

A DOUBLE-PENTODE RECEIVER — See Page 435.

Practical and Amateur Wireless

3^D
EVERY
WEDNESDAY

Edited by F.J. CAMM

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Publication

Vol. 14. No. 357.
July 22nd, 1939.

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VIBRATORS



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AERIAL MAST DESIGN

See Page
437.



Practical and Amateur Wireless

Edited by F. J. CAMM

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Vol. XIV. No. 357. July 22nd, 1939.

ROUND *the* WORLD *of* WIRELESS

Vibrators

THE H.T. battery has always been the main bugbear to the listener who cannot employ mains supplies for his receiver, and many ideas have been suggested from time to time to enable this battery to be dispensed with. Special valves have been designed, gas-operated units have been put on the market, and novel generators capable of operating from small cells have been suggested so that a high voltage may be obtained. The main purpose of the H.T. battery is to deliver a fairly high voltage with a small current, and therefore it does not seem that there should be any difficulty in the way of designing a suitable substitute. One of the most satisfactory schemes is the small vibratory rectifier which is now a part of practically every car-radio receiver. This is fed from a 6-volt or 12-volt accumulator, which is used in every car, and it delivers an output of 100 volts or more at a current suitable for operating either battery or mains-type receivers. We have previously described in these pages a mains limit built round a commercial vibrator, and in this issue we give further details of the method of operation of this type of generator, together with instructions for making different types. For car radio purposes, or for those who live in the country where H.T. batteries are not readily obtainable, these details should prove of value.

From Lawrence Wright's "On With the Show"

HALF AN HOUR of good fun and good music is promised in the excerpt from Lawrence Wright's "On With the Show," which will be on the North Regional air on Friday, July 21st. Stars of this show, which is at Blackpool North Pier, include Tessa Deane, Frank Randle, Lance Fairfax, and Bram Martin and his band.

An SOS for Humour

THE Vienna (Germany) radio studio, in its effort to brighten its programmes, has initiated a new weekly prize competition. Listeners are being asked to contribute wise-cracks, the best of which, in the opinion of the organisers, will be awarded every Saturday a book bearing a dedication personally signed by the station director!

Police Radio

THE Marconi Company of Canada have supplied the Police Department of the City of Sherbrooke, Quebec, with a modern type of two-way police radio outfit, to assist in traffic control. The apparatus was used for the first time during the visit of Their Majesties on the recent tour.

days of the silent film. To-day he is recognised as the man whose back is more familiar than that of any other band leader, so much so that "Jack's Back" is Hylton's own slogan.

Sailing at Edgbaston

ONE of the contests of the Midland Sailing Club at Edgbaston Reservoir, Birmingham, will be the subject of a running commentary by Peter Scott (July 29th), who has represented England in small boat sailing contests on the Continent. The first part of the broadcast will describe the preparations for the race, and then Mr. Scott will go out in a boat with a portable transmitter to describe the race itself. The Midland Sailing Club holds a meeting at the Reservoir every Saturday during the summer season, and some of its members may also be seen there during the winter. For the broadcast it is hoped to have what is called a menagerie race, in which all kinds of small craft compete on a handicap basis. Mr. Scott is the son of the famous Antarctic explorer and is himself noted for his paintings of birds.

The Bath Road

ANTHONY GITTINS has prepared a programme about the journey from London to Bath in the year 1820, which will be produced by Francis Dillon on July 25th. The greatest speed of the coach was eleven miles an hour, and the journey from London to Bath took twelve hours, starting from outside the General Post Office in Lombard Street, or the White Horse in Holborn. It is difficult to say which were more romantic, the members of high society who travelled in the coaches, or the highwaymen. Mention will also be made of the old inns where travellers halted, and where the horses were changed.

Song Recitals by Isobel Baillie and Mark Raphael

SONGS by Purcell, Schumann, Franz, Joseph Marx, Sir Arnold Bax, Ivor Gurney, Holst and Armstrong Gibbs will be sung by Isobel Baillie on July 28th, and Mark Raphael will sing "Les Nuits d'Été" (Summer Nights) by Berlioz, in the same programme. This song cycle is a setting of poems by Théophile Gautier and was composed in 1834.

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"Birthday Party"

WHEN listeners hear the familiar strains of "Oh, Listen to the Band," there is no doubt in their minds as to who it is. Jack Hylton is on the air. He, with Noel Gay, Dorothy Dickson and Norah Swinburne, will be the guests who, as their birthdays fall within the month of July, will qualify to appear in "Birthday Party," which will be broadcast on the National wavelength on July 24th. The guests will again be welcomed by Christopher Stone.

Jack Hylton is a Lancashire lad, having been born in Bolton, the son of a cotton spinner. He had no tuition at all, but long before he was in his teens had won fame as a child prodigy, singing and playing the piano. He gradually worked his way up to fame via pierrot troupes and playing the piano in cinemas during the

ROUND the WORLD of WIRELESS (Continued)

The Trial of Mary Blandy

JOHN GOUGH, B.B.C. features producer in Scotland, has made something of a "corner" in trials, and many listeners will find it hard to forget his dramatic treatment of such cases as those of Madeleine Smith and Katharine Nairn. He is coming to London on July 21st to produce for National listeners a dramatisation of "The Trial of Mary Blandy."

Living in Henley-on-Thames in the middle of the eighteenth century, the "fair paricide," as she later became known, was very popular with all the local young gentlemen, more for her reputed dowry



Tessa Deane, Radio's "Queen of Song," who is appearing in Lawrence Wright's famous "On With the Show" at the North Pier, Blackpool.

than for her person. She appears, however, to have been, if not beautiful, cultured and agreeable, and the local *jeunesse dorée* must have been surprised and horrified when it was learnt that she had apparently been engaged for a long period in adding arsenic to the water gruel she prepared for her dotting father. She at once became the central figure in a *cause célèbre*, and John Gough's account of the proceedings against her should delight all amateurs of crime.

New German 100-kilowatt Station

AT Oldenburg (Germany), close to the Netherlands frontier, the German Reich is installing a 100-kilowatt broadcasting transmitter. It is expected to be brought into operation in October next. The wavelength to be adopted is the one at present used by Munich, 405.4 m. (740 kc/s), this station eventually moving to 382.2 m. (785 kc/s), hitherto monopolised by Leipzig. In its turn, the latter station will take over the wavelength of Graz, namely, 338.6 m. (886 kc/s).

Addition to Czech Network

THE new transmitter now in course of erection at Dobrochov will shortly be ready for its initial tests; it will broadcast programmes in the Czech language for the Moravian districts.

In the South Sea Islands

IN the third of his talks in the "Seeing Life" series, on the Midland (July 24 h), Alan Burgess, a young Birmingham

INTERESTING and TOPICAL NEWS and NOTES

writer who travelled round the world, will tell how he spent a year in the South Seas, seeing Fiji, Samoa, and the Society Islands. He considers Tahiti to be "the best place this side of Paradise."

Sir Hamilton Harty Conducts B.B.C. Orchestra

SIR HAMILTON HARTY will come to conduct a B.B.C. studio on July 27th to conduct a section of the B.B.C. Orchestra in a programme devoted to Mozart, which will include Symphony No. 40 in G Minor.

WLW Announcer Buys an Aeroplane

MICHAEL HINN, who handles the 8.15 a.m. newscasts on WLW (Cincinnati) has at last realised his ambition. Recently he bought a monoplane, and is now talking about travelling in terms of minutes. He holds a private licence.

Mantovani from Skegness

MANTOVANI and his Orchestra are to broadcast in the Northern programme early on Thursday evening, July 27th, from Butlin's Holiday Camp at Skegness, Lincolnshire. Stella Roberts and Jack Plant are the singers with the Orchestra.

Cinema Organ and Dance Band

LIGHT musical entertainment on the Northern wavelength early on Friday evening, July 28th, includes a broadcast by Reginald Liversidge at the organ of the

Lido Cinema, Bolton, and, immediately following this, another "Dancing Here and There" programme in which listeners will hear Cliff Bateson and his New Imperials, and Billy Butler and his Band.

Northern Cabaret

DEvised and produced by Muriel Levy and Joyce Lustgarten, another Cabaret entertainment, "Change of Air," will be broadcast from the Manchester studios in the Northern programme on July 26th. Noel Norris, well known to listeners to the North Regional Children's Hour and to patrons of the Manchester Repertory theatre, will be the compère, and the artists are Jessie Driver, Taylor Frame, Doris Gambell, Muriel Levy and Wilfred Pickles. Maurice Arnold and Doris Kenna will be at the pianos.

Sunday Afternoon Television

THE B.B.C. inform us that, from July 16th to September 17th, inclusive, no Sunday afternoon television programmes



Twelve of Scotland Yard's accident squad recently inaugurated a six months' traffic experiment. They patrolled on foot the busiest thoroughfares in South London, offering advice to all road users, including pedestrians. Each officer will have a hand megaphone, amplified by electricity, and a loudspeaker mounted on a tripod. The idea is to cut down the number of accidents. Our illustration shows a "courtesy cop" on foot instructing passers-by with the aid of his hand megaphone, at the Elephant and Castle, London, S.E.

will be transmitted. Pressure on the limited staff during the holiday season makes some reduction of programme hours essential, and it is believed that this arrangement will cause the minimum inconvenience to viewers.

Concert from Sweden

A CONCERT to be relayed from Sweden on July 24th will be given by the Stockholm Broadcasting Orchestra under the direction of Tor Mann. The programme will include a Concerto for saxophone and orchestra, by Lars-Erik Larsson, played by Sigurd Rascher.

SOLVE THIS!

PROBLEM No. 357

MARTIN had a home-made four-valve set—H.F., Detector, L.F. and power valve combination. Results were not too good on the short waves and he decided that a change in the detector grid leak value might be an advantage. As he had a 2-megohm variable potentiometer spare which was in good order he decided to use this to see the effects of changes in value. He therefore removed the fixed leak and connected the variable component between earth and one side of his grid condenser. When tried out, however, it not only failed to make any change as it was adjusted, but signals were conspicuous by their absence. What had he done wrong? Three books will be awarded for the first three correct solutions opened. Entries must be addressed to The Editor, PRACTICAL AND AMATEUR WIRELESS, George Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. Envelopes must be marked Problem No. 357 in the top left-hand corner and must be posted to reach this office not later than the first post on Monday, July 24th, 1939.

Solution to Problem No. 356

The resistance which Rogers used for the grid leak in his resistance-capacity unit was open-circuited, and thus the grid became choked after a few seconds. The following three readers successfully solved Problem No. 355, and books have accordingly been forwarded to them:

W. Sanderson, 23, Leeholme Avenue, Leeholme, Bishop Auckland, Co. Durham; J. D. Morrice, 55, Jasmine Terrace, Aberdeen; J. Holden, 9, Grant Street, Oldham, Lancs.

Making a Double-pentode Receiver

Details of a Simple Type of Two-valve Receiver with Fair Range and Selectivity and Capable of Working a Loudspeaker at Modest Volume. Home-made Tuning coils can be Used if Desired. By FRANK PRESTON

WHEN it is decided to build a two-valver, a Det.-L.F. circuit is generally adopted without studying whether or not a better arrangement is possible. For many purposes there is a more satisfactory circuit, a form of which is shown in Fig. 1. It will be seen that two pentodes are used; the first, an H.F. pentode, as H.F. amplifier, and the second, a small power pentode, as regenerative detector.

What advantages does this circuit offer over the more conventional one mentioned above? In the first place, it has a more effective range due to the use of an efficient stage of high-frequency amplification. This is very useful when the constructor is anxious to receive a wide variety of European stations, and when an efficient aerial-earth system cannot be employed. There is, of course, the further important advantage that a fairly high degree of selectivity can be obtained if the set is operated with reasonable skill.

Range and Volume

Most constructors discarded a circuit of this general type (although probably of more primitive form) a few years ago when earphones were replaced almost exclusively by a loudspeaker. But by using a pentode as detector, loudspeaker reception is by no means impossible, especially if one is content to have only sufficient volume for a small room or "den." Moderate speaker reception is possible with a single-valve pentode arrangement if the set is carefully designed, and although in theory an H.F. stage does not give any volume increase this is not always true in practice. This is because the permissible input to an L.F. pentode is comparatively high, and the maximum input can more nearly be reached if an H.F. stage is included between the aerial and the detector circuit.

I am not going to give complete and precise instructions for building a set around the circuit shown in Fig. 1, since many readers will probably wish to employ components that are on hand. In any case, the actual components and layout are not extremely important and satisfactory results can be obtained with most generally-used types. However, a suggested form of construction is shown in Fig. 2, where the use of a metallised or aluminium chassis is assumed. It will be seen from this that a two-gang condenser and seven-pin valveholders are shown; these are not essential, and two separate .0005-mfd. tuning condensers could be employed if these were more readily available, whilst the valveholders would be to suit valves that were on hand.

The Coils

Another point that requires explanation is that the unscreened coils shown are similar to those I described in the issue

of PRACTICAL AND AMATEUR WIRELESS dated January 7th of this year in the series of articles entitled "Making Your Own Components." The terminal-number connections given in Fig. 1 are also for these coils. It should be stressed, however, that if home-made coils are employed a good deal of care will be necessary in matching them unless separate tuning condensers, or a two-gang condenser with external trimmer control, are used. The home-made coils could easily be mounted by means of small metal angle brackets, or by screwing two large corks to the chassis on which the coils would grip. Ready-made coils could be used instead if preferred, and these may be either screened or unscreened. The reason for this is that the coils are not only at right angles, but are placed one above and one below the "deck" of the chassis so that there is little fear of interaction

transformer. A three-point shorting switch can be used for wave-changing, passing the lead from terminal 5 of the aerial tuner through the chassis directly above the switch, so that it is screened from the corresponding lead from the inter-valve coil. The anode of the H.F. valve is decoupled by means of a 10,000-ohm resistor and .1-mfd. tubular condenser, while both auxiliary grids are fed from a common H.T. tapping and are by-passed by separate .1-mfd. tubular condensers placed close to the valveholders.

There is a straightforward leaky-grid arrangement for the detector and the reaction circuit is conventional except for the inclusion of a 200-ohm resistor which serves to smooth out reaction control. The anodes of both valves are fed from the same (maximum) H.T. tapping, which can supply a voltage up to about 120. It

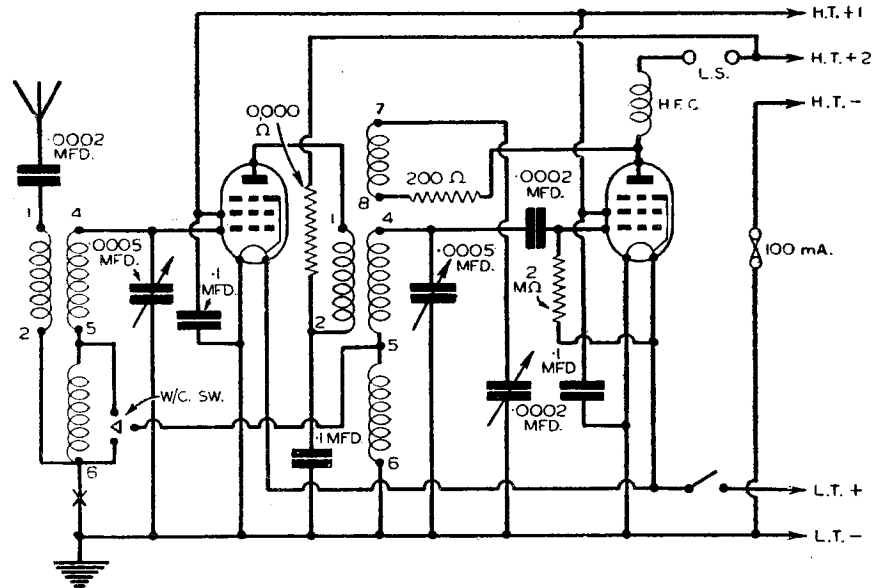


Fig. 1.—Circuit arrangement of the two-pentode receiver described.

between them. If any reader should prefer to use baseboard construction the coils should be screened. Again, they could be ready-made or the home-constructed ones previously referred to, and for which instructions for screening were given in the descriptive article. The H.F. choke may be of almost any fairly good type, and could be made as described in the issue dated January 14th of this year.

