduced above must select a wireless book from our list and send a postcard naming their selections.—Ed.

NEW RECORDS

RICHARD TAUBER has chosen two famous old Irish songs for his latest recording, both of which he sings in English. They are "Mother Machree" and "Rose of Tralee" on Parlophone RO 20408.

A recording of Brahms' celebrated "lullaby" "Ainsi Ou'un Très Vieux Refrain" is supplied by Ninon Vallin, soprano, on Parlophone RO 20409. The coupling is "Violon du Soir," a gipsy song based on Brahms' Hungarian Dance No. 4 in F minor. Both songs are sung in French with piano accompaniment.

A number of interesting records appear in the Parlophone 10in. Classic Series, tenors being much in evidence. Herbert

E. Groh, tenor, sings "Ballroom Whispers" and "Waltz Song," both in German on Parlophone R 2571, whilst another tenor, Joseph Schmidt, sings "Love's Longing" and "The World Belongs to the Young" both tunes being from the film "The World Belongs to the Young," on Parlophone R 2572. An amusing record in this series features the popular radio humorist Ronald Frankau, who, accompanied by Monte Crick at the piano, has recorded "Upper Class Love" and "Brevity is the Soul of Wealth" on Parlophone R 2577.

Leslie A. Hutchinson, another popular radio star who is better known as "Hutch," has made two new records this month. The first is "Now it Can be Done" from the film "Alexander's Ragtime Band" coupled with "It's d'Lovely" from the film "The Fleet's Lit Up"—Parlophone F 1244—and the other "I Hadn't Anyone till You" and "Red Maple Leaves" on Parlophone F 1245.

LETTERS FROM READERS

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

W.B. Speaker Prize

SIR,—Very many thanks for the W.B. speaker awarded to me in your recent competition. Now I know the reason why it is so often specified by you for your sets. I have been a reader of PRACTICAL AND AMATEUR WIRELESS since No. 1, and during that time I have made a number of sets from particulars given in your paper. Wishing PRACTICAL AND AMATEUR WIRELESS continued success.—H. TWINN (Dagenham).

A Car-radio Hint

SIR,—I feel I must defend my article "A Car-Radio Hint" against the adverse criticism which appears in the November 12th issue of PRACTICAL AND AMATEUR WIRELESS.

It was definitely recommended not to go beyond the stated resistance for the reason your correspondent points out. Furthermore, I feel the same correspondent cannot be aware that most so-called 6-volt dynamos will increase up to 40 volts without damage.

With regard to the second letter, I must admit paragraph one, but at the same time, it was stated that a 6-volt cut-out should be used!—HUBERT B. SADEN (Hornchurch).

A DX Log from Scotland

SIR,—I append a log, from a Scottish reader, of DX stations received here during the past few months, for all of which verifications have been received. The RX in use is an 0-v-2 (the Prefect Three) and reception was on 'phones:—

VE2EA, VE2CP, VE4SS, VE5CP;
W2IXY, W3CHF, W4DRZ, W4BYY,
W4BJ, W5BOC, W7ALZ, W7BVO,
W9IAC, W9NLP, W9MM; OA4C, LU8AB,
NY2AE, VP6YB, VR6AY, VO6J,
CO2LY, CO6OM, CT2BC, SU1AM,
SU1KG, K4SA, K4ENY, K4EMG,
VK2XU, VK3WA and CN1AF.

I wonder how many of your readers possess the attractive card of SU1AM, and the valued one of VR6AY?

It may interest readers to know that CN1AF has a nice QSL, one of which I received on November 10th, 1938. The QSL I received was contained in an envelope stamped with 1½d. Coronation Stamp, 1937. On the outside of the envelope was given the operator's QRA: "Jose M. Sierra, C.N.I.-A.F., 19, Rue des Sources, Tanger (Zone Internationale).

I am a member of the B.L.D.L.C., and my method of corresponding with DX stations is to record details of from six to twelve contacts by one station over a period of, say, one week, and then write giving full details of reception. This method is nearly always answered with "Many thanks for very detailed and valuable report, which checks my log."—B.L.D.L.C. 5340.

Correspondent Wanted

SIR,—I would like very much to correspond with any other reader of your most helpful paper. I am sixteen years of age, and I do not know a great deal about set-building of any description, although I possess quite a lot of "junk," some of it useless, and the rest O.K., as far as I know. Short-wave listening is my favourite topic. If some interested reader would oblige me with a line I would be most grateful.—V. E. ROBERTS, 17, Lower Spring Road, Longton, Stoke-on-Trent, Staffs.

Teaching the Morse Code

SIR,—Many amateurs appear to have some difficulty in obtaining suitable practice and tuition in the morse code. I should like to offer my help (through PRACTICAL AND AMATEUR WIRELESS) to any readers who may be living in the Southend-on-Sea district. I have been a qualified instructor in the Royal Corps of Signals for fourteen years, and make this offer purely because of my interest in wireless and signalling. This service will be entirely free of any charge.

I shall be pleased to hear from anyone interested who cares to write to me at the address given below.—W. BRADBURY, 16, Wakering Avenue, Shoeburyness, Essex.

A Mains Three-valver

SIR,—I heartily endorse Mr. R. A. Reeve's suggestion for a mains three-valve set using home-constructed components. Making such a set would give many readers far more pleasure than putting together a set of bought components.

I should also like to see more "How to Make" articles like the recent "Stand-by Mains Transformer" and "Output Transformer" articles, for which many thanks.

