Mr. F. J. CAMM says: "HIVAC MIDGET VALVES OPEN UP A NEW FIELD OF POSSIBILITIES FOR AMATEUR CONSTRUCTORS."

An Interesting Folder "N," giving details and characteristics of HIVAC Midget Valves will be sent you free on request.
PRACTICAL AND AMATEUR WIRELESS

July 27th, 1935

CROSSOR

SUPERHET RADIO

for Battery & A.C. Mains Users

These two new Receivers incorporate the most up-to-date Superhet practice. With the exclusive "Thermometer" tuning and many more important features they are by far the most efficient examples of highly selective radio obtainable at such moderate prices. Backed by a wealth of experience in the manufacture of hundreds of thousands of receivers, they are above all dependable. Hear one at your usual wireless shop—or send coupon.

This coupon brings full details

To A.C. COSSOR LTD., Melody Dept., Highbury Grove, London, N.S.

Please send me free of charge, literature giving full particulars of the new Cossor Superhet Receiver *Model No.

Name

Address

* Please state model required.

PHOTO, 27/7/35
Norway's Proposed Network

For the reorganisation of its system, the Norwegian Broadcasting Administration plans a chain of ten main and ten relay stations with, in addition, one short-wave transmitter. Although the country has only been given one channel in the 1,000-2,000 metre band, the now 10-kilowatt Aalesund-Vigra station will work on a long wavelength.

Polskie-Radio Torun

The Polish transmissions which are occasionally picked up on 304.3 metres, a channel shared with German emanate from the new station at Torun. In almost every case they are relays of the Warsaw radio entertainments. Torun, however, possesses its own interval signal; it consists of two bars of a popular folk melody sung by the timber drifters on the Vistula.

Weather Forecasts for Fishermen

DAILY at B.S.T. 06.00, VAS, Louisbourg, Nova Scotia (Nova Scotia), on 441.2 metres (680 kc/s), broadcasts meteorological bulletins destined to ships trawling off the Newfoundland banks. The calls is: This is P.A.S., the Marconi station of the Atlantic Broadcasting Company, Nova Scotia. These transmissions have been picked up in the British Isles.

International Choral Broadcast

By arrangement with the U.I.R. following the recent Warsaw Conference, an international broadcast is to be made on October 27th next between G.M.T. 17.00-19.00. Youth Sings Beyond the Frontiers is the title of the programme to which groups of youths drawn from organisations in most European countries, and also from states overseas, will each contribute in turn a four-minute broadcast. It will be the first truly international relay in the history of radio entertainment.

Monsieur Radiolo

Under this nom-de-plume many listeners will recall Marcel Laporte, who for many years acted as announcer for the Radio-Paris broadcasts. Following engagements at Radio-Vitus and at Juan-les-Pins, he has now been appointed chief announcer at the studio of the new Nice-La Brague P.T.T. high-power station which it is hoped will soon be on the air.

Canned News Bulletins

FOIT some considerable time the Berlin station has featured the broadcast of topical events recorded by its mobile radio van during the day. In future, these transmissions, on a larger scale, are to be given daily except Saturdays, from B.S.T. 14.45-20.00, and again between B.S.T. 22.20-22.30. On Sundays, under the title German Sport Echo the broadcast will be given between B.S.T. 19.30-20.00.

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France Goes Ahead

NOTWITHSTANDING the number of broadcasting stations operating in Paris so far, registered listeners in the French capital at the end of last April numbered only 871,032; on the other hand, other parts of the country have recently shown a good increase, and the provinces are represented by 1,086,162 licences. By now France may have reached the two million mark, which, although registering progress, is far behind what her neighbours have attained in the same period.

Germany's Proposed Saarbruecken Transmitter

CONTRARY to the decision taken some months ago, the German Authorities now intend to erect an independent station in the Saar district. It will provide its own programmes, but will be connected to the main network for the broadcast of transmissions of a national character.

Grand Opera on a Football Ground

THE Holenwarte Football Ground, one of the largest in Austria, is to be used for the presentation of open-air grand opera. It will accommodate an audience of 20,000 spectators, and for the purpose a special platform has been built, capable of staging shows with one thousand singers, and an orchestra of two hundred musicians. Two of the operas will be broadcast by the Vienna station.

Afghanistan Installs Radio

THE Royal Afghan Government has placed an order with the Marconi Company, London, for the supply of five wireless transmitters to be erected at Kabul, Diyanzahghi, Khost, Khanabad, and Maimana. The Kabul station will possess a short-wave plant for direct communication with London, Melbourne, Rio de Janeiro, and Tokyo. This would appear to be a preliminary step to the establishment of a broadcasting system in that country.

Another Golden Voice

WHEN Stockholm closes down at night, the exact time is given in a feminine voice. The studio is not responsible for the announcement, which is automatically received from the Swedish telephone headquarters. The voice of the sweetest-voiced operator has been recorded on film, which, actuating through rays of light, photo electric cells, connected to amplifiers, broadcasts the exact hour, minute, and second at any time desired.

From Weston-s.-Mare

THE feature "You pays your money" which is described as a choice of evening entertainments will be taken from Weston-super-Mare for Western listeners on July 24th. This broadcast will be run on similar lines to the others and will take the form of visits to a number of places of entertainment, including the Winter Gardens, where a dance band will be heard; the Odeon Cinema, where an organ recital will be given; and the orchestra will be relayed from the Madeira Cove; an Alresco Concert Party will be taken from the Beach; also a Punch and Judy man, and probably a talk by an ice-cream man.
ROUND the WORLD of WIRELESS (Continued)

Short-wave Messages Heard 207 Miles Away

Mr. Douglas Walters proved recently beyond doubt that ultra-short wireless waves can be operated with commercial reliability over much greater distances than has been thought possible. Using a low-power five-metre transmitter on top of Mount Snowdon, Carnarvonshire, Wales, with Mr. David Richards, the Mount Everest radio expert, he established what he believes to be new long-range records. Experiments operating at Stoke Poges, Buckinghamshire, 160 miles away, and Romford, 207 miles away, heard his speech perfectly.

"Only a Mill Girl"

On July 30th Martyn Webster will produce in the Midland studio the mock melodrama "Only a Mill Girl" by the Melluish brothers. He first produced it in London, and it was put on after he was appointed producer at the Birmingham studio. Reginald Burston will conduct the B.B.C. Midland Orchestra and the B.B.C. Midland Revue Chorus, and the cast will include John Lang; Hugh Morton; Alfred Butler, as the villain; Dorothy Summers; and Marjorie Westbury, playing the title part.

"Playtime"

This is the title of a popular show, presented by Nat Day, which will be relayed from the Esplanade Pavilion, Colwyn Bay, for Western listeners on August 1st.