Circuit Details

Now let us return to the circuit and run through it. The first coil is used as a simple aerial tuner with aperiodic coupling, while the second acts as a tuned H.F.

might appear that the consumption of high-tension current would be excessive when using such an anode voltage, but it should be remembered that the current is controlled to a greater extent by the auxiliary-grid voltage than by the anode voltage. Tapping H.T.+1 can receive from 36 to 72 volts.

Coil Modifications

It was mentioned above that the coils may be similar to those described in the January 7th issue. Some readers might remember that the coils referred to had a tapped primary winding, and that provision was made for short-circuiting the lower

(Continued on next page)

MAKING A DOUBLE-PENTODE RECEIVER.

(Continued from previous page)

portion of this, as well as the long-wave section of the grid winding, by means of the wave-change switch. To simplify the switching arrangement it is better to use a three-point switch as indicated. For this to be fully satisfactory it is better to reduce the number of primary turns to a total of 70, of which 30 will be over the grid winding and 40 adjacent to the long-wave section. Of course, those who prefer to do so may use two double-pole on/off switches, or a gang unit; this is slightly more efficient, but the difference will not be very marked.

Layout and Wiring

If the form of construction shown in Fig. 2 is adopted there is little more which need be said concerning the layout and wiring. As usual, all leads should be kept as short and direct as possible, whilst connections passing through the chassis from the coils should be kept on the same side as the coils to which they are attached to points immediately above or below the other component to which they are joined. Fixed resistors and condensers can be suspended in the wiring on the under-side of the chassis, and terminal-socket strips for aerial and earth and loudspeaker may be mounted on the back of the chassis, using flexible leads for battery connections.

For preference, the H.F. pentode should not be of the variable- μ type. If it is, it would be desirable to apply a small bias which might be derived from a tapped $4\frac{1}{2}$ -volt battery shunted by a .1-mfd. condenser and inserted between terminal 6 on the first coil and earth, at the point marked with a cross. Of course, a variable- μ potentiometer control could be added if preferred, but that is a refinement which the average constructor will probably not require.

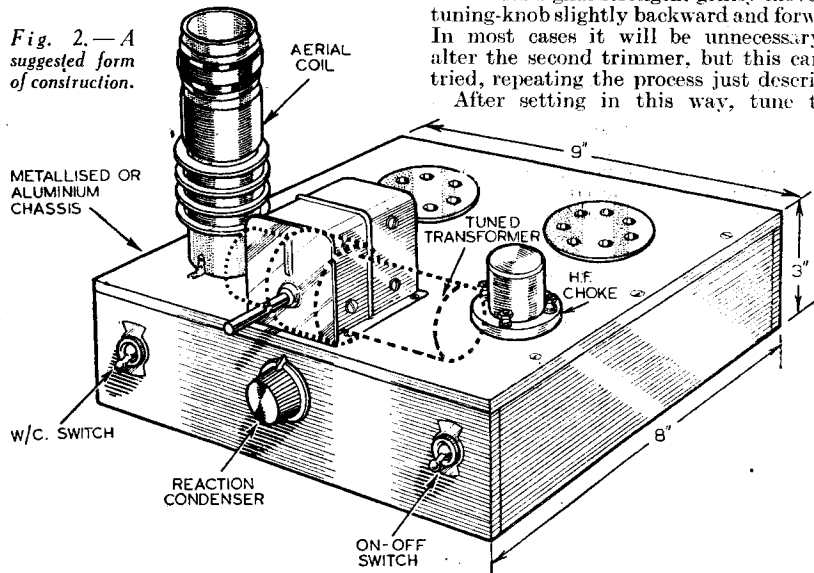
Operation

The method of operation is practically the same as for any receiver with an H.F.

stage, but it will pay to experiment with the most suitable H.T. voltages. Remember to switch off before moving the wander plugs, in order to avoid voltage surges to which pentodes are very sensitive. It will generally be found that oscillation can be obtained very easily, and if reaction control is found to be unduly sensitive (this will depend to a certain extent upon the particular valve used in the detector socket) a small fixed condenser, up to .0003-mfd.,

this assumes that the coils are fairly well matched in the first place. For the benefit of new readers, the method of trimming might be of interest. First, set both trimmers to about their midway positions and then tune in a station near the bottom of the medium waveband. Have reaction adjusted as "loosely" as possible, and then carefully alter the setting of the trimmer on the first section of the condenser, which tunes the aerial coil. As this is adjusted for maximum signal strength, gently move the tuning-knob slightly backward and forward. In most cases it will be unnecessary to alter the second trimmer, but this can be tried, repeating the process just described. After setting in this way, tune to a

Fig. 2.—A suggested form of construction.



may be connected between the anode of the detector and the earth line.

Do not expect to "raise the roof" with the speaker; if you do you will be disappointed, for the volume will not be great. Nevertheless, given a sensitive speaker it will be adequate for experimental work. If earphones are used it will be found that ample volume can be obtained on the majority of stations. Once the gang condenser, if used, is properly trimmed, selectivity should be fairly good, although

station toward the top of the band and re-check, if necessary slightly re-adjusting. It is worth while turning back to the lower setting and again testing the adjustment, for the best possible reception can be obtained only if the two circuits are ganged accurately. Besides, the degree of selectivity is increased as the alignment is made more accurate. As many readers will be well aware, tuning is sharpened by careful adjustment of the reaction condenser and also by biasing the H.F. valve.

IMPORTANT BROADCASTS OF THE WEEK

NATIONAL (261.1 m. and 1,500 m.)
 Wednesday, July 19th.—Up With the Curtain, a variety entertainment.
 Thursday, July 20th.—A choral recital.
 Friday, July 21st.—The Trial of Mary Blandy, adapted by John Goff.
 Saturday, July 22nd.—Sing Song.

REGIONAL (342.1 m.)
 Wednesday, July 19th.—Going Up, a radio version of the Gaiety musical comedy, from Midland.
 Thursday, July 20th.—The Growth of a Beard, a play by Denis Constanduros.
 Friday, July 21st.—Concert Party programme from the Pier, Boscombe.
 Saturday, July 22nd.—Sedgemoor, a radio dramatic reconstruction of Monmouth's Rebellion.

MIDLAND (296.2 m.)
 Wednesday, July 19th.—Going Up, a radio version of the Gaiety musical comedy.
 Thursday, July 20th.—Tewkesbury Festival: part of the pageant play, The Tower.
 Friday, July 21st.—Concert party programme.
 Saturday, July 22nd.—The Schools Inter-

County Athletic Championships at Loughborough—an eye-witness account.

WEST OF ENGLAND (285.7 m.)
 Wednesday, July 19th.—Light orchestral programme from the Continental Restaurant, Bournemouth.
 Thursday, July 20th.—Variety in Miniature.
 Friday, July 21st.—Concert party programme from the Pier, Boscombe.
 Saturday, July 22nd.—Sedgemoor, a radio dramatic reconstruction of Monmouth's Rebellion.

WELSH (373.1 m.)
 Wednesday, July 19th.—Rhyd Night, a parade of seaside entertainment.
 Thursday, July 20th.—A Glimpse of the B.B.C. Week at Harlech.
 Friday, July 21st.—Owen Owen, a talk.
 Saturday, July 22nd.—Boy Scouts' Jamboree, at Gwrych Castle, Abergele, Denbighshire.

NORTHERN (449.1 m.)
 Wednesday, July 19th.—Burbleton Rush-bearing.
 Thursday, July 20th.—Brighter Bridlington Cameos.

Friday, July 21st.—Commemoration Week Concert from the Wallasey Grammar School.

Saturday, July 22nd.—Orchestral programme from the Spa, Scarborough.

SCOTTISH (391.1 m.)
 Wednesday, July 19th.—Find the Flaws, a radio diversion.
 Thursday, July 20th.—Camp Fire Scout Meet, from Monzie Castle, Scotland.
 Friday, July 21st.—Under Canvas: an impression of the various Camp activities recorded at Aberdour.
 Saturday, July 22nd.—Scottish Dance Music.

NORTHERN IRELAND (301.1 m.)
 Wednesday, July 19th.—Golf: An eye-witness account of the Irish Open Golf Championships at Newcastle, County Down.
 Thursday, July 20th.—The Half Door, a play in one act by F. K. Fahy.
 Friday, July 21st.—The Third Concert of Ulster Festival Prizewinners.
 Saturday, July 22nd.—Sedgemoor, a radio dramatic reconstruction of Monmouth's Rebellion, from West.

AERIAL MAST DESIGN

WHEN one travels by rail and passes along the back gardens of certain suburban areas, one of the most noticeable items is the disorderly array of so-called "wireless masts" which flank the railway. Scaffold poles, odd lengths of quartering, and thin, wriggly gas-piping are very common, and it is seldom that one sees a properly-made or substantially-guyed mast. When the question of expense is considered the mast is not a very large item in the complete radio station equipment. Yet it has to support the main collector of energy, and most amateurs now know that a swaying aerial can give rise to signal strength variations, and a badly supported mast can accentuate aerial movement.

We have already described in these pages a lattice type mast which is not only business-like in appearance, but which is capable

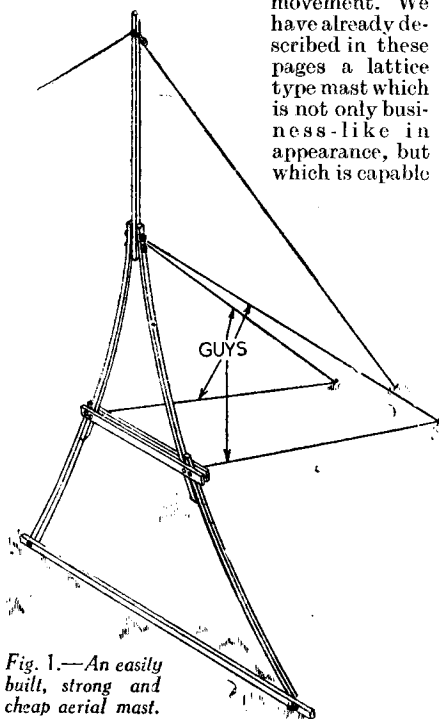


Fig. 1.—An easily built, strong and cheap aerial mast.

of being erected to a height of 40ft. with perfect rigidity. Unfortunately, the amount of timber needed and the work involved in construction make it a rather luxury item for most listeners and simpler types of mast have to be considered.

Single Masts

If a single type of mast or pole is decided upon, some substantial material must be used, even if a number of guys are employed. Ordinary two-by-two quartering as supplied by the average timber yard, is composed of ordinary deal, and this will not withstand the average English climatic conditions without twisting or bending. Even if guyed at several points, it will be found that a bad bend will eventually develop at some part, and if a large knot happens to be present there is every possibility of a fracture-taking place at that point during a strong wind. Therefore, a length of fir or a good flag-staff should be considered in preference to the simpler type of single pole. Good scaffold poles are not, unfortunately, cheap to purchase, but if there is a builder's yard in your district it may be possible to pick up cheaply a scaffold pole which has been used for some time

A Good Aerial Mast is Not Necessarily an Expensive Article, but It May Make a Great Improvement in the Results Obtained with Any Type of Receiver.

By W. J. DELANEY

and which the builder does not feel sufficiently good for further use as a support for building work. Well dosed with weather-proofing paint or other medium, such a pole may be found a very good aerial support, but do not omit guys at least two points above the centre.

Welded bands with rings already attached are obtainable from ship's supply stores, which are found in most big cities, and these are obtainable in many sizes, so that they may be slipped down the mast to the desired level and then attached rigidly for supporting guys.

Guy Supports

These should be of good steel wire, preferably stranded, and with two or more strong insulators inserted to break the continuity of the wire. Three guys can be made to suffice, but four are obviously preferable. In most gardens the pole will have to be placed back near the fence in order to accommodate sufficient length of aerial wire, and this will mean that rear guys will not be possible without going over into a neighbour's garden. In some cases this difficulty may be overcome by making the mast a "communal" affair, the neighbour sharing the expense, and the guys then being divided between the two gardens. Aerials may then be attached to each side at the top and one mast will support them both. Alternatively, the three wire supports will enable two guys to be placed close up to the fence and in line, with a single guy in the front.

Semi-lattice Masts

A type of mast which is finding increasing favour in restricted gardens, and which is much cheaper to build than a full lattice mast, but which is almost as strong and is certainly preferable to a single wooden pole, is illustrated at Fig. 1. This may be built from good quartering—about 2in. by 2in., but do not use ordinary deal. Pine is not very much dearer but will stand weather much better, and may be creosoted or otherwise treated to avoid moisture penetration. It may be built in three or in two sections, a two-section array of this type

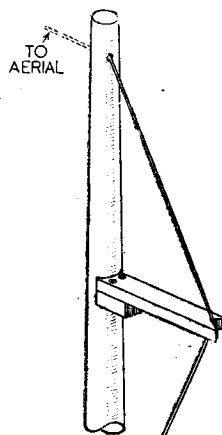


Fig. 3.—Strength may be imparted to the mast top by a back guy as shown here.

being described in this paper in 1933, and shown in Fig. 2. Greater rigidity will be obtained, and the cost somewhat reduced by shorter lengths of the material and building the mast in three sections, as shown in Fig. 1. This type of mast offers very little wind resistance, may be placed right close against a rear garden fence, and should any portion eventually become damaged or warped due to weather conditions, that portion alone may be replaced at low cost. Standard coach bolts may be used for fixing the various parts together, and guys may be used in the standard manner, or a front prop used as shown in Fig. 2. In the latter case

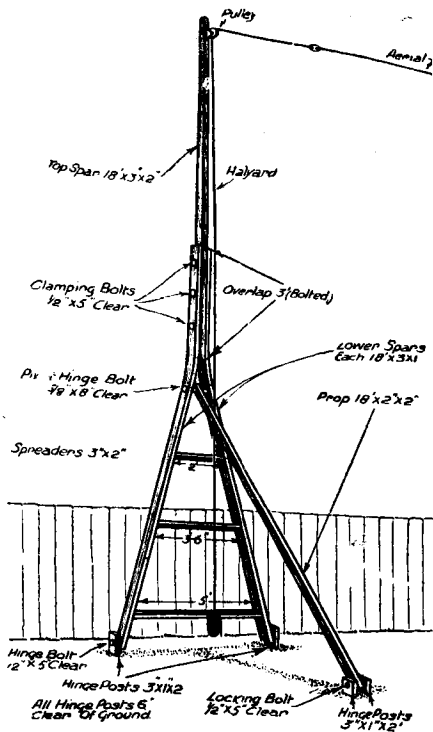


Fig. 2.—A more elaborate form of the type of mast depicted in Fig. 1.

it would be preferable to place a rear guy to take the top strain from the aerial, using the standard ship's mast idea with rear support, as shown in Fig. 3. Remember, when using guys or straining supports, to use turnbuckles with which suitable tension may be obtained after the ropes or wires are attached. Again, suitable wire ropes, manilla or hemp rope, and metal-cored ropes may be obtained from ship's accessories supply stores.