One good point of Mr. Reeve's suggestion is that he specifies a mains set. I think a lot of constructors keep off the mains because of the extra expense, but a home-made set, as suggested, would not cost much, and might start off many battery-set users on to the mains to their own benefit.—A. F. WATSON (Stoke, Hayling Island).

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

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Westinghouse £40 RGCI as illus. New condition with auto safety circuit breaker, size 20" x 24" x 27" for H.T. ½ amp. and 120 Radio Cells and 3 Car Batteries at once. Earns big money.

150 v. 250 m/a for H.T. Cells, 60 cells at ½ amp., 60 cells at 1 amp. and 40 volts at 5 amps. Extra circuit breaker and supply switch guaranteed 5 years. £21/10/-.

MODEL R. WESTINGHOUSE single circuit, wall type, 9" x 10" x 11", 230 v. A.C. for D.C. 100 v. at 500 m.a. Sale £5/10/-.

WESTINGHOUSE 200/250v. A.C./D.C. METAL RECTIFIERS. Wall type "R", Steel case, 12in. by 19in., A.C. mains to D.C. 40 volts 3 amps. for 40 Radio Cells. Guaranteed. £7/7/6. Similar one for Car Battery Charging. 15 volts 6 amps., D.C. output, £8/17/6. Fine model also for A.C. mains with D.C. output of 280 volts, 250 m.a., £7/2/6. Two 50-volt circuits, each of 750 m.a., D.C. from A.C. mains, is another bargain at £8/10/-.

UNITS ONLY. Westinghouse Metal Rectifier Units, 110 v. 75 amp., 35/-. 55 volts 1.5 amp., 37/6. 20 volts 3 amps., 40/5. 9 volts, 2 amps., 26/-.

HOME RADIO AND CAR CHARGERS. The A.C. NITNDAY will keep your battery fit without attention. Model N/86 100/250 volts A.C. and D.C. 6/8 volts ½ amp., 15/-. Model N/86 100/250 volts to D.C. 6/8 volts 1 amp., 25/-. Model N/86 100/250 volts to D.C. 6/8 volts 2 amps., 35/-. Model N/D12. 100/250 volts to 12 volts 1 amp. 6 and 12 volts 2 amps. 55/-. 5 amps., £4/10/-.

Fine DAVENSET A.S.C.4, as illus., 4 circuit charger for up to 80 cells. The A.C. NITNDAY will keep your battery fit without attention. Model N/86 100/250 volts A.C. and D.C. 6/8 volts ½ amp., 15/-. Model N/86 100/250 volts to D.C. 6/8 volts 1 amp., 25/-. Model N/86 100/250 volts to D.C. 6/8 volts 2 amps., 35/-. Model N/D12. 100/250 volts to 12 volts 1 amp. 6 and 12 volts 2 amps. 55/-. 5 amps., £4/10/-.



Two A.C./D.C. DAVENSET CHARGERS Type S.P.C. for 220 volts A.C. to 250 volts 250 m.a. D.C., fitted Ferranti meter and 20 volt regulator. As new, £6/17/6.

TUNGAR CHARGERS. Two of these famous sets. One for 70 volts, 6 amps, with meters and controls, etc., will handle 100 cells a day. £7/17/6. Another fine Tungar for two 5 amp. circuits with meters and variable volt controls, 75 volts, 10 amps. for 900 cells. Bargain, £12/15/-.

Other Chargers. Crypton "SERVICE 3" similar to above but 3 circuits of 12 cells each at 1 amp., 2 amps. and 3 amps. 30 volts 6 amps. max. For 70 radio cells, Crackle black steel case, £8/15/-.

Larger PHILLIPS Model 1081 of 12 volts 10 amp., £7/10/-.

MAINS CONVERSION UNITS. For operating D.C. from A.C. mains, screened and filtered, 120 watts output, £2/10/-.

THERMATEX. Charges by heating. A.C./D.C. 230 v. to 2 volts 1 amp., 30/-.

A.C. ROTARY CHARGERS. 3 phase Motor 200 volts to D.C. Dynamo 8 volts 15 amps., 24/17/6. R.C.A. 3 ph. Motor 220 volts coupled to D.C. Dynamo 500 volts 200 m/a., 25/10/-.

Metvick 3 ph. 1 h.p. Motor coupled to D.C. Dynamo 12 volts 30 amps., £6. Single phase to D.C. Higgs 230 volt A.C. Motor coupled to D.C. Dynamo 8 volts 16 amps., £7/10/-.

300 CELL A.C. CRYPTO MOTOR-GEN. SET. Radio and Car, £32. D.C. CHARGING OFF D.C. MAINS. £14 Davenset DC2 Steel Case £200/250 v. Charger, large meters, wheel controls, 2 circuits, 1 amp. and 3 amps. as new, sale price 25/10/-. Others, all sizes, in stock. State load required.

D.C. ROTARY CHARGERS, 3 h.p. 220 volt D.C. Motor 6 volt 250 amp., Dynamo, £16. 200 volt motor 25 volts 8 amp., dynamo, £4. Motor 220 volts 8 volts 50 amps., dynamo, £6/10/-.

And others up to 6 kW.