Talk on Rodeos

Rodeos in the Western States and Canada will be described to Midland listeners on July 29th by Bredam K. Vallings, who spent some years out West. He is now in charge of the Ministry of Agriculture's campaign against the musk rat in Shropshire. His capacity for telling a good yarn has already been shown in his broadcast talk "Buffaloes and Bears," of Hoffmann "scored an enormous success. Julius Buerger has now turned his gift for pot-pourri to Vienna, and his programme, "City of Music," will be heard on July 24th and 25th. In this pot-pourri listeners will make a journey through 150 years of Viennese music. In the prelude to this programme snatches of the Austrian National Hymn, Strauss's "Blue Danube," and other well-known waltzes of this composer will be included, as well as excerpts from Mozart's "Magic Flute" and the works of Beethoven and Schubert.

Talk on Cricket

Recollections of the Great Days is the title of a talk on cricket which will be given by Sir Ernest Cook for Western listeners on July 29th. Sir Ernest was captain and honorary secretary of Bedminster Cricket Club for twenty years and an old Somerset county player.

"North Wales Nights"

The Northern Outside Broadcast staff are undertaking another "North Wales Night" feature, which will be broadcast in both Northern and Western programmes on July 31st. Billie Manders' all-male concert party, the "Quaintesques," will be relayed from the Pier Amphitheatre, Rhyl; there will be a recital by Horace Bagot at the organ of the Winter Gardens, Llandudno; and further concert party shows, by the "1935 Evening Follies," from the Aradican Pavilion, Llandudno, and by the "Colwyn Follies" from the Pier Pavilion, Colwyn Bay.

Our illustration shows Mr. Douglas Walters (right) and two of his helpers carrying part of their apparatus to the wireless station on Mount Snowdon.

Variety from Coventry

The variety bill for Midland listeners on August 2nd is to be relayed from the Hippodrome Theatre, Coventry.

Good Fare from the Northern Region

Tram-Guards and drivers, shed-men, and the like are to be fed for free on Saturday, July 28th, by the Manchester Corporation Transport Banjo, Mandolin, and Guitar Orchestra, who will broadcast a concert from the Northern programme on August 1st. Their conductor is G. E. Hill. On August 3rd the "Bouquets" concert party, presented by Murray Ashford and Wally Lemon, will broadcast to Northern listeners from the Pier Pavilion, St. Anne's-on-Sea.

Band Concert for Western Listeners

A Band concert will be given for Western listeners on July 28th by the Mortimer Volunteer Repertory Band, conducted by T. J. Powell. This band was formed more than sixty years ago under the name of the Whitechapel Brass Band; it is now connected with the Midland Company. Most of the members are engaged in the tinplate industry. The conductor is a well-known composer for brass bands, his marches being very frequently used in broadcasts and competitions. The soloist at the broadcast concert will be Olive Gilbert (contralto).

Pinero's "Sweet Lavender"

The third of the series of plays by Midland repertory companies is to be broadcast to Midland listeners on July 28th. This is Pinero's "Sweet Lavender," to be performed by the Coventry Repertory Company, and produced in a studio by A. Gardner Davies, the company producer, and Owen Reed, of the Birmingham studios.

SOLVE THIS!

Problem No. 119. Franklin's four-valve receiver was of the universal all-mains type and had given good service for twelve months. One day, however, he found that signals were very weak, and after an hour or so ceased entirely. He tested the valves and found that two of them had broken down, the heater circuits being internally disconnected. As he was using the receiver on A.C. mains he decided that the valves which he should get for replacement should be of the A.C. type, and accordingly purchased two of similar characteristics to those which had broken down. When inserted in the receiver, however, he obtained very poor signals, and he found it impossible to obtain satisfactory results. Why? Three books will be awarded to the first three correct solutions received.

Solution to Problem No. 148.

As the anode current was high on the output valve, and yet the H.T. battery had been in use, the inference would be that the grid-bias was low. As a modification of bias did not affect anode current it was obvious that signals were very weak, and after an hour or so ceased entirely. He tested the valves and found that two of them had broken down, the heater circuits being internally disconnected. As he was using the receiver on A.C. mains he decided that the valves which he should get for replacement should be of the A.C. type, and accordingly purchased two of similar characteristics to those which had broken down. When inserted in the receiver, however, he obtained very poor signals, and he found it impossible to obtain satisfactory results. Why? Three books will be awarded to the first three correct solutions received.
Hints on the Equipment Required and the Methods of Locating Faults and Troubles which Might Arise in Battery and Mains-operated Receivers. By L. ORMOND SPARKS

**EVERY** radio constructor experiences, at one time or another, certain faults which, whether simple or complex, are often irritating and, in many instances, most discouraging. It is fairly safe to say that finding the fault usually takes more time than effecting the actual cure, but this is probably due to a lack of systematic investigation.

While it is obviously impossible to compile a table of every ill a receiver or amplifier is likely to develop, it is a great advantage to classify the numerous faults under suitable headings, thus limiting the field of cause and effect. Such a procedure, if adhered to, and augmented from time to time by notes and observations obtained during trouble tracking, will save a great deal of time and frayed tempers.

If funds only allow one meter, it is suggested that a low-reading milliammeter is the most useful proposition.

**Testing Procedure**

To proceed with the actual testing, arrange the milliammeter in series with a li-volt dry cell, as shown in Fig. 1. Provide leads at least one yard in length, and terminate the free ends with a pair of testing prods. These can be purchased for one or two shillings, or can be made quite easily from stiff copper wire covered, except the tips, with insulating sleeving. The resistance R is fitted to protect the meter, and its value should be such that, when the tips of the prods are touched together, the meter deflection is just below maximum. For a 15 m.a. meter, a value of, say, 50 ohms will be ample.

The single-pole double-throw switch S enables a quick change over to be made, from continuity reading to milliamps, and each valve withdrawn from its holder in turn. With each withdrawal, the current should decrease by an amount equal to the current consumption of the valve removed. No decrease will, of course, point out that the valve is not operating, or the H.T. or L.T. circuit to that holder is broken somewhere.

From this test it is possible to determine if various parts of the circuit are satisfactory. For example, with no valves in the receiver, the meter will register any current that may be flowing, due to potentiometers, resistances, or leakage across the H.T. supply. With the S.G. valve in position, the bias or screen control can be tested, by noting their effect on the anode current; while L.F. and output grid circuits can be checked by plugging in the respective valves, adjusting the bias, and again noting meter readings.

If the receiver is mains operated it is advisable to connect milliammeter in the anode circuits of each valve, in turn, and not in the common negative lead, owing to voltage increase across the various resistances when the lead is reduced by the removal of a valve. Examine all cathode circuits, bias resistances, and decoupling condensers. If the field of the lead-amber is energised or used as a smoothing choke, the continuity test should be applied.