Metal Masts

Although many listeners use ordinary thin gas-piping with satisfactory results, it is not possible to erect a really high mast with this material owing to its general weakness unless extra heavy gauges are employed. These are fairly expensive, and the only satisfactory mast of this type will be made up from several lengths of varying size, each being joined to its neighbour by a proper reducing nipple or joint. The thinness of the final mast at the upper end will introduce difficulty in the attachment of guys, unless the piping is drilled through,

(Continued on page 452)

A Simplified Tuning Indicator

In this Article Details are Given of a Tuning Indicator Circuit Incorporating an Indicator Valve of the Electron Beam Type

THE most common form of tuning indicator used in present-day receivers is of the cathode-ray tube type, an example of which is the well-known RCA6E5 "Magic Eye." This valve has a cathode and a control electrode interposed between the cathode and the target to cast a shadow on the target with an increasingly wider angle as the control electrode becomes less positive with respect to the cathode. The valve also includes a triode amplifier, the anode of which is connected to the control electrode of the C.R. tube and serves in conjunction with a suitable load resistor to control the shadow on the screen.

The amplifier portion of the valve is necessary in order to permit it to be coupled to a source of biasing potential responsive to signal strength such as the output of a second detector. The presence of the amplifier within the tuning indicator tube tends to make the tube relatively large and not readily adapted to smaller radio receivers, such, for example, as car radio receivers, and requires that it be connected to the second detector or other source of variable D-C bias responsive to signal strength variations, which is often not convenient or desirable.

The Radio Corporation of America have developed an improved tuning indicator circuit involving an indicator valve of the electron beam or cathode-ray type in which the amplifier within the valve has been eliminated, thus permitting a tube of smaller size to be employed, and further eliminating the necessity for any external amplifier for the tuning indicator tube.

Referring to the figure which shows a schematic circuit diagram of the arrangement 5 is an intermediate frequency amplifier valve of the screen-grid type having a control grid 6, a screen grid 7, a cathode 8, an output anode 9, and a suppressor grid 10.

Intermediate frequency signals from a preceding amplifier or first detector (not shown) are applied to the control grid 6 through a tuned interstage coupling transformer 11, the secondary 12 of which is connected through its high potential terminal 13 to the control grid 6. The low potential terminal 14 of the secondary 12 is connected with an A.V.C. supply lead 15 for the receiving system, which receives a controlling A.V.C. potential from the second detector indicated at 16, across the output resistor 17 thereof, through a filter resistor 18. The detector is coupled to the amplifier 5 through an interstage coupling transformer 19, and is of the diode rectifier type having a cathode 20 connected to earth as indicated at 21, whereby the bias supply circuit from the resistor 17 is completed to the cathode 8, and other amplifier cathodes (not shown), directly through a ground connection 22 for the said cathode.

For the tuning indicator system under consideration, this type of control is preferable in that it permits all of the cathodes of the controlled valves to be connected to earth, and the controlled grids to be connected with the common A.V.C. supply lead 15.

Amplifier Valve

In modern radio receiving systems, the amplifier valve such as the valve 5, is

subjected to a relatively wide range of A.V.C. potentials extending in some cases from 0 to -40 volts. It has been found that with this range of control a more gradual cut off, and consequently lower distortion in the receiver, may be realized, and a source of controlling potential for the indicator may be obtained if a relatively high resistance indicated at 23, is inserted in series with the screen-grid 7 between it and the positive H.T. supply lead indicated at 24, so that, with no signals, the screen current is sufficient to drop the voltage at the screen to substantially 90 volts with a voltage of 250 at the lead 24. This may require a coupling resistor 23 of 100,000 ohms resistance. The range of control potential variation available across the said resistor is sufficient without amplification, to operate the control electrode of an electron beam indicator valve, such as a valve indicated at 25. This valve is greatly simplified with respect to the well-known electron beam valve including the amplifier, such as the RCA6E5, since it may include only a target electrode 26, a cathode 27 extending through the target, and a control electrode 28, together with the heater 29 for the cathode. One suitable valve for this purpose is the RCA type 6AF6G.

Control Electrode

The control electrode 28 extends through the target and casts a shadow in the electron beam which extends radially from the cathode to the target 26. The control electrode is connected to the screen-grid end 30 of the screen-grid series resistor 23, through a connection lead indicated at 31. The target electrode 26 is connected directly to the positive H.T. supply lead 24 through a lead 32, and the cathode is connected through a biasing resistor 33 to the negative H.T. supply or chassis ground indicated at 34.

While the amplifier valve 5 is preferably an intermediate frequency amplifier tube, it may be any screen-grid valve in a receiving system which is subjected to automatic volume control bias, and whose screen-grid current decreases with increased negative bias on its control grid.

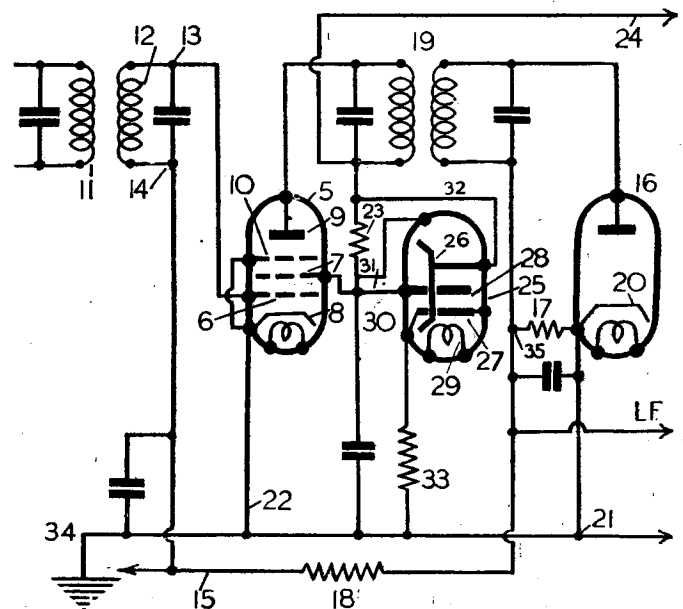
As the signal strength increases, an increasing negative bias from the negative terminal 35 of the output resistor 17 is applied between the cathode 8 and the control grid 6 causing the screen current to the screen 7 to decrease, thereby causing a decrease in the potential drop through the

resistor 23, therefore causing the potential of the control electrode 28 to approach that of the target 26. In the presence of strong signals, the screen current may be reduced to such a value that the screen-grid is substantially at anode potential, whereby the difference in potential between the control electrode 28 and the target 26 is substantially zero and the width of the shadow may become relatively small.

Circuit Resonance

As the signal strength decreases, the potential drop across the resistor 23 increases accordingly, causing the electrode 28 to become more negative with respect to the target 26 and, therefore, to deflect more widely the electron beam on the target 26. This causes the shadow angle to increase proportionately. The tuning indicator indicates resonance in this circuit when adjusted to minimum shadow angle.

It has been found that the range of increase and decrease of the shadow angle may be materially increased through the use of a series cathode or bias resistor 33



Circuit of the tuning indicator arrangement described here.

in circuit with the tuning indicator tube, and this may be of such a resistance value that the cathode 27 becomes more positive or above ground by substantially 50 volts. The bias resistor 33 may have a resistance value of 50,000 ohms, and has been found to approximately double the shadow angle range on the type of tuning indicator indicated in the drawing.

 READ
 "THE CYCLIST"
 2d. Every Wednesday

ON YOUR WAVELENGTH



By *Thermion*

Let's All Go To the Radio Show

THERE is not the slightest doubt that this year's Radiolympia is going to be the most momentous, and the most interesting, in the whole series of shows. Not only is the layout of the exhibition entirely different, for it has been architect designed, but manufacturers have been planning, are planning, and will continue to plan until the show opens in a more intensive manner than ever before, to make the show a thumping success from the point of view of the public. You will not go to the exhibition this year and see only an ornate collection of cabinet work. The manufacturers want you to go to the show to be interested, and I am determined to do my best to persuade every reader of this journal to come to the exhibition too. Many motorists have a little label on the back of their cars which contains the message: "If you can read this, you are too — close!" Under modern traffic conditions, unfortunately, we are all compelled to read those notices. Manufacturers have not been slow to observe that this would be a useful media for advertising the show, and they have produced a very neat little label bearing the inscription, "Let's All Go To the Radio Show." The label is printed in yellow and red and contains also the date of the exhibition. Now I know that a large proportion of my readers run motor-cars, and I want them all to be good chaps by applying to me for one of these labels to stick in the back window of their cars, or even on the windscreen. If they will send a postcard indicating their interest I shall be glad to post them a couple of labels or more if they can persuade some other friends to stick them on the windows of their cars, too.

Notwithstanding the fact that I am a radio journalist, or in spite of it, I can still manage (just about!) to run a car, and I have these labels affixed to the windscreen and rear window of my car. I hope to see many of my readers similarly exhibiting them, and if I challenge anyone in a traffic stop with the cabalistic challenge, "Thermion," and he responds, I'll buy him a drink, maybe two.

Let's All Meet At the Radio Show

I MADE a suggestion in a recent issue that members of the B.L.D.L.C. should band together and come to the exhibition as a party. If a sufficient number agree to do this, I shall be glad to arrange either lunch or dinner for a very nominal fee, and to arrange for speakers. After the function I shall be glad to take readers round the exhibition.

And this offer does not extend only to members of the B.L.D.L.C. I am prepared to run a number of these luncheons and/or dinners so that ordinary readers can come and meet the staff of the journal, the personnel of the Radio Manufacturers Association, and the managers of wireless firms. I must know soon, because the arrangements must be put in hand well before the show. If, therefore, you are prepared to come to the show under this arrangement, will you please drop me a postcard giving your name and address so that I can assess how many to arrange for, and will you please do it now?

Lady Readers

I HAD the temerity, the effrontery, or the impudence to question whether any readers of PRACTICAL AND AMATEUR WIRELESS were of the fair sex. By asking that question I doubted whether ladies were interested in the technique of radio. My deeds upon my head! I have asked for what has been meted out to me. Several lady readers have written to say, and they have said it quite indignantly, that they know as much about radio as many of the males. I will let Miss M. C. N. of Lee-on-Solent, represent the lady

readers who have written to me on the subject. This is what she says:

I SEE that in this week's PRACTICAL AND AMATEUR WIRELESS you seem to be doubtful as to lady readers and S.W.L.s. I read your paper every week, as far as possible, and am particularly interested in the short-wave notes and in readers' logs. I would be glad to exchange S.W.L. cards with European and overseas readers.

"I have logged 63 different countries on the amateur bands (principally 14 and 28 mc/s) since the beginning of this year. Recent entries in my log include YV1AQ, CO8JK, CE1AS, OA4K, CX2AU, VP3CO, TG9BA, W5DNV, HK3CO, W5CXQ, W7DX, VK3BM, W5BUK, XE1GF, and VU2JG. On Monday, July 3rd, I made a special search for W6XBE, the station on Treasure Island, San Francisco, about which there has been quite a lot of discussion lately, and was successful in clearly receiving the programme, with call at 03.00 B.S.T."

Music of the Week

I SUPPOSE nearly every reader recalls the haunting, almost angelic music of Schubert, who was above all a writer of lyrics. Music was in his soul, even when food was not in his stomach. He died at the age of 31, having written 731 lyrics, several symphonies, one or two operas and operettas. The music of "Rosamunde," the famous Unfinished Symphony, and such lilting tunes as "Hark! Hark! the Lark," "The Trout," "Underneath the Lilac Bough," "The Linden Tree," "Impatience," "Who is Sylvia?" "March Militaire," etc., must live for all time, yet one of my readers, C. E. H., of Birmingham, apropos our music critic's remarks, writes:

"In 'Music of the Week' it is written: '... it is strange that Beethoven's life ... is not made into a play as successful as 'Lilac Time.'" I wonder what Schubert would say if he could return to life, and could see what has been done with his music? And now you suggest the same being done with Beethoven.

"I agree that 'Lilac Time' has been very popular—but what about

Schubert? If it is possible for people long since dead to turn in their graves poor old Schubert must have had a rather restless time. I sincerely hope that Beethoven will be allowed to rest in peace."

Well, I do not think that Schubert is going to turn in his grave. "Lilac Time" is a romantic musical comedy linking up some of Schubert's well-known songs. I do not think that Beethoven is likely to wince if his Rondo in G, "Für Elise," or some of his sonatas are dragged into a musical comedy. It will be far better than some of the muck which is composed to-day, and I think the public would appreciate it.

Let's Take Flo to the Radio Show

THAT is only my slogan, and by it I mean to suggest that as a special effort is being made to cater for the feminine interest at the show, every reader should take his sweetheart, wife or sister to it. I hope the dealers will help.

A Faux Pas

I HOPE the editor of the *Radio Times* will excuse me for correcting him on a small matter. In the issue of that journal for July 7th, in a paragraph dealing with the National programme for Saturday, July 15th, it said that listeners were to hear a commentary by Graham Walker, the motor-cyclist, on the 1,000 yards national sprint championship. I do not know why a motor-cyclist should be selected as a commentator for a cycling event, but the paragraph goes on to say that "Curiously enough" (my comment, "Why curious?") Graham Walker has ridden a motor-cycle on the Herne Hill Track. That was in 1930, when "everyone took to cover, and a motor-cycle has never been on the track since." With due respect to the *Radio Times* and for the information of Mr. Graham Walker, I would point out that motor-cycles have been seen on Herne Hill track for many years past in motor-paced events, and they have been seen and heard on the track many times since. I can assure the editor of the *Radio Times* that people did not take cover when Mr. Walker rode round the track, for motor-cycles have exceeded the speed at which he rode on Herne Hill track on almost every occasion on which there has been a motor-paced event.

For Militiamen

THOSE of our younger readers who have been called up under the Military Training Act and who are serving, or about to serve, in the

Notes from the Test Bench

Waverange Coverage

WHEN building a short-wave receiver most amateurs use standard coils and condensers, and as a result a fairly wide band is covered on each range. The amateur transmitter and others who are interested in amateur transmissions sometimes find difficulty in covering the amateur bands satisfactorily owing to the small portion of the dial which is used for the particular band—this depending, of course, on the size of coil and tuning condenser. A plan to be recommended in this case is to use either a special coil, wound so that only the amateur band is covered by the full compass of the tuning condenser, or, alternatively, to use much smaller band-spread condensers and thereby spread out the amateur band to the full dial reading. The latter scheme will not, however, enable each amateur band (that is, the 80, 40, 20, etc.) to be fully covered on the scale, and the special coils arrangement is the only satisfactory scheme whereby a full coverage may be obtained on each band.