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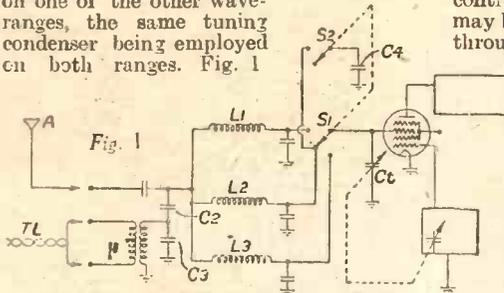
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WIRELESS RECEIVING CIRCUITS.—Johnson, G. W. (Philco Radio and Television Corporation). No. 490138.

In a multi-band superheterodyne receiver, one of the tuning coils is utilised for suppressing image frequency and such undesired signals when the receiver is working on one of the other wave-ranges, the same tuning condenser being employed on both ranges. Fig. 1

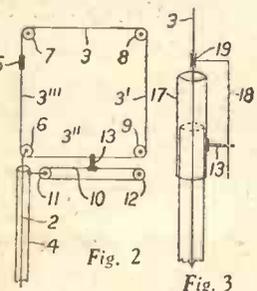


shows the input circuit of a receiver adapted for three wave-ranges by coils L1, L2, L3 associated with the main tuning condenser C2, the input being taken either from an aerial A or transmission line TL. The wave-range switch S1 is conjointly operated with a switch S2 whereby when receiving on the long-wave band (contact 1) the medium-wave coil L2, in series with condenser C4, forms a series acceptor circuit across the input, the circuit being tuned to the lower end of the image frequency band corresponding to the long-wave band. For undesired signals at the higher end of the image frequency band, the impedance of condensers C2, C3 will be small and will greatly attenuate these frequencies; this effect is increased by slightly coupling L1 and L2. In a modification (not shown) where only two wave-bands are concerned, each coil is made to serve as part of the image frequency suppressor circuit of the other, the long-wave coil padding condenser being permanently across the coil and serving to tune it as a parallel rejector circuit at the image frequency. Specification 277799 [class 40 (v)] is referred to.

AERIALS.—Telefunken Ges. fur Drahtlose Telegraphie. No. 490192.

An aerial is matched to a feeder for any desired wavelength by making the aerial of variable effective length so that the aerial resistance may be made equal to the feeder image impedance; a variable reactance in parallel with the feeder at the foot of the aerial, neutralising the aerial reactance. The aerial, Fig. 2,

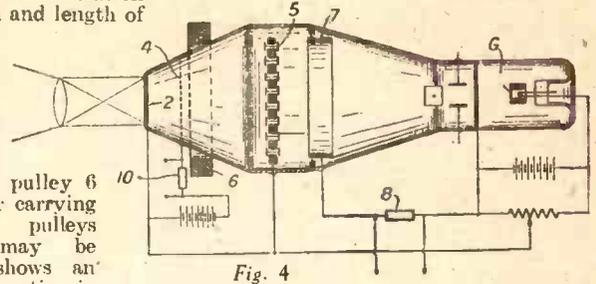
consists of a wire rope 3, 3', 3¹¹, 3¹¹¹, passing over pulleys 6, 7, 8, 9, and closed on itself by an insulator 5. The feeder 2, 4 is connected to pulley 6, and an endless wire rope 10 together with the side 3¹¹¹ of the aerial loop form a lecher-wire system in parallel to the feeder. Rotation of pulley 12 alters the length of the lecher pair by shifting the short-circuiting member 13. The effective radiating length 3¹¹¹ from pulley 6 to the insulator 5 is



similarly adjustable. The aerial and lecher-wire may, alternatively, be formed of one wire rope, in which case a linear relation results between aerial length and length of short-circuited line. If more accurate matching is required with a single manual control, pulleys 9, 12, Fig. 2, may be mechanically coupled through a suitably shaped cam. To reduce the capacity to earth of pulley 6 an insulating member carrying a number of pulleys of small size may be employed. Fig. 3 shows an embodiment of the invention in which the effective length of the aerial 3 is adjusted by the sliding tubular conductor piece 17. The adjustable reactance is formed by conductor 18, slidable on the aerial at 19 and the short-circuiting member 13.

CATHODE-RAY TUBES.—Fernseh Akt.-Ges.—No. 490391.

A mosaic electrode 5, Fig. 4, scanned by a cathode-ray from a gun G to develop picture signals receives an electron image from the photo-electric cathode 2, and the



The photo-electrons are accelerated by a grid 4 to such velocity that secondary emission charges the mosaic elements positively, the secondary electrons being collected by the grid 4 to give a potential across an impedance 10, corresponding to the average picture brightness. The mosaic is double-sided as shown and those electrons from the gun G which are not required to neutralise the positive charges on the mosaic elements cause secondary emission to a ring 7 giving negative image signals across a resistance 8. Specification 442666 is referred to.

NEW PATENTS

These particulars of New Patents of interest to readers have been selected from the Official Journal of Patents and are published by permission of the Controller of H.M. Stationery Office. The Official Journal of Patents can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 1s. weekly (annual subscription £2 10s.).

Latest Patent Applications.

- 31408.—Baird Television, Ltd., Truefitt, E. V., and Grayson, H.—Radio receivers for television, etc. October 31.
- 31086.—Belling & Lee, Ltd., and Stafford, F. R. W.—Aerial systems for radio receivers. October 27.
- 31063.—Blumlein, A. D.—Television transmitting tubes. October 27.
- 31368.—Blumlein, A. D., and White, E. L. C.—Thermionic valve circuits. October 29th.
- 31149.—Fabbrica Italiana Magneti Marelli.—Inter-carrier noise-suppressors for radio receivers. October 27.
- 31289.—Jones, W., and Pye, Ltd.—Synchronising signal separating arrangements for electrical picture transmission systems. October 28.
- 31465.—Plessey Co., Ltd., and Pugh C. A.—Key-operated mechanism for tuning controls of radio receivers. October 31.