**Tests for Distortion**

Distortion will be indicated by violent fluctuation of the needle, and bias or H.T., or both, should be adjusted until the minimum movement, either side of the standing current of the whole circuit, is obtained.

If tests are being applied for distortion only, it is more satisfactory to connect the meter as shown in Fig. 3. Here it will be seen that the reading will be that of the output valve, the current flowing through the L.F. choke, or primary of the transformer, or the L.S. winding, according to the form of output employed. This test, therefore, will give some indication of the efficiency of these components apart from the valve.

Fig. 4 shows the necessary connections to place the meter in the anode circuit of the detector valve. In this position tests can be applied for overloading, instability or operation of reaction circuit, tuning circuit peculiarities, and, in a straight or ordinary H.F. circuit, indication of accurate ganging. It should be remembered that the readings will depend on the form of detection used. If the more common grid-condenser method is used the needle will kick downwards when a state of oscillation is produced, or when a signal is received, the maximum deflection indicating that the associated tuned circuit is dead in tune with the signal. Should the anode-bend method of detection be employed, it will be found that the indications are the reverse. The meter reading will *increase* if instability is present, and when the circuit is in tune.

(Continued overleaf)
With circuits embodying A.V.C., a slightly different procedure is necessary. The meter should be connected in the H.T. lead feeding the H.V. valves to which the A.V.C. voltages are being applied. It will be noted that the use of a volt-meter has received little mention. There is a tendency, for example, to use a good high-resistance meter, and this is not possible when the readings obtained, especially across any mains-operated apparatus, are likely to be misleading. The current is not measured through the meter windings. The second reason is that in so many parts of a circuit the voltage is only a true indication of the operation of the components concerned. For example, if a valve is supposed to pass, say, 4 milliamperes for most efficient results, surely it is better to adjust the circuit so that the required current does flow than measure the voltage across the H.T. supply and assume that the correct current is flowing. It is quite possible, owing to anode components, instability, and other electrode potentials, that it may be very wide of its mark. I am, of course, assuming that it is known that the valves are normal.

Components Tests

There is very little the average constructor can do in the way of accurate testing of components other than continuity, resistance, and current-flow tests. However, it is usually possible to obtain approximate information about inductance and capacity by simple substitution methods. The continuity circuit already explained will be found quite satisfactory for coils, switches, H.F. chokes, variable condensers, and circuit checking, but for components having a resistance over, say, 500 ohms, it will be necessary to employ a larger voltage than that provided by the cell specified. A 9-volt grid-bias battery will be ample, and providing a low voltage is applied at first, and then increased if the dial reading is too low, no harm is likely to be caused to the meter by the test revealing a dead short. To determine the resistance of a component it may be necessary to use a section of the H.T. battery, according to the meter and the item under test. The switch should be in position to cut out the resistance R, and the additional battery connected as shown by the dotted lines. It will be seen that the meter is now used as a milliammeter and that the voltage must be measured. If possible this should be adjusted to a round figure to simplify calculations. After applying the prods across the item under test, and noting the m.a. meter reading, Ohm's Law will enable the value of the resistance to be determined, remembering that

\[ R = \frac{V}{I} \]

Volts x 1,000
Milliamps

While it is possible to determine the majority of faults likely to be experienced in a receiver or component by careful application of the above tests and notes, it must be remembered that the remedies are not necessarily correct to cope with inherent faults in the design of a circuit or component; similarly, the continuity and resistance tests would not necessarily reveal the true faults in the characteristic of a component.

Choosing Instruments

Those readers who have no equipment, and are interested in the subject may find the article in last week's issue on page 503 of interest. This dealt with the various types of measuring and testing instruments and their selection. Complete multi-purpose instruments have also been described in these pages from time to time.

Connections for an extension speaker, a switch to silence the parent, and variable tone control, enabling the relation between the higher and lower frequencies to be continuously varied over a wide range, have been described, and the settings recommended. The connections for A.C. mains are as shown by the diagram (Fig. 5) and the additional battery connected as shown by the dotted lines. It will be seen that the meter is now used as a milliammeter and the voltage must be measured. If possible this should be adjusted to a round figure to simplify calculations. After applying the prods across the item under test, and noting the m.a. meter reading, Ohm's Law will enable the value of the resistance to be determined, remembering that

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NOW that we have reviewed circuit arrangements as a whole we may consider the matter of choosing a circuit for individual requirements, considering the various portions of the circuit in greater detail. In the first place a decision must be made as to whether the set shall be designed for battery or mains operation and, if the latter, whether it shall operate from A.C., D.C. or both. This question is. It appears that there are still a few constructors who are rather dubious regarding their capabilities in the direction of making a mains receiver, and who rather believe that the undertaking is more difficult than the construction of a battery set, and less likely to prove entirely successful. In point of fact, however, there is no reason whatever why this should be so, for a mains set can be made just as easily as one for battery operation and, so long as ordinary precautions are taken, there is no danger involved, and no difficulty in securing completely satisfactory results.

Use the Mains if Possible

And since the efficiency, valve for valve, of a mains receiver is far greater than for a set drawing its power from batteries, every one who has a mains supply is strongly advised to use it. Of the two kinds of current, A.C. is the more convenient, since its voltage can be changed as required, but a D.C. receiver using modern valves is highly efficient. A difficulty which is often present when D.C. mains are taken into the house is that the supply will be changed—probably at a not very distant future—so that no precautions are taken, there is no danger involved, and no difficulty in securing completely satisfactory results.

The Most Suitable Type of Circuit for Individual Needs is Discussed This Week, and Details of a Receiver Suitable for the Average Person are Given.

For Average Requirements

Let us consider first of all the type of circuit most likely to please the man who wants to be able to obtain good reception from a few British stations, and who occasionally would like to listen to the programme from one of the more powerful European stations. Provided that the receiver is well constructed, and that the best possible use is made of modern valves, a high-frequency amplifying stage is not essential, and so a detector-L.F. arrangement can be considered. The next question is the kind of reproduction required—the output volume and the "quality." Unfortunately, the latter is a very comparative term, and the meaning varies considerably according to the listener. At the present time, however, we will assume an average person who likes music, but who has not a critical musical ear. His requirements will be satisfied by an ordinary L.F. amplifier with transformer coupling, and with either a triode or pentode valve in the output stage. This same listener will probably be quite content with an undistorted output of about 500 milliwatts, and this can be obtained by using a single pentode valve transformer coupled to the detector valve, as shown in Fig. 1, or by employing two L.F. valves, the first of which is resistance coupled to the detector, and coupled by means of a 1:3 transformer to a super-power output valve, as shown in Fig. 2.