Output-Filter Circuit

WHEN using an output-filter circuit one common cause of disappointment in the results is the use of an unsuitable L.F. choke. It should be remembered that the choke is in parallel with the speaker transformer; consequently it will have a marked effect on the loading value of the speaker, and, therefore, if any old choke is selected and the speaker matching is not attended to, the valve may be operated with an incorrect load value.

Earth Connections

WHEN making earth connections in a circuit it should be remembered that in some cases H.F. currents may be present in the earth lead and, therefore, care should be taken not to provide duplicate paths which might give rise to losses. Several cases have recently been noted in which leads to earth have run separately to a bolt on the chassis, and a "closed loop" has been formed by the duplicated leads and the chassis, and although no apparent losses were present, two or more bridging wires across the loop definitely gave improved results. A good plan to be followed is to take all "earth" points in each individual stage to one bolt or earthing point associated with that stage only. Although in some cases this may lead to rather long wires in certain circuits, it will probably be found that there is an advantage to be gained in the localising of the earth point. These details are, of course, applicable mainly to the modern multi-wave superhet type of receiver.

newly-formed Militia, probably find themselves confronted with a number of rather difficult problems. I am pleased to draw the attention of everyone interested to our contemporary, *Tit-Bits*, which is running a regular weekly National Service Page. This feature is of the very greatest help to everyone now serving in His Majesty's forces, and thousands of queries are dealt with each week by the special department organised by this famous paper.

Our Stand at the Exhibition

JUST jot the following down in your notebook if you would not mind: Radiolympia, Wednesday, August 23rd, to Saturday, September 2nd. PRACTICAL AND AMATEUR WIRELESS, Stand No. 9—same spot as previous years.

A.R.P. Equipment at Radiolympia

IT has been decided to stage an exhibition of A.R.P. equipment in the part of Olympia known as Portcullis Avenue—that is, the wide corridor between the Portcullis Entrance to the Grand Hall and the Hammersmith Road.

Wireless Den

THE same correspondent with the jaundiced outlook on Beethoven, has gone all goo-goo over the photographs of wireless dens I publish from time to time. He asks whether they are stalls at Radiolympia, show-room displays, or shop window dressing. Do the owners ever do any work in them? Are the floors lined with thick Turkey carpet? This correspondent tells me that he has a goodly space under the tiles.

Junk to the left of me,
Junk to the right of me,
Shavings all round me,
Surely I've blundered!

The photographs I publish are not stalls, show-room displays, or shop-window dressing. I do not believe that you should convert a room into a passable imitation of a marine store or an old clothes' shop in order to be considered a wireless ham. Only people with disorderly, unmethodical minds run wireless dens of this sort.

PRACTICAL WIRELESS SERVICE MANUAL

By F. J. CAMM.

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

SEEING IS BELIEVING

Too Much Trust is Placed in Judging Receiver Performance by Ear, and the Writer Shows How Far from Perfect this Method can be, and Stresses the Need for Meters for Test Purposes. By L. O. SPARKS

IT is really amazing, when one gives a little thought to the matter of circuit testing and adjusting, how few constructors make full use of some form of meter to guide them when modifying or testing a receiver or similar apparatus. Judging the performance of any sound-reproducing apparatus by ear alone is a very doubtful business. The ears of the average person are not capable of detecting small changes in volume and, what is even more important, no two ears possess the same sensitivity and frequency response.

What might appear to be perfect to, say, the tester or operator, could quite possibly represent a most distorted sound to a person blessed with ears so sensitive and perfectly balanced in a tonal sense that they could detect the slightest imperfection in a single tone or the resultant effect of several tones or instruments. A very common example of the widely-varying tastes of tone appreciation is that provided when several people are listening to the

Meters

Meters suitable for measurements of the currents and voltages usually associated with radio apparatus can cost anything from a few shillings to more pounds than the average constructor would care to spend on a single component. In spite of the widely-varying prices, they all achieve the same object although, of course, it will be readily appreciated that the more expensive instruments possess a very much higher degree of accuracy and, therefore, are in the long run the far better investment. Although there are various types of meters, each designed for some specific measurements, space does not permit dealing with individual types, so we will assume that we are only interested, in this article, with the measurement of direct current and voltage.

Instruments for these purposes can be divided into two classes, namely, those with a moving coil movement, and those having what is termed a moving iron action. The

reproduction of their receiver. Such symptoms might mean many things but one of the first tests which could be applied with advantage is that which would indicate if all valves are consuming their normal current. If a mA meter is to hand, this can be carried out quite easily by connecting the meter in series with the negative H.T. lead which would indicate the total current consumption of the apparatus, or by inserting it in series with each anode circuit in which case the current consumption of each valve would be checked under true operating conditions.

In addition to the above indications, such tests would also reveal if the rectifier, in the case of an A.C. receiver, was delivering its output or whether any faults existed in the smoothing equipment or in the grid bias voltages. The second method would also show if any breakdown was present in any of the anode components. The connections for these simple tests are shown in Fig. 1.

Output Distortion

To test for this form of trouble, the meter should be inserted in the anode circuit of the output valve and careful observations made of the reading obtained when the valve is fully loaded, i.e., reproducing a signal at its maximum rated output. If all operating conditions are correct, the needle or pointer of the meter will remain sensibly steady, indicating the correct anode current for the H.T. and bias supplied. This value can always be determined from the maker's leaflet.

If the pointer oscillates about a given setting, it will show that the valve is being

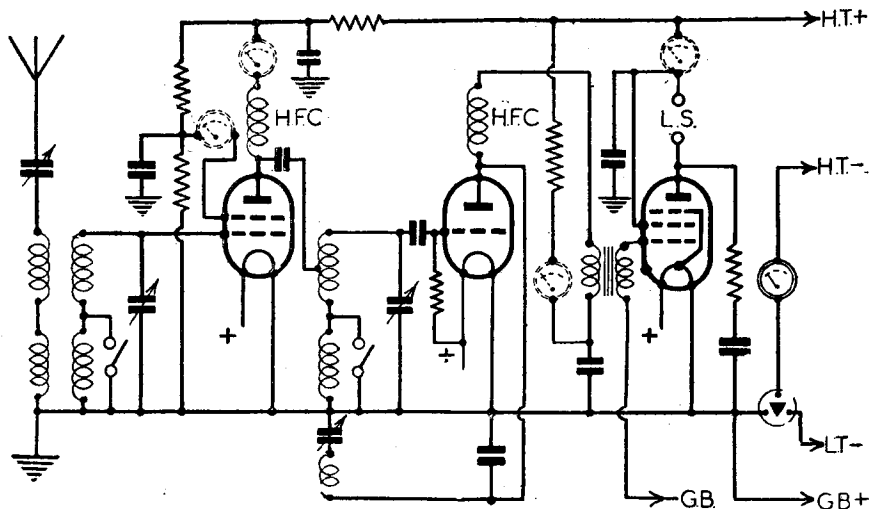


Fig. 1.—A standard 3-valve circuit showing where meters may be inserted to show various working characteristics.

same loudspeaker. One will think it is high pitched; another will think it is deep toned, while a third will be of the opinion that it is just right. The only person who is usually satisfied 100 per cent. is the owner of the apparatus.

From these remarks it is hoped that the reader will appreciate that aural tests alone are not satisfactory and that some means must be employed which will provide definite visual indication of what is happening. Such methods will give concrete proof which will not depend on or be governed by individual physical capabilities or defects. Apart from the question of obtaining accurate observations, there is another very good reason why meters should be used. For example, when carrying out even the most simple tests or modifications much time and patience can be saved by the intelligent use of a meter designed to measure current or voltage.

former are in many ways the superior type, but the latter have the advantages of being more robust, lower in cost and suitable for A.C. and D.C.

With normal radio apparatus, the currents and voltages to be measured cover quite a wide range and one has to face the problem of purchasing several meters or using what is known as a multi-range meter, which is naturally more expensive to buy, though not so very difficult to construct around a good milliammeter. For instance, past articles in these pages have explained how to add series resistances and shunts to a milliammeter having a scale reading of 0 to 1 mA. to enable it to be used as a milliammeter and voltmeter of several ranges.

Using Meters

Most constructors have experienced a falling off in signal strength or quality of

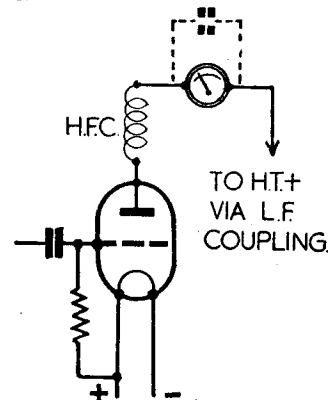


Fig. 2.—A meter in the detector anode circuit will indicate oscillation and other effects.

overloaded and the signal input should be reduced.

If, however, the pointer swings towards a higher setting during the handling of a signal, the grid bias voltage is too high for the applied anode voltage. Therefore, either the bias can be reduced or the H.T. increased, providing the maker's specified maximum value is not exceeded. If there is volume to spare, it is always advisable to decrease the bias voltage. In other instances, it will be noted that the meter needle swings downwards and this means that insufficient bias is being applied, so the

(Continued overleaf)

A Radio-controlled Alarm Circuit

Details are Here Given of an Easily-constructed Arrangement for Operating a Warning Alarm

THE circuit to be described is one for which no originality is claimed, since the same basic principles are employed in a device used for measuring small variations in length of metal bars. Nevertheless, it is highly efficient and relatively simple to construct.

The theory of operation is as follows: It is well known that the anode current of a valve oscillator will drop as the resonance point is approached, and will drop to a minimum at resonance, rising again as the circuit is tuned through resonance.

It is obvious, therefore, that if the circuit is tuned to resonance, and then the capacitance in, say, the grid circuit is added to in order to bring it out of resonance, then a change of anode current will take place. This change of anode current may be made to produce a change of voltage drop across a load resistance, and this voltage drop may then be tapped off and applied as a bias to buck the steady bias on a thyatron, thus causing the latter to "flash."

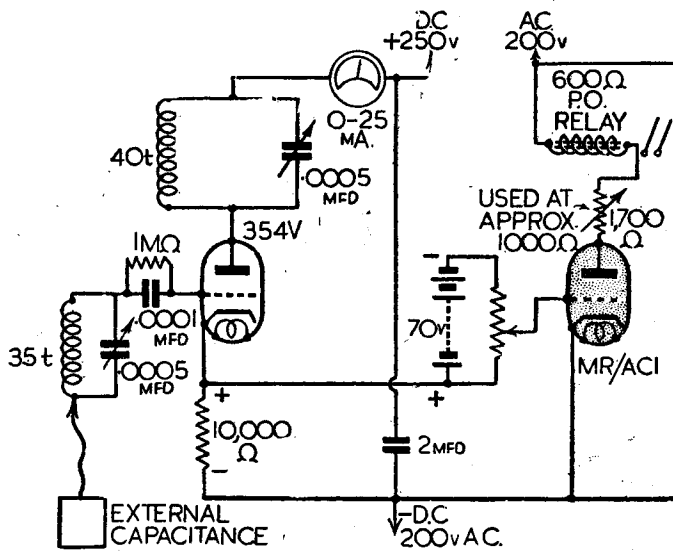
P.O. Relay

When the thyatron "flashes" it becomes conducting and passes current, and this flow of current may be arranged to energise the operating solenoid on a relay, such as a G.P.O. telephone relay. This relay in turn may directly operate a warning device such as a hooter, or if the current to be passed is too great for the contacts, then it may operate a larger contactor which in its turn operates the warning device.

The latter scheme had to be resorted to in the actual laboratory "hook up" used by

the writer. In this case the warning device consisted of a 12-volt electric motor horn.

The circuit diagram, with actual component values used in the laboratory "hook up," is given below.



A useful Radio-controlled Alarm Circuit.

It may be seen from this that the oscillatory circuit employed is a conventional tuned plate-tuned grid circuit, using a triode valve, Mullard 354V.

The external additional capacitance,

which can take the form of a wire unobtrusively attached to a door latch or knob, is joined to what would be the earthy end of the grid tuning condenser.

The load resistance is placed for convenience in the cathode circuit of the 354V, and the voltage across this is tapped off and applied so as to buck the standing bias on the MR/AC1.

Adjustments

The adjustment of the circuit consists of adjusting the anode tuning condenser for minimum reading of the anode milliammeter, this will be about 2 mA, and a current change of, say, two or three milliamps is registered by touching the door knob. Then by adjustment of the MR/AC1 bias potentiometer, this current change may be made to flash the MR/AC1.

Quite possibly it may be found that instead of the relay contacts closing when the MR/AC1 becomes conductive, they may open instead and remain closed when the MR/AC1 is not conductive. In this case the obvious remedy is to use the other set of contacts on the relay.

The above arrangement operated successfully with a lead approximately 12 feet long when the door knob was touched either with the bare hand or with a heavily gloved hand.

In addition, an aluminium plate approximately 2ft. square was connected in place of the door knob; the alarm sounded as soon as anyone approached within about 1ft. of the plate.

SEEING IS BELIEVING

(Continued from previous page)

remedies are, of course, just the opposite to those given for the previous trouble.

While referring to output valves, it must be remembered that this test will not prove satisfactory with Class B or Q.P.P. systems, owing to the fact that when valves are operating under those conditions the bias is so adjusted or the characteristics of the valves are such that very wide fluctuations of anode current are produced when a signal is being handled, while an extremely low standing current is consumed whilst the valves are idle.

Coil Tests

When constructing your own coils, it is very desirable to be able to determine any increase in efficiency and selectivity produced by different windings or methods of construction. To do this by ear alone is far from satisfactory; therefore the simple arrangement shown in Fig. 2 should be adopted, as this will enable a visual indication to be obtained.

Assuming that the coil is in the circuit in the normal way, and that everything is ready for test. Tune in a reasonably powerful signal without applying reaction. If the meter is watched during the tuning procedure, it will be seen that the current reading decreases—that is if an ordinary

leaky-grid detector is being used—as the coil is brought in tune with the transmission. Note the total needle deflection produced and then make any alterations to the coil, such as tapping positions, number of turns, diameter of former or thickness of wire and then repeat the experiment. A fairly accurate idea of the efficiency of each coil can be gathered from the amount of deflection of the meter needle, so continue

with coil adjustments until the maximum deflection is produced.

This test alone, however, is not always satisfactory, unless one is lucky enough to live in an area free from the interference of other stations and where the maximum efficiency and quality is required. If a coil is adjusted for maximum output, it will be found that it is very unselective so the following test should be applied and a happy medium obtained.

Repeat the original experiment but, when the meter pointer has reached its lowest position, note the dial reading and then, very slowly, detune the circuit, say, two degrees at a time and note the current reading for each setting. The results, current against dial settings, should then be plotted on squared paper as shown in Fig. 3, when a curve similar to that indicated will be produced.

The readings must be taken each side of the maximum deflection and continued until the normal standing current of the valve is reached.