Specifications Published.

- 494677.—Baird Television, Ltd., and Gilbert, A. H.—Television or like systems.
- 494688.—Marconi's Wireless Telegraph Co., Ltd.—Reduction of noise in radio receiving and similar apparatus.
- 494734.—Murphy Radio, Ltd., and Baker, G. B.—Radio receivers.
- 494696.—Murphy Radio, Ltd., and Brayshaw, G. S.—Loud-speaking telephones.
- 494351.—Farnsworth Television, Inc.—Means and method of controlling electron multipliers.
- 494536.—Michaelis, E.—Television apparatus operating without phase distortion.
- 494620.—Farnsworth Television, Inc.—Scanning-apertures for image-dissection in television systems.
- 494375.—Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—Television receivers.
- 494459.—Radioakt.—Ges. D. S. Loewe.—Modulation circuit arrangement for television. (Addition to 472900.)

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

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THE AMATEUR TRANSMITTER
(Continued from page 260)

anode circuit, such as plugs and jacks, to allow one meter to be used for both circuits, as it is absolutely essential for it to be possible to take readings of the current consumption of each valve.

Adjusting the P.A.

The adjustment or tuning of the P.A. stage is quite simple; in fact, it is practically identical to that of the oscillator anode.

With the drive applied, i.e., the output of the oscillator, a low voltage should be applied to the P.A. anode and the variable condenser rotated until the resonant point is reached, when a well-defined dip in anode current will be produced, in the same manner as with the oscillator circuit. By the way, the curve showing the behaviour of the anode current of an oscillator, given in last week's issue, was wrongly marked. Incidentally, the anode current reading should have been on the vertical line and the dial readings on the horizontal base line.

The greater the dip produced the greater will be the drive applied, so the anode current meter can provide some indication of the output and coupling of the oscillator.

A more correct indication can be obtained by connecting a low-reading milliammeter in the grid circuit of the P.A. valve as shown by the cross in Fig. 3, the meter reading rising with increase in drive. This test can be applied before H.T. is switched on to the anode of the P.A.

The oscillator stage will, of course, be tuned in the normal manner before the coupling condenser is added, and readjusted when the coupling is brought into circuit. A reasonable amount of time should be spent in carrying out tests to determine the most satisfactory coupling point to the oscillator tank circuit.

Co-operation Circle

Here is a call from the Guildford district. P. D. H. of that town would like to get in touch with anyone interested in transmitting in his area, so come along someone and make contact with him.

What about the Midlands? Aren't there any readers in that part interested in this subject? Let's hear from you, it's far better to get in touch with other enthusiasts than to struggle along on your own.

Link coupling can, of course, be experimented with, but as this will necessitate the use of an additional tuned circuit in the P.A. stage, the question of space becomes a governing factor.

However, more about that next week. In the meantime, the A.A. circuit should be brought into use by means of the link coupling coil, which is now round the anode tank coil of the P.A. Quite a good approximation of the increase in power, or, in other words, the efficiency of the additional stage, can be obtained by noting if it is possible to light a lamp of higher wattage.

The same applies to the loop-lamp test.

THE TRIO-PEN S.W.2

IN the theoretical circuit of this receiver which was recently described the coil connections 1 and 2 were shown joined together. There should not, of course, be any connection between these two points. Terminals 6 and 4 on the coil unit were also shown in this circuit joined to the L.T. positive line instead of to the L.T. negative line. The wiring diagram is, of course, correct and should be followed when wiring the receiver.

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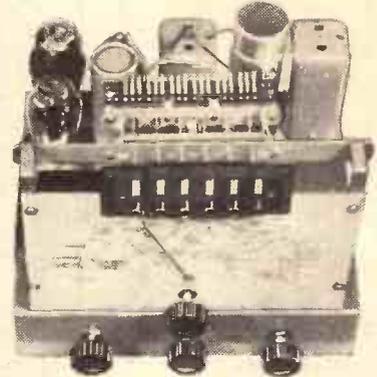
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RADIO CLUBS & SOCIETIES

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 EXETER AND DISTRICT WIRELESS SOCIETY

AT the meeting of the Exeter and District Wireless Society held on Monday, November 7th, Mr. E. W. Saunders (G3MU) demonstrated his multi-valve receiver and quality amplifier. Mr. Saunders also gave in detail the construction of each piece of apparatus, and members were able to hear for themselves the excellent quality of the equipment.

A very animated discussion followed as to the merits or demerits of transformer coupling, and the evening was voted one of the most successful of the society's "round table" talks of the session.

Meetings are held every Monday at 8 p.m. at No. 3, Dix's Field, Exeter, and all those interested should get in touch with the secretary, Mr. W. J. Ching, 9, Sivell Place, Heavitree, Exeter.

THE CROYDON RADIO SOCIETY

A VERY enthusiastic Croydon amateur, Mr. Stuart Davis, visited the Croydon Radio Society on Tuesday, November 8th, in St. Peter's Hall, Ledbury Road, South Croydon. The evening was devoted to a thorough description and demonstration of his recording and reproduction apparatus. The power pack provided for an output of 40 watts, and Mr. Davis was of the opinion that the secret of high quality lay in having plenty of power output, even if not all of it was used. He knew that as regards pick-ups, the society had done much experimenting, for he had read of activities in this direction in PRACTICAL AND AMATEUR WIRELESS. Eventually he had chosen a Davey.