These remarks apply to a battery receiver, and in the case of a mains (either A.C. or D.C.) the requirements could easily be met by using a single triode valve of the indirectly-heated, small-power type, as shown in Fig. 3. In considering the available output the best course is to refer to the makers' figures regarding the maximum undistorted output for the various valves, or to look up the series of articles published in PRACTICAL AND AMATEUR WIRELESS under the heading of "Valve Types and Uses"; the articles dealing with output valves appeared in the issues dated December 29th, 1934, and January 19th, 1935.

One or Two L.F. Stages?

A mains-operated set capable of providing an output up to 1 watt or so does not present any difficulty, and the design is perfectly straightforward. In the case of the battery receiver, however, there are several points which must be borne in mind. It is evident from the above statement that either of two entirely different L.F. arrangements will give the required results. The constructor might well ask why a two-L.F.-valve circuit...
"natural" reproduction from the two valves, due to the fact that each valve provides a lesser degree of amplification, so that there is in consequence less risk of instability. This point is one which has been over-emphasised, however, by a few critics who have always contended that a pentode must, if necessary, produce a certain amount of distortion by giving greater amplification to the higher notes. In practice this point is of far less importance than it is in theory, and a modern, pentode, properly used, can be trusted to perform very satisfactorily.

Pick-up Connections
A more important advantage of the two-valve arrangement occurs when the receiver is to be used as a radio-gram, or when pick-up terminals are to be provided. In this case it would be necessary—in order to obtain the required degree of amplification—to connect the pick-up in the detector grid circuit when only a single L.F. valve was employed. This is not an ideal method, especially if the pick-up leads have to be long enough so that the detector valve is of the high-impedance type. With the two-valve amplifier an adequate degree of amplification, and good quality reproduction, can be ensured by connecting the pick-up in the grid circuit of the first of the two L.F. valves. The two sets of connections referred to are shown in Figs. 1 and 2.

The position is similar, but not quite so difficult, in the case of a mains receiver. At the same time, however, the degree of amplification provided by a mains pentode is very high, and a fair output can be obtained by feeding the output from a modern sensitive pick-up into the grid circuit of the output valve. Despite this, when gramophone reproduction is regarded as being very important there are good reasons for using two L.F. valves.

A REMOTE-CONTROL DEVICE

Here is a device for effecting control of the set from a distance, which is once constructed, neat, and efficient. The position is similar, but not quite so difficult, in the case of a mains receiver. At the same time, however, the degree of amplification provided by a mains pentode is very high, and a fair output can be obtained by feeding the output from a modern sensitive pick-up into the grid circuit of the output valve. Despite this, when gramophone reproduction is regarded as being very important there are good reasons for using two L.F. valves.

Detector-stage Requirements
We can now turn our attention to the detector valve of the hypothetical det.-L.F. circuit under consideration. Since this must be connected directly to the input from the aerial-earth system, it is evident that the valve should be highly efficient, and that it should be preceded by a reasonably selective tuning circuit. In many respects a screen-grid or H.F. pentode valve might be considered most suitable; since this would give a fairly considerable amount of amplification. In practice there are difficulties in matching amplification of these types, however, since the impedances of the anode circuit should be something between 250,000 and 1,000,000 ohms; this cannot be provided by the

Fig. 4.—These two circuits show the type of detector circuit referred to on this page. The circuit on the left is for battery operation, and that on the right for A.C.

average L.F. transformer, and if a resistance were used it would cause such a drop in the H.T. voltage that the valve would be prevented from functioning correctly. The best plan is thus to use a triode valve, having an amplification factor of about twenty-four in the case of a battery receiver, and fifty in the case of a mains reaction control, and thus to prevent the detector from bursting into oscillation suddenly. This is an important point, because the absence of H.F. amplification is a necessary condition for the possible amount of amplification in the detector stage, which really functions as a combined H.F. amplifier and detector.

Either triple flex or bell wire can be used for the extension. The loose cover can be made of stout plywood and should be arranged so as to leave the terminals exposed, as shown in Fig. 2.

NOTES AND NEWS

Interesting Statistics
It has been computed that Europe is now in possession of twenty-three and a half million wireless receivers, and that some twenty-four and a half millions are distributed over the rest of the world, which represents a total of roughly forty-eight million sets. As a conservative estimate this would mean two hundred million listeners. The world population is usually put down at one thousand eight hundred millions, so we must take it that of its inhabitants one out of every nine listen to radio entertainment.

Proposed New Pilsen Transmitter
The Czech Broadcasting Company is seeking a site for the new broadcasting station which it has decided to build in the neighbourhood of Pilsen. The studio will usually put down at one thousand eight hundred millions, so we must take it that of its inhabitants one out of every nine listen to radio entertainment.

China Disapproves
The Peking Authorities recently decreed that Chinese studios must strictly veto the broadcast of "any songs or stories which may arouse lustful thoughts in the children's hour is also forbidden.

518 PRACTICAL AND AMATEUR WIRELESS

July 27th, 1935
Variable Aperiodic Aerial Coupling

I N order to achieve stability in a two-valve S.W. set, and knowing that the aerial coupling has a lot to do with this factor, I devised the following scheme. I obtained a paxolin coil former, and to this I attached an angle bracket cut out of scrap tin.

A variable aperiodic aerial coupling device attached to the lid of a receiver cabinet.

Fixed to this is a brass threaded rod fixed with nut on each side. I fixed the former to the bracket with a nut and bolt on each side. I next drilled a hole in the lid of the cabinet directly above the tuning end of the aperiodic coil. If a single feeder coupling has a lot to do with this factor, I obtained a paxolin coil former, and to this I attached an angle bracket cut out of scrap tin.

Sectional view of a solenoid-operated remote control switch.

That DODGE of yours! Everyone of "PRACTICAL AND AMATEUR WIRELESS" must have originated some little dodge which you think will interest other readers. Why not pass it on to us? We pay 2s. 6d. 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., Ltd., Southampton Street, Strand, W.C.2. Put your name and address on every item. Please note that every note sent in must be original. Mark envelopes "Radio Wrinkles." Do NOT enclose Queries with your Wrinkles.

A Handy Trimming Condenser

The following particulars are of a small variable condenser, which I have found very successful in resolving stations on my short-wave set. A station is tuned in by adjusting the slow-motion dial of the short-wave set. In this way and the little condenser is then screwed forward or backward till the station is heard at its best. The material required consists of a piece of brass strip drilled and marked off as shown, a small ebonite strip, two 3 in. diam. brass or copper discs, a piece of threaded rod and nut to fit same, a handle from the junk box, two small terminals, and a screw for fixing to baseboard. Bend the brass strip to form a bracket. Attach one of the discs to the end of the threaded rod, then screw the rod into the threaded hole provided, and fix the ebonite handle. Attach the other disc to the ebonite strip by means of one of the small terminals.