If the sides of the curve have a gentle slope, as indicated by the solid line in Fig. 3, it will show that the circuit is not too selective and that the signal will be accepted over a wide band of the tuning range of the coil. Such conditions will allow any other station operating on a nearby wavelength to cause interference.

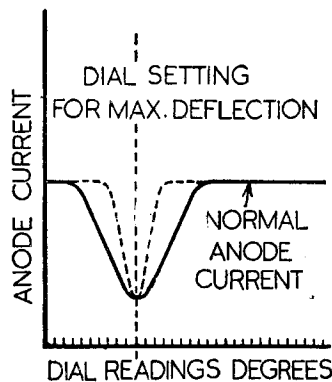


Fig. 3.—How the needle indications will show the performance of a tuning circuit.

A PAGE OF PRACTICAL HINTS

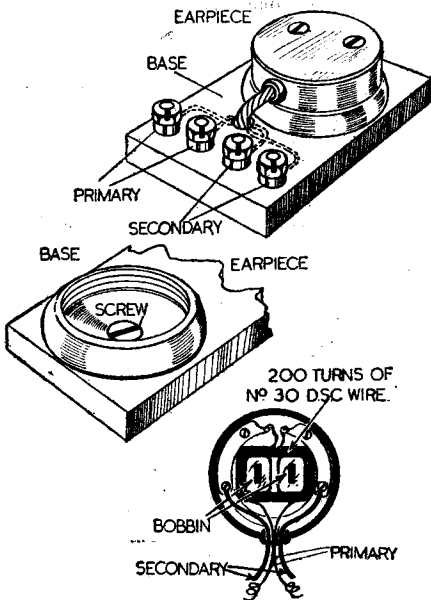
SUBMIT YOUR IDEA

READERS WRINKLES

THE HALF-GUINEA PAGE

A Simple Microphone Transformer

An easy method of constructing a transformer for a single-button microphone, is shown in the illustration. The high resistance windings of an old earpiece are used as the transformer's secondary circuit, and the primary winding consists of 200 turns of No. 30 gauge D.S.C. wire wound



An old earphone is utilised in this simple microphone transformer.

over the earpiece bobbins, and held in place with a little sealing wax.

A piece of wood, 4in. by 3in. by 1/2in., is then cut, and on it is mounted the earpiece cap, and four terminals. Connecting leads are attached to the primary and secondary windings, and the earpiece, diaphragm, and cap are screwed together again. To complete the transformer the leads are taken through a small hole drilled in the wooden base, and connected to the terminals as shown in the diagram.—D. SCARFF (Shildon).

Novel Reaction Control

WHEN I made the S.S. one-valver, I thought that the method of controlling the reaction could be improved, so I fixed it up as in the sketch, which clearly shows the construction. I have not given any dimensions so that the constructor can suit his own requirements. The device forms a sort of pivot between the string and the ebonite arm. It consists of a suitable piece of tin soldered to a short axle, with a washer soldered on the other end. It is advisable to fit a second washer between the tin and the ebonite arm, and this need not be soldered. The space between the washers, must, of course, equal the thickness of the ebonite. A slot must be cut in the arm to allow for the circular movement. It is a good idea to pass the string once round the pulley connected to the knob to

THAT DODGE OF YOURS!

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

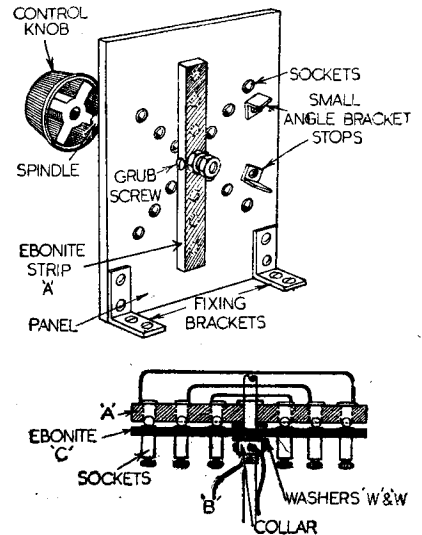
SPECIAL NOTICE

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

prevent it slipping.—P. O'SHEA (N. Kensington).

A Rotary Switch

I REQUIRED a rotary switch a short time ago, and constructed one, as shown in the sketch. I procured half a dozen ball catches and several tube-type sockets with screw-terminals. A piece of



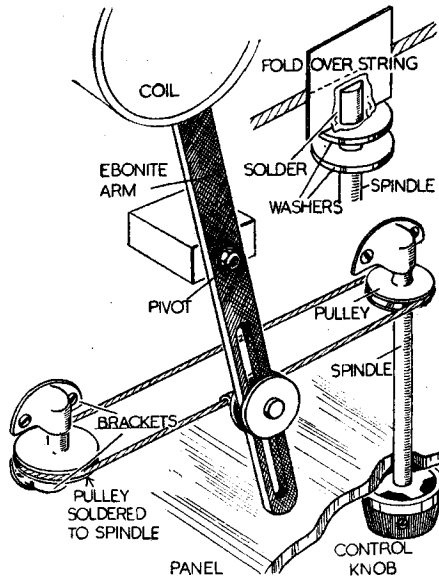
A simple rotary switch.

brackets, as indicated.—E. COLLINGWOOD (Darlington).

A Simple Jack

THE closed circuit jack illustrated was made quite easily from some odd materials found in the junk box.

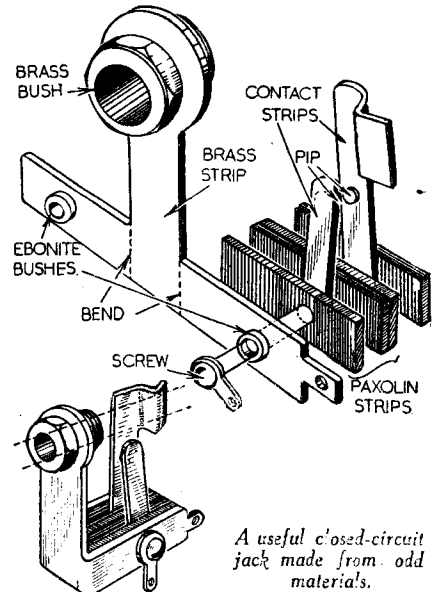
A brass strip is cut to shape, and bent to hold together the paxolin strips necessary for holding the contact pieces, which are also shaped, and slightly bent inwards, so that when the jack plug is inserted the pips



A novel reaction control for the S.S. one-valver.

ebonite, A, is drilled to receive the catches, the ebonite strip being secured to a rod, B, by two grub screws. Another piece of ebonite, C, is drilled to receive the rod B, and also the sockets. Two washers, W and W1, are fitted on the rod, one on each side of the ebonite panel C. The other end of rod B (behind the panel) is secured by means of a collar.

The wiring is shown in the second sketch. As the ebonite switch-arm is rotated, the spring-catches locate in the sockets. The switch assembly can be secured in position by means of the angle-



A useful closed-circuit jack made from odd materials.

are parted and spring back into position when the plug is removed. A bush and nut from an old condenser is used for the plug entry.—G. WARWICK (Newcastle).

VIBRATORS—Princip

Details of Working and these New H.T. Aids.

THE vibrator as a means of obtaining H.T. from a low-voltage battery has, during the last few years, made itself practically indispensable, especially in the field of car or boat radio. Some of the earlier car sets used a motor-generator principle, usually termed a converter, to obtain H.T., but the mechanical vibrator has almost entirely swept the car-radio field, and has made its appearance in one or two battery sets for the home.

The principle of a vibrator is extremely simple, and very similar to an electric bell, and to those with a little mechanical skill is a very interesting and useful article to make, the cost being very low.

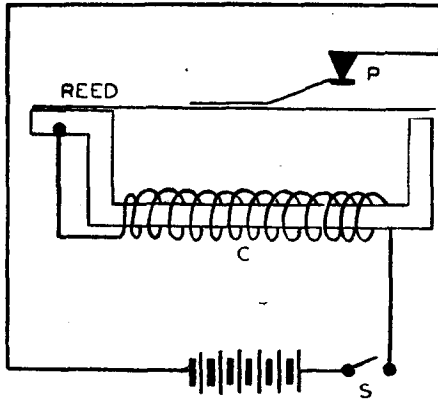


Fig. 1.—The essential features of the vibrator in theoretical form.

Designs for two vibrators are given later, both sound and practical and capable, with a suitable transformer, of giving 200 volts from a 6-volt car battery at sufficient current to operate a 5-valve battery set.

Before proceeding with the construction of the instruments it will be best to run briefly over the working of the vibrator.

The Principle of Working

If a transformer is taken, with a few turns of thick wire on the primary and many turns of finer wire on the secondary, and a low voltage D.C. applied to the primary, no voltage will be found at the secondary terminals, but if we rapidly interrupt the primary current we shall get a voltage at the secondary terminals depending upon the transformer ratio.

This is exactly what the vibrator does in its simplest form, just interrupts the primary current, thereby producing a form of A.C. which is stepped up by the transformer. A motor-car ignition coil, a spark coil, or the ordinary shocking coil all work on the same principle.

Mechanically, a vibrator consists of an armature or reed fixed at one end and free to move at the other end, its free end is just over the pole of an electro-magnet. The reed carries contacts which are fixed above it; Fig. 1 is a diagram of this. If switch "S" in the diagram is closed, current from the battery flows through the coil "C" which immediately attracts the reed. As soon as this moves it breaks the points "P" carrying current to the coil, with the result that the reed flies back, again making contact, and again being attracted, the cycle going on until switch "S" is opened.

If we put a transformer primary in series with the vibrator coil, the current through

the primary is restricted by the coil resistance, and reduces the output we can get from the secondary, so we have to adopt a different arrangement which is illustrated in Fig. 2.

With this arrangement I can easily get 200 volts with a 6-volt input.

How it is Made

A look at Fig. 3 shows the mechanical details of the vibrator used.

It consists of a frame "F" of soft iron bent as shown, at one end it has a coil "C" of 28 or 30 S.W.G. enamelled wire.

The pieces marked "I" are insulating material, bakelite or fibre to insulate armature "A" from the frame, and also to insulate bracket "B" from frame and armature.

This bracket is about 1 in. wide and has two points "P" riveted to it about 1/2 in. apart and in line with each other. Only one is shown, the other one is immediately behind this.

The only thing special about the job is the armature or reed which has to carry two points not electrically connected, the difficulty being got over by making it of two strips of tin about 3/16 in. wide, doubled over and soldered to make the free ends thicker, and joined at the free ends by a piece of thin bakelite secured by rivets. This separates the strips all the way along by about 1/16 in.

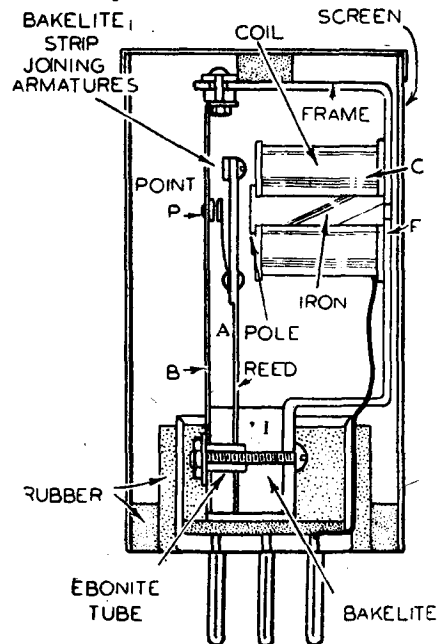


Fig. 3.—Constructional details of a vibratory unit as shown in Fig. 2.

Each strip carries a point on the end of a thin spring, one point can be from a good electric bell, but the other should be a motor car ignition point, the opposite one on the bracket "B" being a similar point.

The bracket must be brass or aluminium, not iron.

The actual mechanical construction of the vibrator is fairly simple, and practically everything is shown in the drawings, but it is advisable to mount it flexibly and it must be screened.

Mounting Device

Since we may need to remove it from the set, and because the points wear out in time, it is usual to mount a vibrator on a base, similar to a valve; Fig. 3 shows also how this is arranged.

An ordinary valve base, from a burnt-out valve is used, all the glass and cement being removed.

Three pins only are used, and a small hole is drilled in the side of the base near to the top end of each pin. The wires from the vibrator pass down outside the base, through the holes, down the hollow pin and are soldered at the tip.

In the bottom of the base is a rubber disc, the vibrator stands on this and is

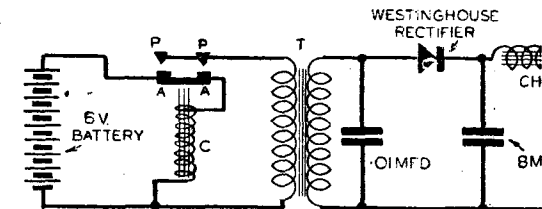


Fig. 2.—Modified arrangement called for when the transformer to the input circuit.

packed in with rubber block, preferably sponge rubber, which prevents it touching the sides.

The screen is a simple metal tube, closed at one end; two pieces of rubber tube are slipped over the base and the screen pushed down over the tube, right to the bottom of the valve base. If there is any risk of the vibrator touching the screen it is advisable to line the screen with felt, which will also help to deaden the noise.

A rubber block in the top of the screen also helps to steady the mechanism against shocks.

Connections

The connections are as follows; vibrator frame to one armature bar, one end of coil to frame, the other end of coil to one valve base pin, the other armature bar to another pin, and the bracket carrying the points to another pin.

If old electric bell contacts are used for one lot of points these should be the ones connected to the frame. It is immaterial which pins are used as long as the constructor remembers how he has wired them.

The full circuit for use with this is given in Fig. 2 and, no doubt, a few details will be useful.

The transformer was made from an old Mullard H.T. unit choke, rewound with 18 S.W.G. D.C.C. wire to fill the available space.

In order to test this, the remaining half of the original winding was connected to 220 volt A.C. mains and a low reading A.C. meter put across the new winding;

les and Construction

Useful Instruction for

By A. L. JACKSON

adjustment was made by removing turns until it read 6 volts. A 6-volt dial light bulb could be used to give an approximate idea, and is the simplest way to adjust the ratio.

It will be apparent that if 6 volts is applied to the new winding, A.C., of course, we shall get 220 volts from the original winding, now the secondary, which is exactly what we want, and joining up the transformer and vibrator with a 6-volt car battery, as illustrated in Fig. 2; we shall get 220 volts A.C. if the vibrator is properly adjusted.

Before we can use this it must be rectified and smoothed. The simplest way is to use a metal rectifier, mine cost 1s. 6d. from an advertiser in this journal. If a valve is preferred a 6-volt American rectifier can be used and avoids tapping the battery, but it must be indirectly heated.

The choke should have a high inductance and a low D.C. resistance; the smoothing condensers can be electrolytic 8 mfd. each.

It is also usual to shunt the transformer secondary with a .01 condenser, and as quite high peak voltages are generated a 1,000-volt test component is called for.

Nothing has been said about the adjustment of the vibrator because most readers can adjust an electric bell, but initially the armature should be about $\frac{1}{16}$ in. from the pole and, both sets of points just touching, adjustment is made by bending the brass springs carrying the points. Those on the armature bar joined to the frame are responsible for the vibrating, the others being only a simple make-and-break for the transformer current.