For recording, a Simplat disc was used, and during the course of the evening Mr. Davis recorded many items direct from radio, and played them back to the meeting. Among the visitors present was Mr. D. W. Aldous, the authority on recording, and a member of the British Sound Recording Association, whose comments helped to provide interesting food for discussion. Finally, good as was reproduction on radio and record, Mr. Davis treated the society to reception of the television sound transmission, when results, using the society's special di-pole aerial, were something distinctly better than ordinary. Next Tuesday, November 29th, Mr. W. J. Bird, ex-chairman, will lecture on "Sound in the Cinema." He hopes to bring along various sound tracks and some interesting experiments on sound reproduction will take place. Hon. sec., E. L. Cumbers, Maycourt, Campden Road, South Croydon.

EDGWARE SHORT-WAVE SOCIETY

ON October 26th, G2QY explained his 5-metre transmitter and receivers, and also described the different aerials used during recent tests. It was pointed out that the 5-metre tests across the Atlantic will be held during the present month, and half the club have decided to build receivers. A discussion will be held on November 30th on members' sets and results. Recent lectures were given by Messrs. Cossor, who described their oscilloscope and signal generator; also Dr. Stephens, of T.C.C. Condensers, gave one of the most interesting lectures this year.

All tickets have now been sold for the club's first annual dinner, and the club's membership has now reached 40 since the beginning of this year. On Wednesday, November 9th, Mr. Youthead described his service equipment, and serviced a set which had many faults. A most interesting demonstration was given.

Secretary, F. Bell, 118, Colin Crescent, N.W.9.



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. J. F. (S.E.17). There was not sufficient interest to justify publication. We could not give details of a radiogram of the type you mention.

R. S. G. (Birmingham, 29). The complete kit for the set was advertised by Messrs. Peto-Scott at 28s. 9d. There is no book, so far as we are aware, which deals with the subject on the lines mentioned.

E. S. (Doncaster). The issue is unfortunately now out of print.

J. I. (South Shields). We have no trace of the call in question, which does not appear in our official lists.

P. C. (Rochester). Messrs. Peto-Scott can supply the parts or a complete coil.

RADIO, PHYSICAL AND TELEVISION SOCIETY

ON Friday, November 11th, a lecture entitled "The Electrical Arrangement of Road Traffic Control Systems" was delivered by Mr. E. N. J. Riddle, of The Siemens and General Electric Railway Signal Co., Ltd.

The lecture was fully demonstrated both by lantern slides and also by actual apparatus. In addition to members of the society, a number of police officers interested in the subject were also present. Forthcoming events of the society include a visit to the main telegraph office of Cables and Wireless, Ltd., at Electra House, Victoria Embankment.

Readers interested in the society may obtain further particulars from the hon. secretary, C. W. Edmunds, 72a, North End Road, London, W.14.

ASHTON AND DISTRICT AMATEUR RADIO SOCIETY

A HIGHLY instructive lecture on "Electrical Calculations" was given by Mr. S. Wilde at the November 9th meeting, when 21 members attended. Mr. Wilde has kindly offered to give a series of lectures on this subject. 2CYG is now G3WI. Mr. Bridge is G3VC, and Mr. K. Birch has received the call of 2FOS.

A crystal frequency register has been compiled for the benefit of members, and is also available for the use of other societies.

Several members have joined the R.A.F. (C.W.R.) and are now eagerly awaiting their training.

Secretary: K. Gooding (G3PM), 7, Broadbent Avenue, Ashton-under-Lyne.

THE MERSEYSIDE AMATEUR TRANSMITTING SOCIETY

THIS society, formerly the Bootle and District Amateur Transmitting Society, is open to any person, novice or expert, on Merseyside.

We have acquired for H.Q. two large rooms, one 30ft. by 15ft., and the other 15ft. by 15ft. We have entirely redecorated them and fitted a new staircase, fireplace and workbench. A transmitter is under construction, which will be installed at H.Q. Another amateur radio course will be started in the near future for the benefit of the learners. Our chairman, Mr. R. D. MacKenzie (ex 2A11) is now G3SX. Members of the society will be supplied with keys so that they can use the H.Q. whenever they wish. If any person would like to spend an evening with the society, please write to the secretary, Mr. C. E. Cunliffe, 368, Stanley Road, Bootle, Liverpool, 20.

DOLLIS HILL RADIO COMMUNICATION SOCIETY

AT the meeting on November 1st, Mr. D. N. Corfield (G5CD) delivered his lecture on "The Alignment of Superhet Receivers." With unusual brilliancy he explained the early receiver built on this principle, and leading up to modern practice the subject was covered with much detail. A practical demonstration followed with the alignment of a receiver belonging to Mr. E. Eldridge, and Mr. Corfield allowed members to inspect a signal-generator built by members of the Golders-Green Radio Society.

We next meet on Nov. 29th, which evening will be devoted to the sale of "junk" by members, and we offer a cordial invitation to anyone who cares to attend. All meetings are held in Brainercroft Schools, Warren Road, N.W.2, at 8.15 p.m., alternate Tuesdays. Hon. sec., Mr. E. Eldridge, 79, Oxgate Gardens, Cricklewood, N.W.2.