The other end of the ebonite strip is fixed to the bracket by means of the other small terminal. The condenser can also be fixed to baseboard ready for use, and the handle and nut can be so adjusted that the two metal discs can never touch when the rod is fully screwed forward.—F. T. Eeles (New Washington).

Good Results with Short Aerials

The sensitivity of modern receivers employing two radio-frequency stages or their equivalent in a superhet circuit is so great that a considerable amount of latitude is given with regard to aerial efficiency. In fact, many manufacturers of commercial receivers definitely state that their sets are built to give full performance with aerials consisting of from twenty to thirty feet of wire all told. As a matter of interest I have recently been carrying out experiments with various types of set in connection with quite short indoor aerials, and with quite astonishing results.

The aerial I have been using is of the indoor type, only ten feet high, and with the horizontal portion only six feet long. It is well insulated, and the earth connection is short and direct to a really hefty earth plate. With this simple collector system, and a very ordinary type of four-valve superhet of good make, I have identified over fifty stations in a short time, all free from interference, and all at really good strength. Thus, with five-valve supers having one H.F. stage in addition to the frequency-changer and I.F. valves, and needing only a small internal frame aerial, and four-valvers operating on mains aerials or quite tiny indoor aerials, the unsightly aerial poles may be eliminated.—H. C. (Uxbridge).

An Efficient Remote Control Switch

HERE is a scheme for remote control which I have found to give highly satisfactory results in every way. The switching, in particular, is very definite. The base is a piece of ebonite or wood approximately 2 in. by 4 in., or, alternatively, the control may be built direct on to the baseboard of the receiver. A piece of 3 in. soft iron rod, 2 in. long, is obtained, and two formers for the solenoids are made to slide smoothly on it. These formers are each wound with 200 turns of 26-gauge enamelled wire, and a wooden disc is glued on one end of each. A band 2 in. wide in the centre of the rod is given a good thick coat of shellac and left to harden thoroughly. When this is ready the solenoids are slipped over each end and they are then mounted in their respective positions by clamping under metal bands screwed to the base.

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Negative Resistance

An Explanation of a Little-used Term which Sometimes Confuses the Amateur Wireless Experimenter.

In certain textbooks and also in various papers on electricity the term "negative resistance" occurs, and it would appear from correspondence that this term causes a certain amount of confusion in the mind of the non-technical listener. It would seem that this is because the term "positive resistance" is seldom seen, and it is not a simple matter, therefore, to compare the two opposite types of resistance in order to arrive at a decision concerning one of them. It is well known that when a voltage is applied to any conductor there is a restraining force at work endeavoring to prevent the flow of electricity. This restraining influence will vary with the material being used and the form in which that material is arranged, and it is practically always referred to as "resistance"—but actually it should be referred to as "positive resistance," if the flow of electricity is a steady unvarying current. Thus in Fig. 1 we see a battery joined to a resistor, which may be the filament of a valve or any similar device, and the current flowing through that resistance will be a steady, unvarying current of a certain value, determined by the voltage of the battery and the size and kind of material from which the resistance is made. This is an example of "positive resistance."

A.C. Instead of D.C.

The supply of current from a battery is, of course, what is known as a direct current, and is flowing always in one direction. If, however, instead of using this type of supply we use an alternating supply, what happens to the current flow when the changes in direction and polarity take place? It has already been explained in these pages that an alternating current starts from zero, rises gradually to a certain positive value, and then, at the same speed, drops back to zero, passing on to a negative value and again returning to zero. Therefore, if an A.C. is applied to a pure resistance, there will be a gradually increasing difference of potential between opposite ends with a periodic change in polarity, and there will be a fixed relationship between the potential difference, and the voltage, and the value of the resistance, just the same as with the direct-current supply. If, however, instead of using a pure resistance we use an ordinary arc, and superimpose an A.C. supply on a D.C. supply applied to that arc, we find a different state of affairs. Firstly, the alternating current will always flow through the arc in the opposite direction to that in which the alternating difference of potential is acting, because the total current will be reduced owing to the fact that at certain moments currents are flowing in an opposite direction. From this it may be seen that instead of an arc consuming energy in a circuit of this nature and thus tending to stop the flow of A.C., it actually encourages the A.C. circuit and supplies energy.

The Duddell Circuit

Now look at Fig. 2, which shows an ordinary arc circuit across which is joined an oscillatory circuit (a coil and condenser in series). If the resistance is adjusted until the arc is struck there will be a steady flow of current through the arc; but a steady current cannot flow through a condenser and thus it was discovered by Duddell that an alternating current is set up in the circuit formed by the arc and the coil and condenser, and this is due to what is known as the negative resistance of the arc. Due to this fact also, it is found to be impossible to strike an arc from a source having the exact voltage required by the arc itself, but it must be connected to a much higher source of supply with a resistance in series.

The Ordinary Reaction Circuit

The ordinary valve as used in a wireless receiver also has the ability to provide negative resistance under certain conditions, and the most popular arrangement is generally referred to as the reaction circuit. By referring to the ordinary detector valve circuit (Fig. 3) and comparing it with the points just mentioned, we find that if the anode is joined to the positive terminal of a battery (or source of direct current) and the heated filament is joined to the negative pole of that battery, there will be a steady direct current flowing from filament to anode inside the valve.Ignoring, for the time being, the effect of a potential on the grid, if an increase in anode current is required it will be necessary to increase the anode potential, and thus in this condition the valve offers a positive resistance to A.C. We know, however, that the potential on the grid can have a very marked effect on the flow of current in the valve, and for this reason the L.F. valve is biased to reduce the anode current. Thus an increase in anode current may be obtained (without varying the anode voltage) by modifying the grid potential, but if this applied potential is of a certain value it will be found that the increase in current may be obtained and yet the anode potential may be decreased. In this condition the valve offers negative resistance, and the conditions are satisfied by connecting an inductance coil in both anode and grid circuits and arranging these in such a manner that there is a degree of coupling between the two inductances. The degree of negative resistance in governed by the degree of coupling between the two coils, and in theory it should be possible to adjust this coupling to such a point that the resistance could be reduced to zero, but various small fluctuations in the ordinary valve circuit prevent this ideal from being obtained. As the degree of negative resistance increases, however, the changes in anode current due to an applied E.M.F. in the grid circuit will grow, and thus there will be a point at which a weak signal in the grid circuit would produce no change in anode current, and thus enable, with the aid of the negative resistance effect, to obtain changes in anode current from very weak signals and thus build up the strength of an otherwise inaudible station. Of course, one of the most valuable properties of the reacting detector valve, and the effects are well known to every listener. With this condition it is possible to hear many stations which are otherwise inaudible.
Short-wave Variables

It is rather interesting to note how, as short waves have progressed, so the size of the variable condenser used for tuning has decreased. I was reminded of this fact by discovering a 0.0035 mfd. variable which was used for tuning a short wave some five years ago. The 0.0035 mfd. size soon became popular, then 0.002, and so to 0.0015 and 0.001 mfd. as used today. A capacity of 0.0001 mfd. is now coming into favour as the main tuning condenser in band-spread schemes, and this important part of the receiving arrangements. Length, height, direction all play their part, and much experimenting is required to arrive at a satisfactory compromise for every waveband. My own aerial has undergone another change with every pleasing result, and details are given herewith for any who care to imitate them.