Mechanical Noise

Needless to say, the points should be clean and smooth and meet each other squarely.

A vibrator makes a certain amount of mechanical noise, depending to some extent on the adjustment, and it is not a bad idea to enclose the whole unit in a felt-lined metal box to reduce this noise, and with an ordinary battery set, to run the unit from a separate accumulator, otherwise the vibrator can cause interference through the filament leads with directly-heated valves.

A unit made up on these lines will be found to give perfectly satisfactory results if reasonable care is taken in manufacture, but remember also that the intermittent current taken from the battery can cause interference; keep the battery leads well away from the aerial.

Self-rectifying Vibrator

Commercial vibrators are usually of a different design from the one described

and use a centre-tapped transformer; the smaller ones are usually also self-rectifying, and the circuit used is shown in Fig. 4. It will be seen that six platinum points are used, hence the cost of a commercial instrument.

It is quite a practical proposition to make a vibrator of this type to operate efficiently, but a lot more care is needed in the adjustment, quite small alterations causing the voltage output to jump between 100 and 200 volts, and it must be rigid enough to keep the adjustment once it is set.

A glance at Fig. 3 will show that each side of the armature has a point fixed to it, and other points mounted above and below the armature, contact is made alternately with these points, sending a current through first one side, and then the other, of the centre-tapped transformer.

Dotted lines from the secondary of the

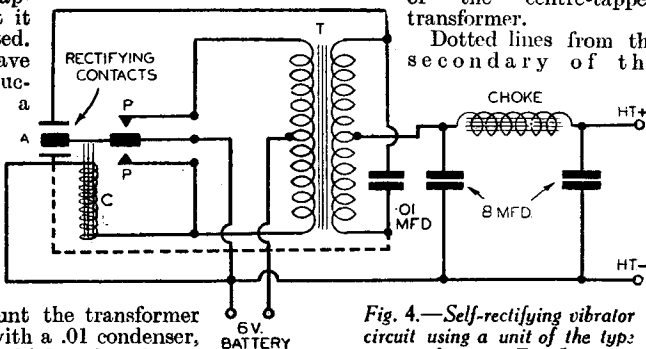


Fig. 4.—Self-rectifying vibrator circuit using a unit of the type shown in Fig. 5.

transformer to four other points similarly placed on the armature show the means employed to rectify the secondary A.C., this being done automatically by the moving armature. The rest of the circuit used is given in Fig. 4 as well.

The construction employed in my model is slightly different from the previous instrument, and the main part, i.e., the magnet and coil, was taken from an old electric bell.

The details of construction will be found in Fig. 5, the magnet carrying the coil is longer than before and has a round rod fixed to it, and the other end a bracket to carry the armature.

If a separate rectifier is used this bracket need only be $\frac{1}{16}$ in. wide, but for a self-rectifying unit it should be $\frac{1}{8}$ in. wide, the armature in this case being double width to take the extra points alongside the others. Both sets of fixed points are mounted on fibre strips seen in the drawing, the points themselves are mounted on thin brass spring, and these springs are bent up or down for adjustment purposes.

On the bottom of the bracket carrying the armature is fastened a piece of tube, the lid of a very small tin would do, with a large washer soldered on the bottom, for the flexible mounting in the valve base. A strip of soft rubber is put round inside the base first, the vibrator with the washer laid upon it, then another piece of soft rubber forced in, this will be found to hold everything firmly but flexibly.

The connecting wires from the valve pins will be seen running between the bakelite and the rubber.

In fitting everything up, the armature is in electrical contact with the frame, the top piece of fibre has a distance-piece separating it from the armature.

The bottom piece of fibre is fixed in a different way, both the pole piece and the bottom bracket being slotted, and having a piece of metal forced in the slot and soldered; these form raised ridges right across the pole and bracket.

The fibre ends are then slotted with a

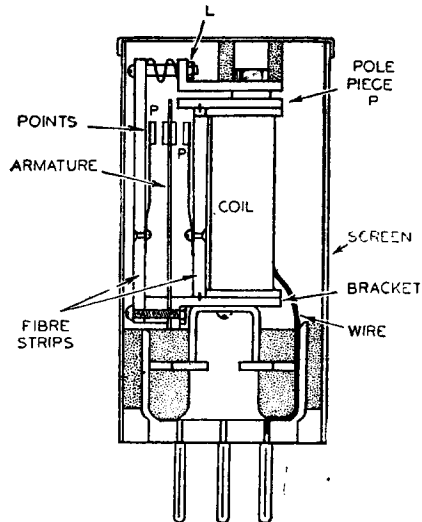


Fig. 5.—Constructional details of the vibratory rectifier.

hacksaw, and slid into place with shellac varnish as a cement. If a good fit is made the shellac is not necessary.

At the top of the vibrator will be seen another bracket on top of the pole piece. This is used to secure the top of the long fibre and to give a certain amount of adjustment to the fibre strip. Final adjustment should be made with this screw, which also has a spring under the fibre, seen in Fig. 5.

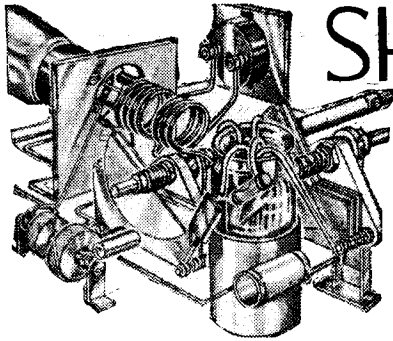
When all the parts are made and assembled the connections are soldered to the frame and the springs carrying the points. A non-rectifying instrument needs only three valve pins, but a rectifying one needs five pins.

Adjusting the Rectifier

Adjustment will be found a matter for patience, owing to the number of points, and final adjustment is best made with the complete unit in use and a voltmeter across the output. This gives a visual indication of what is happening. The whole thing is screened in exactly the same way as the first one described, but a piece of rubber tube will be better in the top of the screen, to fit over the nut.

Properly made and adjusted, this model will give excellent results, though having tried both, I personally prefer the first one, owing to its simplicity, and simplicity usually means greater reliability; in any case the adjustment is much easier.

It is impossible to give current consumptions from the battery because the efficiency varies considerably with the apparatus used, and the workmanship, but an average would be between 1 and 2 amps from a 6-volt battery, certainly not more.



SHORT-WAVE SECTION

THE STANDARD FOUR-VALVE SHORT-WAVER

Blueprint W.M. 383 describes a useful four-valver, but as the original issues are now out of print, the main details are reprinted here.

MANY constructors prefer the four-valve straight type of short-wave receiver, and the popularity of the Standard four-valver is evidenced by the large sale of blueprints. The issues of *Wireless Magazine* in which this was described are now out of print and, therefore, for the benefit of those constructors who may wish to build this receiver, the following are the main details of the circuit. It incorporates an aperiodic H.F. stage utilising an S.G. valve, followed by a triode reacting grid-leak detector. This is coupled to a small L.F. valve through a resistance-capacity coupling, and the output power valve is fed through a standard L.F. transformer. Decoupling components are included in the third stage, and the 'phones or loudspeaker are filter fed from the output stage. It will thus be seen that the receiver is more or less a straightforward job, but there are two interesting refinements in the detector stage.

Detector Refinements

Firstly, there is a small bandspread condenser connected in parallel with the main tuning condenser so that tuning may be more easily carried out. Secondly, the usual H.F. choke in the anode circuit has been dispensed with, and a resistance substituted. The output valve is fed from a volume control connected across the secondary of the L.F. transformer, and the output filter ensures that, with the wiring adopted for the panel components, and the removal of H.F. from the output stage, no hand-capacity effects will be experienced when tuning in.

The chassis is of Plymax, that is, ordinary plywood with a layer of aluminium foil on the upper surface. All earth points are taken to this surface, which also acts as a screen. Note carefully that the two leads from the tuning condenser are taken

directly to the coil—not via other components.

Home-made Choke

The H.F. choke is home-made and was wound on a length of $\frac{1}{2}$ in. ebonite tube with 60 turns of No. 28 D.C.C. wire—close wound. The neutrodyne condenser used as the coupling unit between the H.F. and detector stages has to be adjusted to provide the necessary coupling to ensure smooth reaction all over the tuning range and, therefore, some time should be spent in obtaining the required adjustment. It may take some time to get this setting right, as the coils may cover a fairly wide range and the desirable setting will enable you to change coils for any desired wavelength without having to readjust the coupling condenser. The H.T. voltage to be used with the set should be between 120 and 150 volts at H.T.2 and at H.T.1, which feeds the screen, should be between 70 and 80 volts. The grid-bias should be adjusted in accordance with the valve-makers' instructions, and these will be about $1\frac{1}{2}$ volts

for the first L.F. stage and between 12 and 16 volts for the output valve.

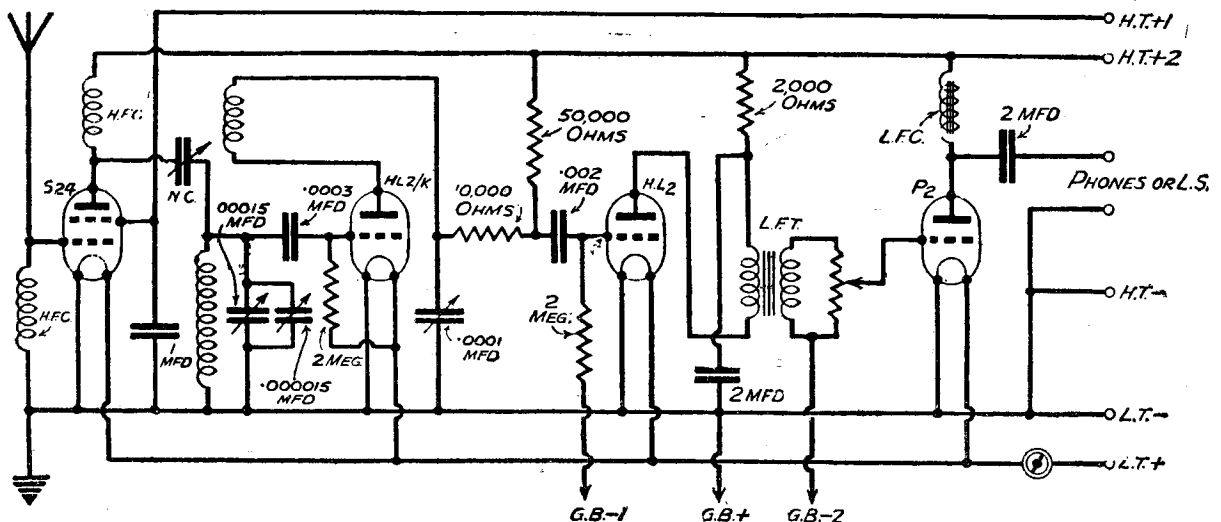
The aerial should be as high and clear as possible, preferably not longer than 50ft. On wavelengths below 100 metres it may be found that results are better without an earth connection, but the receiver should definitely be tried out with this addition, and results compared with and without the lead. A great deal depends upon the efficiency of the actual earth and the particular wavelength being used, and no hard and fast rules can be laid down.

Wave-range Covered

The coils specified for this receiver are three in number and are designed to tune from roughly 13 to 26, 24 to 52 and 46 to 96 metres. This is, however, with a .00015 mfd. tuning condenser, and as will be seen from the theoretical diagram, the tuning condenser having this capacity has in parallel with it a further .000015 mfd. variable. This means that the total parallel tuning capacity is greater than that for which the coils were designed and accordingly the wave-range of the individual coils will be increased. On the first coil you will cover the 14, 16, 19 and 25-metre bands used by broadcast stations, as well as the 20-metre amateur band. On the next coil will be found the 25, 31 and 49-metre broadcast bands and the 40-metre amateur band. The largest coil starts off in the middle of the 49-metre broadcast band, which really spreads from 44 to 50 metres, and goes right up to the top of the range that the average short-wave amateur wishes to cover. The 80-metre amateur band is fairly near the top of the tuning scale. The three lowest broadcast bands and the 20-metre amateur band may be regarded as daylight waves.

LIST OF COMPONENTS

- Chassis: One Peto-Scott chassis to specification.
- Choke, H.F.: One home-made as described in the text.
- Coils: One set of B.T.S. short-wave.
- Condensers (Fixed): One T.C.C. .002 mfd. One T.C.C. .0003 mfd. Two T.C.C. 2 mfd. 250-volt working. One T.C.C. 1 mfd. 250-volt working.
- Condensers (Variable): One Polar short-wave .00015 mfd. slow-motion type C. One Polar short-wave .0001 mfd. slow-motion type C. One Eddystone .000015 mfd. short-wave condenser, type 900. One J.B. neutralising condenser. One Eddystone Vernier slow-motion drive.
- Valveholders: Five Clix 4-pin chassis type.
- Resistances (Fixed): One Erie 10,000-ohm 1-watt type. One Erie 2,000-ohm 1-watt type.
- One Erie 50,000-ohm 1-watt type. Two Erie 2 megohm 1-watt type.
- Resistance (Variable): One Erie 250,000-ohm potentiometer.
- Sundries: Tinned copper wire for connecting. Insulated sleeving. Three Clix wander plugs for G.B. connections.
- Switch: One Bulgin on-off single-pole toggle.
- Terminals: One Peto-Scott terminal strip complete with terminals to specification.
- Transformer (Low-frequency): One Ferranti AFB.
- Valves: One Marconi-Osram S24. One Marconi-Osram HL2K. One Marconi-Osram HL2. One Marconi-Osram P2.
- Loudspeaker: One Stentorian W.B. Standard Model.



Theoretical circuit of the Standard Short-wave Four.

Leaves from a Short-wave Log

Polish Short-wave Broadcasts

THE new schedule of transmissions has been established as under: SP31, 31.48 m. (9.525 mc/s) and SP48, 48.86 m. (6.14 mc/s), daily at B.S.T. 20.40 in the French language; at B.S.T. 19.50 in English (Fridays), Italian (Saturdays), and in French on Sundays at B.S.T. 20.40. SPW, 22 m. (13.635 mc/s), SPD, 26.01m. (11.535 mc/s), SP19, 19.84 m. (15.12 mc/s) and SP25, 25.55 m. (11.74 mc/s), broadcasts are carried out from midnight to 03.00 B.S.T. SPD gives out news in the Portuguese language at B.S.T. 00.35; SP19, a news bulletin in English at B.S.T. 02.00 and again from SP25 some five minutes later.

Belgian Congo on the Ether

A 250-WATT short-waver has been installed at Leopoldville (Belgian Congo); the call-sign is OQ2AA. It works daily from B.S.T. 11.25-13.00 on 19.78 m. (15.17 mc/s) and 31.5 m. (9.525 mc/s).

Radio Damascus Calling

It is reported that the French authorities are testing out a station at Damascus (Syria). The wavelength is stated to be 24.4 m. (12.295 mc/s). Experimental broadcasts have been heard at B.S.T. 19.00.

Albania Again on the Air

ZAA, Tirane, the 3-kilowatt station on 49.31 m. (6.084 mc/s), which was taken over by the Italian authorities, has re-started its broadcasts. They are now made in both the Italian and Albanian languages.