THE ILFORD AND DISTRICT RADIO SOCIETY

AT the November 3rd meeting, Mr. Darvell demonstrated his 4-band, 7-valve superhet receiver, and following this, an interesting discussion was held on the various points raised on the circuit design.

At the meeting held on November 10th at the society's headquarters, Mr. Menage, of Messrs. Rothermel, Ltd., gave a most interesting lecture to an appreciative audience of members. He dealt with the manufacture and application of piezo-electric crystals, in a manner which showed that he was master of the subject. The various ways in which the crystals may be used in the form of speakers, pick-ups, microphones, deaf-aids, and their numerous uses for manufacturing concerns, were carefully explained. On November 24th, a lecture will be given by G6MG, of Messrs. Premier Supply Stores. Hon. sec., C. E. Larget, 44, Trelawney Road, Barkingside, Ilford.

D. B. (Worcester Park). Complete kits or the separate parts may be obtained from advertisers in this paper.

S. F. (Bow, E.3). The trouble should definitely not have occurred. The receiver is perfectly suitable without alteration for A.C. or D.C. mains, and we think, therefore, that you have made some mistake in the wiring.

R. A. J. (Penmaenmawr). The "Outline of Wireless" and the "Wireless Constructor's Encyclopaedia" would be the best books for your purpose.

F. R. B. (Wythall). An inverted "L", about 60ft. in length, would be ideal. H.T. at 66 volts, and I.T. at 2 volts with a general-purpose valve (H.L. type) by a good maker will be found suitable. The addresses are Wingrove and Rogers (Polar), 188/9, Strand, W.C.2.; T.C.C., Wales Farm Road, North Acton, London, W.3.; and Dubilier, Ducon Works, Victoria Road, North Acton, London, W.3.