The whole arrangement is quite simple and, as shown in Fig. 1, is a single length of wire (insulated, by the way) led, almost vertically, from the top of the mast to the aerial terminal, through a piece of ebonite rod fixed in the roof of the shed which comprises my "den." From the top end to the terminal the length is exactly, five metres, so it will be seen that the height of the mast is nothing extraordinary, nor is the length of the aerial. Results, however, have been much better than those obtained with a 40 ft. "inverted-L." size usually used. The 20- and 40-metre amateur bands in particular have yielded very gratifying results on this wave.

The Aerial System

Readers may notice that the aerial is coming into favour as the main tuning components, most of which, for this band, are particular simple. Coils, for instance, are easily made. Three turns of No. 18 tinned copper wire wound on a lin. diameter former, with a space of about 1/4 in. between adjacent turns, when removed, will prove an excellent self-supporting air-spaced coil, which may be mounted directly on the end of the variable condenser. Reaction may be obtained by a similarly mounted coil or by a few turns of wire on a piece of 1/8 in. diameter ebonite rod, so mounted as to slip inside the larger coil (Fig. 2). Incidentally, aerial coupling in a 5-metre receiver need only be very loose, and quite sufficient should be provided by allowing the lead-in to lie on the baseboard below the tuning coil. Some aerials may be ingenious enough to make a small-capacity tuning condenser from one or two plates of an old variable, but, if this is done it must be borne in mind that as little ebonite should be used in the construction as possible. For the short-wave choice 1/16 in. diameter ebonite rod again is useful, and on a suitable length of it about twenty-five turns of No. 32 d.c. should be wound. Other items, such as valveholders, grid leaks, and fixed condensers are best bought, though the latter, of the air-spaced variety, may be easily made as described in a recent note.

Stand-off Insulators

Many amateurs prefer to have their short-wave coils mounted well off the baseboard clear of metal condensers, metallised valves, and baseboards. To this end they very often use stand-off insulators on which the coil-holder is mounted. It recently occurred to me, however, that this is a waste of a component, as the arrangement may be carried out by a simple adaptation of the insulator. A valve-pin socket is mounted on a short strip of metal—aluminium, brass or copper—which in turn is screwed on to the top of the stand-off insulator by means of a piece of B.A. studding and a nut. A further nut allows for connecting purposes, and a number of insulators so fitted may be fixed to the baseboard at suitable angles to allow the insertion of the coil-pins in the sockets. Fig. 3 shows the idea, and depicts the Bulgin stand-off insulator, which is of porcelain with a 2 or 4 B.A. tapping in the top.

NEWNES

TELEVISION AND SHORT-WAVE HANDBOOK

By F. J. CAMM

New Camel Batteries

Three well-known Camel accumulators are being improved in design, and the Duralife range of cells is also being modified in a similar manner to avoid all possibility of acid creeping. As all battery-users are aware, the cause of the acid is one of the greatest difficulties with which the user is confronted, and, apart from the risk of damage to the battery connections, there is also the danger of damage to carpets, etc., which might arise due to slight spilling of the acid or even from the fumes. In the newly-designed cells the top is moulded in one piece and lead bushes are fitted for the terminals of the plates. Over these bushes a lead cap is placed and this is welded to it. It will thus be seen that it is impossible for acid to creep through the junction thus formed, and this represents a distinct advance over the usual rotatable type of bush which somehow always manages to work loose through continual use. A point of vital interest to the user is that the cells are available without any increase in price. The makers are Camel Accumulators, Ltd., 9, Newington Causeway, London, S.E.1.

A Shockproof Receiver

Athough a receiver is made up to be used with care, the manufacturers are sufficiently careful to ensure that robustness forms quite a big feature of its make-up. The illustration on this page shows a Marconiphone receiver which was in use on a steam trawler the Lord St. Helens) during last year. Whilst on a voyage north of Scotland in January last, the ship ran into a very bad storm, during which the set was thrown off the shelf on which it had been standing, and crashed to the cabin floor—a distance of about 5 ft. When the set was replaced on the shelf and again connected to aerial and earth it was found to be still in good working order, being none the worse for the fall, so far as the electrical side was concerned. Of course, the casing of the set had been badly damaged, as may be seen in the illustration, but the receiver continued working for another six or seven weeks before the boat came into port and the receiver was put into the agent’s hands for repair. No replacements were found to be necessary, which is good testimony to the soundness of valves, components and connections.

New “Brimar” Valve

Messrs. Standard Telephones and Cables, Ltd., are adding a new pentode to their range of Brimar valves, the U.A.C. of the 50-volt 2-amp. type. The anode and auxiliary grid voltage is rated at 500, and the mutual conductance is 10 mA/V. The price of the valve is 1s. 6d. Four New Ever Ready Valves

The Ever Ready Company announce four new types which are to be shortly added to their range. These are a battery triode (K30A) for normal detector stages, and two L.F. triodes (K30B and K30D), together with an A.C.-H.F. pentode (A50A). The battery triodes are of the 2-volt 1-amp. type, the triode has an impedance of 22,500 ohms and an amplification factor of 18, whilst the other two have impedances of 12,000 ohms with amplification factors of 11 and 18. In each case the H.T. rating is 150 volts and the price 6s. 6d. Type K30D may be obtained with a clear or metallised bulb. The A.C. valve is of the 4-volt 1-amp. heater type, indirectly heated, and has an impedance of 900,000 ohms and an amplification factor of 2,700. A grid bias of 1.5 volts is required and the anode voltage rating is 200. The price is 1s. 6d.