Another Experimental Broadcaster

ALMOST daily towards B.S.T. 19.00 the Polytechnic School of the University of Bucarest (Rumania) carries out test broadcasts on 24.61 m. (12.19 mc/s).

An Alternative to Chungking

XPSA, Kweiyang, in the province of Kweichow (China) is on the ether

daily from B.S.T. 07.00-07.00 on 43.04 m. (6.97 mc/s), with a power of 10 kilowatts. This station has been erected in view of the recent air raids on Chungking, and will carry out the same programme as this latter station.

Radio Sofia

THE 1.5 kilowatt transmitter has been regularly working on 35.44 m. (8.465 mc/s), but on a recent date was heard broadcasting on 32.61 m. (9.2 mc/s). As this is not a portion of the waveband allowable to radio transmissions of an entertainment character the change may be only a temporary one.

Budapest Tries Out New Channels

RADIO LABOR, the Hungarian station (HHAQ2), which has been testing on 25.32 m. (11.85 mc/s) and on 41.5 m. (7.23 mc/s), has also been logged by listeners on 13.84 m. (21.68 mc/s), allotted to HAS6, and on 31.17 m. (9.625 mc/s), used by HAT5, Szekesfehervar (Budapest).

Altered Wavelength

H2ET, the 300-watt transmitter owned and operated by the newspaper *Empreso el Telegrafo*, of Guayaquil (Ecuador), is stated to be working on 32.61 m. (9.2 mc/s).

La Voz De La Victor

TIPG, San José, Costa Rica, which was for some considerable time on 31.21 m. (9.612 mc/s), appears to have lowered its wavelength to 30.94 m. (9.695 mc/s) and is operating daily from G.M.T. 13.00-15.30; 18.00-20.00 and from 02.00 to 05.30, with an English news bulletin and broadcast entertainment between 03.30 05.15. The channel now adopted is immediately next to the one used by FZF6, Fort-de-France (Martinique). The address of TIPG is Casa Victor, Apartado Postal, 225, San José, Costa Rica.

BOOKS RECEIVED

THEORY AND DESIGN OF VALVE OSCILLATORS FOR RADIO AND OTHER FREQUENCIES. By H. A. Thomas, D.Sc., M.I.E.E., 270 pp., 103 illus. Price 1ss. Published by Messrs. Chapman and Hall.

THIS is one of the Monographs on Electrical Engineering, which, as pointed out by Mr. E. V. Appleton in the foreword, is written by an acknowledged authority in this field of work. It deals first with the fundamental principles of oscillation generation and then passes to the various types of oscillator and conditions for maintaining oscillation. It covers every phase of the subject including frequency changes due to temperature effects and frequency stabilisation in various types of apparatus in which valve oscillators are employed. For those students who are anxious to understand more about the valve oscillator, or for those who wish to use this type of apparatus for any purpose, the book will be found of the utmost value.

ELECTROLYTIC CONDENSERS. THEIR PROPERTIES, DESIGN AND PRACTICAL USES. By Philip R. Coursey, B.Sc., M.I.E.E., F.Inst.P., etc. 190 pp., 112 illus. Price 10s. 6d. Published by Messrs. Chapman and Hall.

THERE is probably nobody in this country who knows more about electrolytic condensers than Mr. Coursey, and in this Second Edition of his book he has taken the opportunity of correcting a few errors which crept into the first edition and at the same time put forward a number of suggestions that have been adopted in order to clarify certain points. The book explains fully the general nature of condensers and electrolytics in particular and then passes on to the origin and development of this particular component.

The different types, their make-up and function, are clearly and adequately described and illustrated, and the final chapter deals with the various applications of electrolytic condensers. Mathematical material has been reduced to a minimum and the book may be clearly followed by everyone. Every radio expert and amateur should make a point of reading it, in view of the very wide use of this type of condenser in modern radio and associated apparatus.

THE 1939 ALL-WAVE SUPER HET.

IN our issue dated July 8th last we described a 7-valve all-wave receiver in which a J.B. Linacore Tuner was employed. On page 401 of that issue an advertisement by Messrs. Peto-Scott quoted the price of this tuner at 65s. instead of 55s. As a result of this error in price the quotation for the "A" Kit for this receiver should also be reduced by 10s. The Kit "A" therefore costs £8 13s., or a deposit and 12 monthly payments of 15s.

PATENTS AND TRADE MARKS

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

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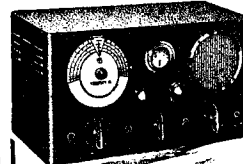
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Practical Television

July 22nd, 1939. Vol. 4. No. 161.

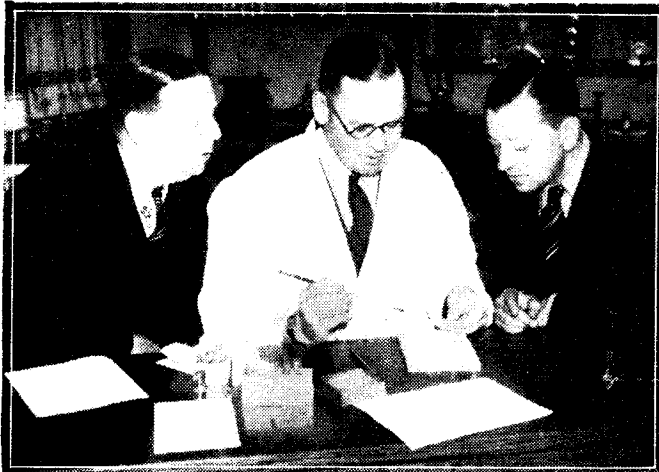
Is There An O.B. Menace?

AS one critic rather aptly put it, our old friend "the menace" is creeping in once more in an effort to reduce the number of outside television broadcasts which can be featured by the B.B.C. One of the latest was in connection with the Eclipse Stakes, a horse-race at Sandown Park which has a very popular appeal. After giving permission for the B.B.C. to televise it and allowing engineers to carry out tests and find satisfactory camera positions, the authorities reversed their decision and banned the broadcast. Surely this free advertisement of horse-racing as associated with the Sandown Park meeting was sufficient to offset the imaginary reduction in gate, which no doubt the authorities felt would be real. Television in no way constitutes a menace to these outside events where sport, physical fitness or spectacular events are featured. On the other hand, it must help them by bringing them to the notice of a wider circle of the public who otherwise would in no way be familiar with their characteristics. Once these are made known through the medium of television, the interest stimulated will create a desire in the minds of many viewers to participate in the actuality on the next occasion. Past history has proved over and over again that the so-called menaces in one form or another which have arisen in connection with divers industries have been mythical, and when co-operation has taken the place of obstruction the benefits to all have become apparent and all sections of the community have benefited.

An Ounce of Practice

A CAREFUL study of the many and varied reports of American television and reception makes very interesting reading and brings to light many of the points which occurred in the early days of the B.B.C. service but which have now become so commonplace as to be disregarded in this country. First of all, every writer comments on the excellent sound reproduction due to the use of a wide frequency band on the ultra-short waves. Too often is this negated in the case of British sets by an apparent casual attention to the design of the sound receiver and the use of loud-speakers which are cheap and of inferior quality. This is to be regretted as it deprives the salesman of a good talking point when dealing with the advantageous features associated with the sound and vision service. Then, again, it is normal practice in the United States to radiate a test pattern between items, and this has been designed with commendable care to enable the set user to see straight away the degree of line resolution obtainable with his receiver. Whether this practice is politically sound is open to question, but the engineer, as distinct from the non-technical member of the public, can see at a glance whether the set controls have been adjusted properly. There seems to be a tendency to run the cathode-ray tubes at too high a brightness level, with the result that the vertical detail in the picture is reduced to almost half that

associated with normal performance. It is truly remarkable how the average person who uses a television set does not yet fully appreciate the intrinsic value of a correct balance between the contrast and brightness controls which are provided. An excess of one or the other destroys the half tones of the picture and robs it of its true pictorial value. On the other hand, it is quite apparent that the fault does not lie wholly at the receiving end. The B.B.C., for reasons which are not disclosed, persist in using cameras of varying sensitivity, with the result that when the user has adjusted his controls to suit one camera picture, as soon as a fade-over is made to a second camera, the levels are all wrong. Where three or four cameras are to be used on any single transmission, every effort should be made to see that their performance characteristics are almost identical. This, of course, does not absolve the viewer from his share of responsibility, but until he can be satisfied that the radiated picture is above suspicion, there is a tendency



George Western watching the pathologist testing their blood for grouping at the Royal Northern Hospital.

Transmitter Control

THERE is no doubt that as far as America is concerned there is a general hesitancy to commit the television industry to any one particular set of picture standards. The R.M.A. of that country have made certain recommendations in this connection, and it is interesting to note that so far every manufacturer has accepted these findings and built either transmitting or receiving apparatus to conform to them. Lurking in the background all the time, however, is the fact that the Federal Communication Commission have in no way committed themselves on the matter, and many responsible industrialists feel that while 441 lines may be acceptable at the start of the service, the peculiar form of control which exists in America may bring about a demand for a higher standard

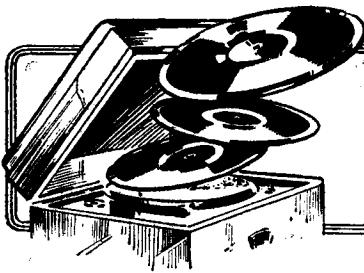
before the industry has had an opportunity really to establish itself. The engineer is giving serious consideration to the design of receiving equipment which will anticipate any fundamental changes and so remove the fear of obsolescence in the American market. If only the whole of the control of the picture definition, frame frequency, picture frequency and other vital matters could be vested in the transmitting end, then many of the economical difficulties would vanish. It is for this reason that the Du Mont system of television is being studied carefully, for the inherent characteristic of the scheme employed is that the deflecting pulses for the receiver cathode ray tube are radiated together with the vision and sound signals. Time base generator equipment is, therefore, unnecessary in the receiver proper, for the sweep wave forms after amplification are applied directly to the C.R. tube electrodes. The receiver is, therefore, irrevocably locked to the transmitter and any changes which occur at the latter, either accidental or introduced deliberately, must manifest themselves in the receiver automatically. The whole matter is one of great importance and merits a careful study, especially in a country like America, where mass production has been reduced to such a fine art, and a new industry, once started, can produce sets at a price which will ensure widespread popularity with the public.

Improving the Standard of Sport

IT has not become generally realised that the B.B.C., through the medium of its television service, is capable of improving to a very high degree the standard of play

That famous comedy team the Western Brothers were amongst the first to register and be tested for Blood Transfusion at one of the seventy transfusion centres which are now open all over the country. They went to the Royal Northern Hospital, Holloway Road, London, N., the nearest centre to their homes. This life-giving service is painless and has no ill effects. In war or similar emergency, it would be as necessary as bandages. Our illustration shows Kenneth (left) and

in various forms of outdoor summer sports. One very striking example is tennis, which has now such a very wide public appeal. Famous professionals have on several occasions appeared before the camera in the studio and given useful hints on strokes and ball control based on their experience, and it is known that many viewers have taken advantage of this free coaching and applied the knowledge given to their own individual efforts. In support of these lessons, however, the transmissions from the centre court at Wimbledon have been of an excellent character. Due to improved camera positions the pictures radiated have been of good quality and this has enabled both singles and doubles matches to be watched by those enthusiasts who are unable to make the necessary journey to view the All-England Championships direct. By studying the strokes of first-class players in this manner under actual tournament conditions, tennis enthusiasts have derived considerable benefit.



Impressions on the Wax

A REVIEW OF THE LATEST GRAMOPHONE RECORDS

A NEW novelty record this month by Ambrose and his Orchestra contains a number that has created a remarkable stir in America. It is called "The Penguin" and is composed by a young American musician named Raymond Scott, who specialises in oddly-titled tone poems for dance orchestra. On the other side is another of Scott's compositions. This is called the "War Dance of the Wooden Indians"—*Decca F 7089*.

Charlie Kunz plays yet another of his piano solos of popular tunes on *Decca F 7099*. He includes in his medley the hits of the moment, "Deep Purple" and "The Masquerade is Over."

A record that I can recommend for swing fans is The Quintet of the Hot Club of France's version of "I Wonder Where my Baby is Tonight," coupled with "Time on my Hands" on *Decca F 7100*.

The Street Singer chooses "South of the Border" and "The Masquerade is Over" for his latest record—*Decca F 7094*, whilst the famous "Blackbirds" star sings, with organ and drums accompaniment, "A New Moon and an Old Serenade" and "Our Love" on *Decca F 7095*.

Brunswick

ALREADY firmly established as a hit song is the adventurous story of the "Three Little Fishes." It is played by Guy Lombardo and his Royal Canadians on *Brunswick 02767*. The coupling is "Deep Purple."

Don't pass by a new record by Count Basie because someone has told you he is a swing pianist. His playing of "How Long Blues" on *Brunswick 02762* is unusual and compelling.

Latest word to be added to the transatlantic dictionary is "Vocadance," which means a vocal record of a popular dance tune. An example is Bing Crosby singing "I'm Building a Sailboat of Dreams" and "It's the Dreamer in Me" on *Brunswick 02768*.

By the way, I hear that the Decca Company have produced something new in the needle line. It is called the Decca Perma-point, costing 5s., and will give perfect reproduction for over 2,000 sides without being changed. Also, next time you visit your record dealer ask him for a copy of "Swing Music News," a free leaflet which, I learn, is every month, containing all the lowdown on new swing records issued by Decca, Brunswick and Vocalion.

A leading article on this leaflet explains that a new policy allows for the release of only the most authentic examples of swing. Future issues will include many records of Negro "Race" music of a kind never before issued in this country. A prize of three free records is being offered by "Swing Music News" for the best letter commenting on this bold policy.

Rex

HAVING got that off my chest, let me introduce you to a new dance. C. L. Hermann, the director of Mecca Dance Halls, has evolved this new dance in conjunction with Miss Adele England, and they call it "The Handsome Territorial."

On a new Rex record Miss England tells you how to set about learning this topical dance. While not exactly in line with an army drill manual, there are several phrases that strike a familiar note. For example, at one moment Miss England says "On the word 'Boo' bend the knees..." and dancers are told to "swing the arms smartly in marching military style." On the reverse side of the record there is Ivor Kirchin and his Band to play the music for you to practice the dance.

Parlophone

NO Parlophone list is complete without a new record by Richard Tauber, and this month he sings two arias from his Covent Garden success "Don Giovanni" on *Parlophone R 20444*.

Millicent Phillips, the young girl soprano, has recorded "One Night of Love" and "Cibiribin" on *Parlophone R 2679*, whilst Herbert E. Groh, the famous tenor, sings "Song of my Heart" and "My Heart Belongs to you Alone" on *Parlophone R 2678*.

Leslie A. Hutchinson (Hutch) has made three new records this month of six typical "Hutch" songs. First we have "We've Come a Long Way Together" and "A New Moon and an Old Serenade"—*Parlophone F 1463*, secondly "Sing My Heart" coupled with "Our Love"—*Parlophone F 1464*, and finally "Don't Worry 'Bout Me" and "Life is Nothing Without Music"—*Parlophone F 1476*.