B. P. (Belfast). We have no blueprints or other constructional details of television receivers.

A. T. R. G. (Portlads). We regret that we cannot supply a blueprint of a receiver using the coils mentioned.

A. M. W. (Greenock). The price is 5s., from all booksellers, or 5s. 6d. by post.

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1937 Crystal Receiver ..	0.1.37	PW71	F. J. Camm's £4 Superhet ..	— PW58
The "Junior" Crystal Set ..	27.8.38	PW94	F. J. Camm's "Villesse" All-Wave (5 valver) ..	27.2.37 PW75
STRAIGHT SETS. Battery Operated.			Mains Sets : Blueprints, 1s. each.	
One-valve : Blueprints, 1s. each.			A.C. £5 Superhet (Three-valve) ..	— PW43
All-wave Unipen (Pentode) ..	—	PW31A	D.C. £5 Superhet (Three-valve) ..	1.12.34 PW42
Beginner's One-valver ..	10.2.33	PW85	Universal £5 Superhet (Three-valve) ..	— PW44
The "Pyramid" One-valver (HF Pen) ..	27.8.38	PW93	F. J. Camm's A.C. £4 Superhet 4 ..	31.7.37 PW50
Two-valve : Blueprints, 1s. each.			F. J. Camm's Universal £4 Superhet 4 ..	— PW60
Four-range Super Mag Two (D, Pen) The Signet Two (D & LF) ..	— 24.9.38	PW36B PW76	"Qualitone" Universal Four ..	16.1.37 PW73
Three-valve : Blueprints, 1s. each.			Four-valve : Double-sided Blueprint, 1s. 6d. Push-Button 4, Battery Model } ..	22.10.38 PW95
The Long-range Express Three (SG, D, Pen) ..	24.4.37	PW2	Push-Button 4, A.C. Mains Model } ..	—
Selectone Battery Three (D, 2 LF Trans) ..	—	PW10	SHORT-WAVE SETS	
Sixty Shilling Three (D, 2 LF (RC & Trans)) ..	—	PW34A	One-valve : Blueprint, 1s.	
Leader Three (SG, D, Pow) ..	22.5.37	PW35	Simple S.W. One-valver ..	0.4.38 PW88
Summit Three (HF Pen, D, Pen) All Pentode Three (HF Pen, D (Pen) Pen) ..	— 29.5.37	PW39 PW31	Two-valve : Blueprints, 1s. each.	
Hall-mark Three (SG, D, Pow) ..	12.6.37	PW39	Midget Short-wave Two (D, Pen) The "Fleet" Short-wave Two (D (HF Pen), Pen) ..	27.8.38 PW91
Hall-Mark Cadet (D, LF, Pen (RC)) ..	16.3.35	PW48	Three-valve : Blueprints, 1s. each.	
F. J. Camm's Silver Souvenir (HF Pen, D (Pen), Pen) (All-wave Three) ..	13.4.35	PW49	Experimenter's Short-wave Three (SG, D, Pow) ..	30.7.38 PW30A
Genet Midget (D, 2LF (Trans)) ..	June '35	PM1	The Prefect 3 (D, 2 LF (RC and Trans)) ..	7.8.37 PW63
Cameo Midget Three (D, 2 LF (Trans)) ..	8.6.35	PW51	The Band-Spread S.W. Three (HF Pen, D (Pen), Pen) ..	1.10.38 PW68
1936 Sonotone Three-Four (HF Pen, HF Pen, Westector, Pen) Battery All-Wave Three (D, 2 LF (RC)) ..	— —	PW53 PW55	PORTABLES	
The Monitor (HF Pen, D, Pen) ..	—	PW61	Three-valve : Blueprints, 1s. each.	
The Tutor Three (HF Pen, D, Pen) The Centaur Three (SG, D, P) ..	21.3.36 14.8.37	PW41 PW62	F. J. Camm's ELF Three-valve Portable (HF Pen, D, Pen) ..	— PW65
F. J. Camm's Record All-Wave Three (HF Pen, D, Pen) ..	31.10.36	PW69	Parvo Flyweight Midget Portable (SG, D, Pen) ..	19.6.37 PW77
The "Colt" All-Wave Three (D, 2 LF (RC & Trans)) ..	5.12.36	PW72	Four-valve : Blueprint, 1s. "Imp" Portable 4 (D, LF, LF, Pen) ..	19.3.38 PW86
The "Rapide" Straight 3 (D, 2 LF (RC & Trans)) ..	4.12.37	PW82	MISCELLANEOUS	
F. J. Camm's Oracle All-Wave Three (HF, Det, Pen) ..	28.8.37	PW78	S.W. Converter-Adapter (1 valve) ..	— PW48A
1938 "Triband" All-Wave Three (HF Pen, D, Pen) ..	22.1.38	PW84	AMATEUR WIRELESS AND WIRELESS MAGAZINE	
F. J. Camm's "Sprite" Three (HF Pen, D, Det) ..	26.3.38	PW87	CRYSTAL SETS	
The "Hurricane" All-Wave Three (SG, D (Pen), Pen) ..	30.4.38	PW89	Blueprints, 6d. each.	
F. J. Camm's "Push-Button" Three (HF Pen, D (Pen), Det) ..	3.9.38	PW92	Four-station Crystal Set ..	23.7.38 AW427
Four-valve : Blueprints, 1s. each.			1934 Crystal Set ..	— AW444
Sonotone Four (SG, D, LF, P) ..	1.5.37	PW4	150-mile Crystal Set ..	— AW450
Fury Four (2 SG, D, Pen) ..	8.5.37	PW11	STRAIGHT SETS. Battery Operated.	
Beta Universal Four (SG, D, LF, Cl. B) ..	—	PW17	One-valve : Blueprints, 1s. each.	
Nucleon Class B Four (SG, D, (SG), LF, Cl. B) ..	6.1.34	PW34B	B.B.C. Special One-Valver ..	— AW387
Fury Four Super (SG, SG, D, Pen) Battery Hall-Mark 4 (HF Pen, D, Push-Pull) ..	— —	PW34C PW46	Twenty-station Loudspeaker One-valver (Class B) ..	— AW440
F. J. Camm's "Limit" All-Wave Four (HF Pen, D, LF, P) ..	20.9.36	PW67	Two-valve : Blueprints, 1s. each.	
All-Wave "Corona" 4 (HF Pen, D, LF, Pow) ..	9.10.37	PW79	Melody Ranger Two (D, Trans) ..	— AW388
"Acme" All-Wave 4 (HF Pen, D (Pen), LF, Cl. B) ..	12.2.38	PW83	Full-volume Two (SG det, Pen) ..	— AW392
The "Admiral" Four (HF Pen, HF Pen, D, Pen (RC)) ..	3.0.38	PW90	Lucerne Minor (D, Pen) ..	— AW426
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A.C. Twin (D (Pen), Pen) ..	—	PW18	Three-valve : Blueprints, 1s. each.	
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Selectone A.C. Radiogram Two (D, Pow) ..	—	PW10	Fan and Family Three (D, Trans, Class B) ..	25.11.33 AW410
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A.C. Leader (HF Pen, D, Pow) ..	—	PW35C	Transportable Three (SG, D, Pen) Simple-tune Three (SG, D, Pen) ..	— WM271 June '33 WM327
D.C. Premier (HF Pen, D, Pen) ..	31.3.34	PW35B	Economy-Pentode Three (SG, D, Pen) ..	— Oct. '33 WM337
Ubique (HF Pen, D (Pen), Pen) ..	28.7.34	PW35A	"W.M." 1934 Standard Three (SG, D, Pen) ..	— WM351
Armada Mains Three (HF Pen, D, Pen) ..	—	PW38	£3 3s. Three (SG, D, Trans) ..	Mar. '34 WM354
F. J. Camm's A.C. All-Wave Silver Souvenir Three (HF Pen, D, Pen) "All-Wave" A.C. Three (D, 2 LF (RC)) ..	11.5.35 — —	PW50 PW54	1935 £6 6s. Battery Three (SG, D, Pen) ..	— WM371
A.C. 1936 Sonotone (HF Pen, HF Pen, Westector, Pen) ..	—	PW56	PTP Three (Pen, D, Pen) ..	— WM389
Mains Record All-Wave 3 (HF Pen, D, Pen) ..	5.12.36	PW70	Certainty Three (SG, D, Pen) ..	— WM393
All-World Ace (HF Pen, D, Pen) ..	28.8.37	PW80	Minute Three (SG, D, Trans) ..	Oct. '35 WM396
Four-valve : Blueprints, 1s. each.			All-wave Winning Three (SG, D, Pen) ..	— WM400
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QUERIES and ENQUIRIES

Using Headphones

"I have a mains set which has two sockets at the back for plugging in an extra speaker, if required. I should like to know if it is possible to plug earphones in these sockets for a partly deaf person to hear plainly, without having to have the set above normal pitch. If so, what type of earphones would I have to get?"—C. A. V. (N.W.10).