B.T.S. Short-wave Coil Unit

For covering a number of different wave-ranges on the short-wave band British Television Supplies have produced a neat triplex-range unit, covering from 12 to 80 metres. This consists of two coil formers only, arranged at right-angles and separated by a metal screen. The coil formers each carry three windings, and a multi-contact switch is mounted on a small bakelite panel fitted at right-angles to the metal screen. Thus wiring is reduced to a minimum, and the coils are, in effect, mounted direct on to the switch. The two coils and their individual switch contacts are entirely separated electrically, so that the two units may be employed in L.F. and detector circuits using one coil as the aerial coil and the other as a tuned-grid coil, or in a superhet as aerial and oscillator coils. The switch is of the special anti-capacity low-loss type, with self-cleaning contacts and a roller-locking device. A single-hole fixing device enables the entire unit to be mounted on a panel in a receiver without any difficulty. The ranges covered are from 12 to 25, from 19 to 40, and from 50 to 80 metres. A 5,000 mfd. tantalum condenser may be used on the output. The resistances of the coil are: 12-25 m., 1,500 ohms; 19-40 m., 3,000 ohms; 50-80 m., 5,000 ohms. The coil is wound from 200 m. of No. 24 W.R.C. wire. The coil, of course, is fitted with four glass insulators, and bushing which somehow always manages to work loose through continual use. A point, however, which we have noticed is the use of a small bakelite panel for the switch. This may all be due to wrong H.T., due to the method of combining the various parts of the unit and the lack of signals beyond this point confirming instability. This may all be due to wrong H.T., due to the method of combining the various parts of the unit and the lack of signals beyond this point confirming instability. This may all be due to wrong H.T., due to the method of combining the various parts of the unit and the lack of signals beyond this point confirming instability.

COMPONENTS TESTED

IN OUR LABORATORY

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CHOOSE AND
USING YOUR
LOUD-SPEAKER
BEGINNERS
SUPPLEMENT

Some Problems Affecting Selection, Application, and Location.

By H. J. BARTON CHAPPLE, B.Sc., A.M.I.E.E.

GIVEN a receiver of good design, the
success with which a naturalistic
reproduction will be achieved
depends upon the characteristics of the
speaker to be used and the way in which it is
used, and the location selected for it by the
listener, and all these points are well
desirable in many instances. Of course, this
refers to baffles not forming part of the
reception cabinet, for when a speaker is
placed in the cabinet the cabinet itself
forms part of the baffle, and a smaller
area suffices. There is, however, a risk
that the cabinet itself will have resonances
within the audible scale, with the result
that instead of a true bass, most of the
depth notes will consist of a boom at one
particular frequency.

Alternatives

This brings us immediately to the
question of the correct procedure—shall
the speaker be built into the set, or made
a separate unit? Theoretically, the
separate unit consisting of speaker and
sub-box is the better, but as a
large baffle is often unwieldy, and is not always
a welcome addition to the domestic
furniture, in many cases the built-in
arrangement is unavoidable.

There are many devices which render
a good-sized baffle far from unsightly.
For example, it can be disguised as a
screen, and sometimes it is possible to
build the speaker into a door or even
into a wall. Alternatively, a special
cabinet may be built for the speaker
alone, of ample dimensions for good
reproduction. This has the advantage
over a built-in speaker that it may be
installed in the best position from an
acoustic point of view, leaving the set to
be placed where it is best served by aerial
and earth.

A Celestion high-note speaker or
tweeter, and an energised M.C.
speaker by the same makers.

A Ferranti speaker cabinet of modern design.

Where good top response is required, even
with a sensitive superhet, an expensive speaker
with a reasonable upper register
response will give better quality than a
general purpose speaker. Another alternative,
however, of course, is to use two speakers,
one taking care of the lower and middle
register, and the other specially designed
to reproduce mainly the notes above
4,000 or 5,000 cycles.

Using Two Speakers

There are several methods of
doing this. You can, for example,
have two specially designed moving-coil speakers, or the experimenter
may produce quite interesting results by using one good moving-coil
speaker as the bass unit, and an old
moving-iron instrument for the top
notes. Another scheme is to have
two speakers of similar characteris-
tics, but to feed one through a filter
which passes the top notes to a
greater extent than the lower regis-
ter, while a further alternative is
to use one of the new piezo-electric
tweeters for the treble instrument. In
the piezo speaker, it is to be explained,
more output is led to a specially prepared
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more output is led to a specially prepared
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which passes the top notes to a
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LETTERS FROM READERS

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

An Ultra Slow-motion Device

SIR,—Looking through the current issue of your paper, I see on page 410 a description of a slow-motion device. Whilst I appreciate the writer's idea, I should like to suggest that with the data given it is not wholly possible to carry out. For instance, if the second slow-motion dial shown in the sketch (Fig. 2) were to be used as the auxiliary dial, one could not use it in conjunction with the main one to give very accurate calibration, as was intended because these types of condenser dials are arranged so that when the figures 100 or 150 as the case may be reach the hair line they stop. However, the main dial will still go on revolving, so that the two dials will give inaccurate readings. Also, the auxiliary dial, a half of it will be of use if at all not calibrated. With the idea I submitted, however, I was most careful to avoid pitfalls like those given by the other, raised type condenser dials as the auxiliary dial, and having one calibrated all the way round, or, if one of these was impossible to obtain, two “reading off” spots should be used. I think on the whole it would be better for your readers to use my method in preference to the other one, for the above reasons.

I was very pleased to see the first of your series “Midget Portables described in your pages”-looking forward to the next.

SIR, A. D. C. (Clifton).

A Midget S.W. Set for Overseas

SIR,—Being a regular reader of your journal, I sincerely hope you will be kind enough to publish a design for a Cameo Midget short-wave set for those of us who reside in the Far East. The point is this: that we rarely receive any long- and medium-wave stations. The first valve must be a screen-grid, which is a regulation of our Post Office. The output valve may be either a pentode or a triode. Of many others, I do not mind the cost of such a set, because in expensive American sets here which are very popular.—LIM SIEW WEEHONG (Singapore).

An A.V.C. Four-valve!

SIR,—I have been a regular reader of your publication PRACTICAL WIRELESS since its inception, and have taken advantage of the opportunity afforded of obtaining your splendid books and fine gifts. Please accept my best thanks for the same.

I am one of those patient readers who are waiting for a "De Luxe A.V.C." four-valve, to include visual tuning and an ordinary pentode; this latter for economy considerations. Wishing your paper every success.—A. L. ABANDOR (Stokeport).

Our Two-valve Superhet: American Valves

SIR, I read with great interest your article on a two-valve superhet which you must compliment you on your design, which is excellent, considering the limitations you are working under. Not many makers of British and Continental valve designers, with few exceptions, are well behind the Americans. "Valve noise" is, of course, the bugbear of multi-valve receivers, especially superhet, and your new design should reduce this annoyance. The most efficient rectifier is, I think, the thermionic type. Of course, you come up against valve design, as you want to keep your valves down to two. The American amateurs produced several excellent two-tube superhets using their wonderful series of six-volt tubes. The most popular circuit uses a 6AL as detector-oscillator, and a 6GF as L.F. amplifier and second detector. The volume from a set of this type would, of course, greatly exceed that of a two-valve superhet. I am sure you will agree with me that our British manufacturers are very slow with their designs and developments. Some component manufacturers have practically given up this kind of work, and all research seems to fall on professional set designers. Of course, I except my list of grumbles our Communications Engineers and the G.P.O. and Services, etc. The trade wireless papers are full of the dangers of cheap American radio sets and a plea for absurd import duties. They say these sets are inefficient and too cheap. The point is this: these sets are midgets and designed as additions to an existing installation. Therefore they must be cheap or the public will not buy. The real answer to our manufacturers is that they cannot design a cheap set to compete in any way with the Americans. When I say "cheap" I use the word only in connection with prices. The quality of foreign radio goods is every bit as good as British. I shall be pleased to receive your opinions on several of my statements.—T. A. J. JAMES (Lewisham).

[Our American valves is just the opposite, but perhaps British manufacturers have a reply to the above criticism.—Ed.]

A Log of 20-metre Stations

SIR,—I have been a short-wave listener for over a year, and during that time I have never had such good results as I had the other day. The report of my reception might interest other readers, so I enclose particulars. I was listening to the 20-metre phone stations, and I received twenty-one fresh stations in about one and a half hours, and they were all at R7-8, which is particularly good for my set, the usual strength being R4-5. I heard many of the amateurs remarking on the good results. The point is this: these sets are midgets and designed as additions to an existing installation. Therefore they must be cheap or the public will not buy. The real answer to our manufacturers is that they cannot design a cheap set to compete in any way with the Americans. When I say "cheap" I use the word only in connection with prices. The quality of foreign radio goods is every bit as good as British. I shall be pleased to receive your opinions on several of my statements.—T. A. J. JAMES (Lewisham).

[Our American valves is just the opposite, but perhaps British manufacturers have a reply to the above criticism.—Ed.]

Amateur Transmissions on 40 Metres

SIR,—Having read in your journal a short time ago a letter from a youthful correspondent regarding reception of amateur stations, I wish to state that I am an amateur, and of course my curiosity were aroused. Since then I have learnt much about modulation, Q.R.M.s, amplifiers, microphones, etc., simply by listening to them. I have now received many talk around the world, and think your journal is one of the finest.

I have a seven-valve, or tube, set as they call it, in fact, a 20-metre set which receives the short and standard broadcast band, and I receive GSE regularly every afternoon. I am very interested in the midget portable sets, and am trying to construct one with American parts.—W. V. DAWKEX (West Kootenay, British Columbia).

The Editor will be pleased to consider articles of a practical nature suitable for publication in PRACTICAL AND AMATEUR WIRELESS. Such articles should be typed in double line, and the name and address of the sender should be clearly marked on the paper. All contributions should be despatched to The Editor, PRACTICAL AND AMATEUR WIRELESS, Ltd., 8-11, Southampton Street, Strand, W.C.2. 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 contributions intended for publication must be addressed: The Editor, PRACTICAL AND AMATEUR WIRELESS, Ltd., 8-11, Southampton Street, W.C.2.

CUT THIS OUT EACH WEEK.

Do you know.

—THAT a separate valve may be employed for automatic volume control of the manner of many users is productive of the most confusion.

—THAT abrasive should not be used on the moving parts of switches, owing to the risk of metallic dust being afterwards liberated with wearing and other troubles.

—THAT ordinary should not be used in the open air for insulation purposes, etc., unless protected from sun and rain.

—THAT when bombard develops in a mains return, a broken ear connection should be suspected.

—THAT care should be exercised when using telephone headsets, owing to the risk of metallic dust being afterwards liberated with wearing and other troubles.

—THAT a centre tap must be provided on the output component for a Class B stage.

—THAT it is not essential for the plate or anode of a valve to be made of solid metal, but a gauge binding wire may be used in just as effective manner.

352 PRACTICAL AND AMATEUR WIRELESS July 27th, 1935
The Wonderful Linacore

When it was introduced the Linacore was hailed with enthusiasm by home constructors everywhere, and now in thousands of homes it is setting a new standard of radio reproduction.

It is particularly suitable for the home constructor who requires maximum range without interference and good quality reproduction.

Write now to J.B. for leaflet and blueprint describing the Linacore.


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A Local Station Set

“I live just outside North London and wish to build a set to work from the A.C. mains. I am not keen on foreigners, and have no experience. Can you give me details of a suitable set?—R. O. (Wood Green).

You would not doubt find an A.C. two-valve would give you adequate results. A band-pass tuner should be used, and would work with your set and it may not. We are not certain, however, whether this will

Using a Converter

I should like to try short-wave reception, and would build the short-wave converter-adaptor described in your recent issue. If you can assure me on this point I will go ahead with the building.”—G. A. D. (Birkenhead).

Unfortunately we cannot give you the assurance you ask for. It may work with your set and it may not. We have no circuit details of your set and cannot ascertain the particular circuit which is adopted. If it is a perfectly straightforward superhet you will probably find that the converter may be used by tuning your superhet to a wavelength of about 1,500 to 2,000 metres. To make certain on the point, however, we think it would be wisest to write to the makers of the set and obtain their view, as there may be some peculiar aerial-input arrangement which would prevent good short-wave reception with the converter.

Danger from Inexperience

“I have acquired from a second-hand store an all-electric radio-gram. I have thoroughly examined the inside, and although it does not work it appears that the mains output is of the 500-volt type and the valve types are all indicated on a label, which is, unfortunately, torn. As the set used seven valves I wish to economise by using a 5-valve adaptor described in your recent Issue. Can you give us any details yet?—H. T. E. (Nottingham).

The Exhibition is being held this year from August 14th to the 24th, and we shall again be exhibiting at the same spot, Stand No. 9, on the Ground Floor. We shall be pleased to see you during the Exhibition, and members of the staff will again be in attendance throughout the ten days.

A Fuse Point

“I have a shop-built A.C. three-valve receiver and a fuse is fitted on the chassis, but owing to the peculiar aerial-input arrangement I cannot see what part of the circuit it is fitted in. What happens after about a fortnight is that the fuse blows when I switch on. After replacing it about four times I bought one of higher rating, and although this lasted longer it has also blown. It seems that the selection of the makers is too low and the surges cause it to go. My point is this—if I replace it again with a higher value which will not blow through the surge, will it still offer protection in the set?—B. M. H. J. (Dalkeith).

It is very unlikely that the manufacturers would have fitted a fuse of the wrong rating. It would appear, therefore, that some fault has developed in the circuit which causes an unnecessary surge when switching on, and this may be a faulty electrolytic condenser. After the passage of a certain current this automatically becomes sealed and thus the receiver works satisfactorily. Perhaps a good radio dealer could check this point for you. We do not advise the fitting of a larger fuse in view of the danger.

S

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