EXTENSION speaker sockets are now provided in two different types. In some makes of receiver they are of low impedance, whilst in other sets a high-impedance output circuit is provided. You may use headphones in either case, and if you have to purchase a pair it would be advisable to communicate with the makers of the receiver and ascertain what type of output is provided. In either case a matching transformer may be used so that 'phones of the wrong type may be used satisfactorily—that is to say, if the output is high impedance a step-down transformer may be used with low-impedance 'phones and vice versa.

All-wave Reception

"I wonder if you can supply a blueprint or constructional details of a receiver to tune from about 4 metres up to 2,000 metres? I believe such a set is available commercially, and I should like to make one."—F. R. (N.W.5).

WE have not designed a receiver of this type and thus cannot supply a blueprint. We would point out that below 10 metres, special arrangements are desirable and in general it is not advisable to try to make one receiver do for such a wide band. It is preferable to build a special ultra-short-wave receiver for use below 10 metres.

P.W. Deaf Aid

"In a recent issue, reference is made to a Deaf Aid. Could you give me the date when this appeared and let me know whether a blueprint is available? Could you say if any of the wireless firms have made the aid and the approximate cost of same?"—F. R. J. C. (Downham Market).

THE article appeared in our issue of June 4th, 1938, but no blueprint is available. Messrs. Peto-Scott can quote for a complete kit of parts and Kit "A" was listed at £5 17s. 6d. This included valves, single headphone with band, carrying case and batteries.

Home-made Condenser

"I notice in a recent issue that you have made use of a twisted length of wire for a condenser, but I fail to see how this can work, and what is the reason for using this

type of condenser? Perhaps you could explain this to me."—J. F. (Highbury).

THE two pieces of wire may be regarded as two metal plates, one being joined to each side of the circuit. The condenser effect is due to the capacity existing between the metal surfaces, the dielectric being formed by the insulated covering of the wires. You will note that ordinary flex is generally employed, and the wires are twisted to increase the capacity. This is a very simple device when extremely small

RULES

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

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

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

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

Send your queries to the Editor, PRACTICAL AND AMATEUR WIRELESS, George Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2.

The Coupon must be enclosed with every query.

capacities are required, and a wide range of adjustment is needed.

Capacity Variations

"I have been trying to get results from a small set I have made, but I find that I cannot get a gradual increase in the reaction. As soon as the plates begin to intermesh, the set oscillates. I have reduced the H.T. as much as possible, and I wonder if I could modify the condenser by cutting the plates to get a more gradual increase. Would this be in order?"—K. F. F. (Finchley).

IT would be quite a good idea to make the modification suggested, if you do not want to obtain a new condenser of lower capacity. The plates may not need cutting as it may be possible with your component to loosen the lock-nut holding the plates to the spindle and to turn them all slightly

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so that they intermesh one at a time over a narrow angle. This was at one time adopted in a certain make of condenser, and some small components are still on the market with graduated plates.

Non-inductive Components

"I have noted several times in specifications that non-inductive condensers and resistances are specified, and I should be glad if you could tell me how such components can possess inductance and why it is necessary to specify this particular type of unit."—L. F. E. (Gt. Yarmouth).

SOME resistances are made from resistance wire, wound round a former, and therefore in this respect they resemble an ordinary inductance coil. The inductance will, of course, depend upon the number of turns, size of the former, and so on. Some fixed condensers are made from flat plates of mica and foil and thus do not possess inductance. On the other hand, large values of condenser are generally made up by using a length of foil-"plated" waxed paper, rolled to occupy a small space, and thus an inductive effect is produced. When resistances and condensers are used for H.F. decoupling, it is essential, if the decoupling is to be complete, that components not possessing inductance be used, and thus it is necessary to specify non-inductive components. Non-inductive resistances are those moulded from various composition or wire-wound components in which the wire is doubled or wound back upon itself. Non-inductive condensers are the flat-plate type of coiled condensers in which adjacent turns are short-circuited.

A Connection Difficulty

"I have noticed in some of your designs that connecting wires are soldered to tags which are then clamped beneath terminals or bolts. It seems to me that this is introducing unnecessary difficulty, as surely the combination of a soldered joint and a friction contact at the head of the terminal is poor practice. Why not solder the wire direct to the terminal, or alternatively flatten the wire and place this beneath the terminal? I should like to know why you adopt the practice."—S. E. F. (Barmouth).

IF a connecting wire is properly soldered to the tag, the two may be regarded electrically as a single piece of wire. The tags are generally copper, tinned, and thus copper is in circuit throughout. This will not introduce any loss of efficiency. The drawback to soldering direct to the terminal is that the terminal is probably thereby ruined and cannot be used again. If the wire is flattened as you suggest, not only is the surface ruined, but any hammering will alter the characteristic of the metal which, in short-wave apparatus, could increase the H.F. resistance. If the wire alone is placed beneath a terminal, a reduced surface contact is generally obtained, due to the round section of the wire. Thus a well-soldered connection to a reliable soldering tag is not only the most efficient but also the most useful type of contact to adopt.

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ADVERTISEMENT INDEX

	Page
Automatic Coil Winder and Electrical Equipment Co., Ltd.	Cover ii
British Institute of Engineering Technology	277
Electradix Radios	275
International Correspondence Schools, Ltd.	274
London Radio Supply Co.	277
McCarthy, H. Ltd.	278
Midland Instrument Co.	277
New Times Sales Co.	273
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