Harry Roy and his Orchestra have a couple of records, one of which features the new hit song "Three Little Fishes"—*Parlophone F 1454*. The coupling is "And the Angels Sing." On the other record—*Parlophone F 1455*—they give their version of "We've Come a Long Way Together" and "A New Moon and an Old Serenade."

PRACTICAL MECHANICS HANDBOOK

By F. J. CAMM.

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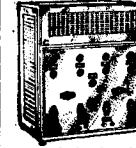
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VIBRATOR BATTERY SUPERSEDA, with metal rectifier, for H.T. from your 2-volt battery. Three output volt lappings. A boon to those who are not on the mains. Reduced from £5 15/- to Sale Price 35/-, CIRCUIT BREAKERS, Three 50 amp. Circuit Breakers, Sp. open panel type, 27/6 each. A 200 amp. ditto, with time-lag 5/20 secs., 75/-, One 100 amp. 600 volt trips pole Ironclad Switch sec., 25/-, One 100 amp. 600 volt D.P. Ironclad Switch, 20/-.

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Criticism, Chat and Comment

Programmes and Listening

Our Music Critic, Mr. Maurice Reeve, Discusses the Ideal Concert Programme from the Listeners' Point of View

THE Promenade Concerts will soon be with us again, and, before their season closes, the full autumn rush will be upon us.

At the height of the season there is so much music going on, so many masterpieces are repeated over and over again, and the new works which claim our attention seem to grow in number with the passing years, that the trouble is no longer what shall we hear but "how can we possibly fit in this or that?" The Promenade Concerts are a unique institution in more ways than one. Starting, as they do, during the close season, and running until they just overlap the start of the season proper, they place pretty nearly the whole world of music before us as in a huge tray of *hors-d'œuvre* from which we can sharpen our appetites. Although everything performed there will be repeated again and again during the following six or eight months, they enable us to see, as in a collection, music's choicest numbers. Many is the time that a person has seen such and such a work down to be played by Herr this or Monsieur that at one of the "classy" symphony concerts during the winter months, when a memory has been struck up in their mind: "Of course," they say to themselves, "that's that marvellous thing I heard at the Proms." They then, most likely, go and hear it from the comfort and luxury of the stalls and with all the freedom, ease, and expense, of which the Proms. do not permit.

Which brings me to the question of programmes.

What is the ideal programme for a symphony concert?

Of course, the Proms. are not exactly orthodox symphony concerts, although their first parts, falling before the interval and the news bulletin, usually includes a symphony.

A symphony concert must be highbrow!

Nothing whatever that is not in the highest traditions, or, as one might put it, born in the purple, musically speaking, could be permitted at the symphony concert where the stalls are at least twelve shillings each, the programmes one shilling and a withering look from our neighbour if we turn it over during the performance of an item thrown in.

Part two of the Prom. programme is so essentially popular in character, including solos and songs, that they would not, classically speaking, be considered eligible for that awe-inspiring title. But to the sincere music lover in the street, if not on the street, we are quite entitled to style them symphony concerts. After all, we "dine" at the Corner House, soup or no soup, tails or no tails, so why shouldn't we "symphony concertise" at the Proms.?

They are in Queen's Hall after all is said and done.

Ideal Programme

Apart from its being the law, the ideal programme must contain a symphony. The symphony is the form in which music is presented to us not only at its most regal and magnificent, but in its most infinite variety.

The great symphonies contain something of everything, a claim which no other work except an opera can make. An overture would also seem to be a necessity. Being composed in "first movement" form, it might be called a symphony in miniature.

There is something very stirring and pulse-quickening about a first-class overture. Not too long, and its tunes and rhythms easily assimilated, it forms the ideal curtain raiser for the pageant.

Then there is the tone poem, of which class such works as Debussy's "Après midi d'une faune" or Wagner's "Siegfried Idyll" are perfect specimens, are ideally calculated to afford contrast and relief from the mental strain of the bigger works. The pictures which they conjure up for us, in distinction to the "absolute" nature of the symphony, are a delight to the imagination as well as to the ear.

Concertos

And lastly come the concertos for a solo instrument, and the vocal excerpts from the operas, both with orchestral accompaniment. With the solo parts in adequate hands, few works in the whole repertory are

PROMENADE CONCERTS, 1939

IN issuing its Prospectus of the season of Promenade Concerts, to be conducted by Sir Henry J. Wood in the Queen's Hall between August 12th and October 7th, the B.B.C. announces that arrangements have been made to broadcast not less than an hour's music from each concert, beginning every night throughout the season at 8 p.m. In addition, at least two first halves, and an average of one second half per week, will be broadcast complete on either the National or the Regional wavelength.

calculated to give greater satisfaction. What is lovelier than a Mozart aria beautifully sung, or a Mozart or Beethoven concerto performed by a master of his instrument, piano or violin, as the case may be?

As an alternative to this, what more thrilling or exciting than a set of variations written round a beautiful theme, such as Elgar's immortal "Enigma" set?

Not to mention the symphonic poem, like Tchaikovsky's or Richard Strauss, telling the story in music of Romeo and Juliet or Don Juan, dramatic and pulsating, tender and luscious, by turns?

Although everything cannot be included in a programme which tradition limits to about two hours' duration, these are the dishes which comprise music's banquet. They cover the whole gamut of human emotion and no mood is left undrawn.

How to Listen

There is a very great art in listening to such a "feast," or welter, of sound, and the success or otherwise of the concert, both on the audience collectively and each one individually, will certainly depend on the frame of mind we are in when we

enter the hall and on our reactions to each event as it passes in front of us. When a performance goes wrong it is not an uncommon observation that the reason was that the artist had had a quarrel with his wife, or that she had given him something for his dinner which displeased him. Have you ever wondered at what went wrong when you listened and things did not come up to expectation? The almost invariable reason given is that the music itself was at fault. "It was too highbrow." "No one can be expected to understand such stuff." And "the chap must have been drunk when he wrote it," are the commonest expressions, made when we hear something we do not like. The reasons are twofold. Firstly, we sit down to listen in the wrong frame of mind. Probably we should never have gone to a concert at that particular time at all. When listening in we frequently realise, before the particular programme commences, that favourable conditions for doing it justice cannot last until it is over, even if they should be present when it began. It is obvious, for instance, that we can allow more latitude when variety and certain types of light music are coming over than during the transmission of classical music. They require less concentration and the "thread" of what is going on is much easier to pick up each time one is compelled to drop it; consequently one can much more easily "forgive" intrusions and interruptions either at the telephone or the front door bell than one can when Beethoven is absorbing our attention. If our attention to a symphony, or any piece of music for that matter, has to be abandoned halfway or badly cut into during the performance, then the portion we do hear of it is worse than useless.

Programmes might be studied, too, with much greater care. Good music should never be "turned on." Without claiming any superiority over rival forms of entertainment, it just cannot stand that treatment.

Another Reason

The second reason why classical music is sometimes apt to pass over our heads is that we do not know quite what to look for in it. This, of course, is a very big subject and can only be mentioned here. The form of the work and the ability to follow the thread of its story is obviously of the first importance. Also in an understanding of its rhythms. But to get familiar with it so as to know when its great movements are coming before they actually do, is, perhaps, the finest way of assuring ourselves of the fullest possible pleasure.

And that is why Promenade audiences always get their full money's worth. It is an education to watch their faces: the pleasurable anticipation that precedes the high lights of the music followed by a look of unutterable satisfaction after they have gone.

Get to know it and the language it is written in, just as you know the language of the other entertainments you listen to and enjoy. If you do this good music will never let you down.

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.

Special Notice: Will club secretaries please send in reports in the form in which they appear on this page.

DOLLIS HILL RADIO COMMUNICATION SOCIETY
Hon. Sec.: E. Eldridge, 79, Oxgate Gardens, Cricke-wood, N.W.2.

STIRLING Corner, on the Barnet by-pass, is the location for the field-day on July 23rd. The actual site is at the rear of the "Inn" or "Hotel" on the corner. If any trouble is experienced in finding the site inquiries can be made at Hendon Park Farm, which is nearby. The transmitter, 3G8KP, will operate on 14,024 and 14,266 kc/s, and reports by any who hear the transmissions would be very welcome at any distance, and all reports will, of course, be acknowledged. It is suggested that reports should include full details of type and direction of aerial used for reception, and, where possible, note on interfering stations. We invite any reader to visit the station, especially those who can manipulate a morse-key, using the international code.

GOLDERS GREEN AND HENDON RADIO SCIENTIFIC SOCIETY

All communications to be addressed to: H. Ashley Scarlett, 60, Pattison Road, Hampstead, N.W.2.

The annual direction-finding competitions open to all interested in this work will be continued during July and September on wavelengths of 80 to 5 metres. All secretaries of radio societies have been notified, and there is every indication of a record attendance.

During the past and present anxious situations it has been most encouraging to note the value set on our work of the past ten years by the Army and Air Forces. Unquestionably the continued interest has been largely stimulated and encouraged by the generous support of the Radio Industry.

The first competition was held on May 21st, in the country about Watford—Berkhamstead—Dunstable—Hitchin—Hertford.

RADIO, PHYSICAL AND TELEVISION SOCIETY

Headquarters: 72A, North End Road, West Kensington, W.14.

Hon. Sec.: C. W. Edmunds, 15, Cambridge Road, North Harrow, Middlesex.

Meetings: Friday evenings at 8.15 p.m.

At a recent meeting of the society, Mr. C. W. Edmunds (G4KL), lectured on "Alternating Current Bridge Measurements with Home-made Apparatus." The lecturer dealt with A.C. bridge measurements of inductance, capacity, and effective resistance at audio-frequencies, in a manner suited to the needs of the advanced student of electrical engineering. Every effort was made to make clear the practical side of the subject, and the lecturer brought with him a great deal of apparatus.

Preparations are already being made for the society's field-day which is to be held in the Dorking district of Surrey towards the end of August. New members are welcome, and further particulars may be obtained from the hon. secretary at the society's headquarters.

SLOUGH AND DISTRICT SHORT-WAVE CLUB

Headquarters: 35, High Street, Slough, Bucks.

Secretary: K. A. Sly (G4MR), 16, Buckland Avenue, Slough.

Meetings: Alternate Thursdays at 7.30 p.m.

At the last meeting held on July 6th, the chief item of interest was a talk given by Mr. Houchin (G3GZ) on transmitters of 25 years ago. This talk was voted a great success by all members. The secretary was congratulated on obtaining his full call of G4MR. A discussion on conditions took place, and it was decided that on the whole DX conditions had been bad during the past fortnight. The research group held a preliminary discussion on the course of experiment to be adopted, and plans have now been made for regular listening schedules to be kept by its members. A very popular feature was inaugurated at the last meeting, viz., a query corner, a period set apart for members to submit their difficulties to the meeting at large. Quite a few troubles were cleared up by members who had experienced the same difficulty, and found a cure for it.

On the agenda for the next meeting we have a talk to be given by Mr. Paine (G6PR) on "Arranging and operating a portable station for National Field-day." This talk was postponed from the last meeting owing to lack of time. Also on the agenda are the ever-popular morse classes (slow and fast), the discussion on conditions, more work by the research group, and the query corner.

The subscription is 2s. 6d. per annum, with an extra 3d. payable at each meeting to cover the cost of the club-room.

SALE AND DISTRICT RADIO SOCIETY

Headquarters: St. Mary's Schools, Barkers Lane, Sale, near Manchester.

Secretary: Mr. S. C. O. Allen (2FCQ), 31, Emmerdale Drive, Sale.

Meetings: Weekly, on Thursday evenings, at 7.30 p.m.

MR. A. T. GAFNER, who is an operator in the Royal Army Signals Corps, was welcomed as a member of the society at the meeting on July 6th. The society now has a good deal of equipment, and it is proposed to apply for an amateur transmitting licence in the near future. Several members hold A.A. or full transmitting licences. Slow morse transmissions on the 1.7 mc. band, proved very successful; further practice periods are planned for the next few weeks. It was decided to communicate with shipping companies to see if arrangements could be made to visit the radio room of a steamer at Salford Docks.

Application is to be made for affiliation to the Radio Society of Great Britain.

Readers of this magazine who are interested in

amateur radio will be welcomed as members of the society. The subscription is sixpence per week, and the entrance fee one shilling.

THE SURREY RADIO CONTACT CLUB

Headquarters: 79, George Street, Croydon, Surrey.
Hon. Sec.: S. A. Morley, 22, Old Farleigh Road, Selsdon, Surrey.

The July meeting of the above club included a very interesting and instructive talk and also a demonstration given by Mr. B. Wardman (G5GQ) entitled "Construction, Calibration and the Use of Frequency Measuring Apparatus."

Mr. Wardman described in full the construction and operation of the frequency meter which he had built. With the aid of G3IG's superhet receiver he then demonstrated how the meter worked, and when checked up, it was found to be perfectly accurate.

Will prospective members please note that there will be no club meeting held during August; the next one to be held will be in September.

TELEVISION FEATURES

TELEVISION AT ROEHAMPTON

SUMMER sports and a fashion display are to be televised from the Roehampton Club during a four days' visit by one of the B.B.C. mobile units from July 26 to 29.

On July 26 viewers will see a demonstration of bicycle polo. The rules are very similar to those of ordinary polo, with four players a side and the same size of field.

Roehampton is the home of croquet, so the following afternoon will be devoted to a demonstration of the game, which should disprove any lingering ideas that croquet is not exciting. E. G. Heathcote will demonstrate some of the thousand and one different strokes which are possible in croquet and a commentary will be given by H. F. Crowther Smith.

On Friday afternoon, July 28, a parade of beachwear fashions will be televised from the Roehampton Swimming Pool with commentaries by Betty Cameron Smail and Jasmine Bligh, the television announcer.

Two separate transmissions will come from Roehampton on Saturday afternoon, July 29. First a display of trick diving will be given by Frank Foster and Tony Zukas. Tony Zukas is an American swimmer who has won more than sixty medals. On leaving the University of Iowa, Zukas became a professional swimmer and has been swimming instructor at Miami and Bermuda. In 1937 he swam a distance of two hundred and seventy feet under water. Frank Foster comes from Springfield, Massachusetts. He is a professional water comedian who specialises in "belly floppers" from great heights. He appears to strike the water flat. Another trick is to escape from a bag thrown in the water. He also swims tandem fashion under water with Tony Zukas to distances up to one hundred and fifty feet.

Kayak rolling will be the subject of the final transmission. The kayak is a form of Eskimo canoe, and kayak rolling is the hazardous

business of turning a side somersault to starboard and coming up smiling on the port side, and vice versa.

THE PARNELL COMMISSION

A PARNELL programme dealing, not with the great Irish statesman's much publicised love affair, but with one of the great political triumphs of his career, was televised in the evening programme on July 18, and will be repeated in the evening programme on July 28.

"The Parnell Commission" will give a dramatic but authentic record in sound and vision of Parnell's vindication by a Royal Commission, which investigated certain letters that were published by "The Times" implicating him in the Phoenix Park murders. These murders took place in 1882 and were denounced by Parnell and the Irish Party. Soon afterwards, "The Times" published in facsimile certain letters bearing Parnell's supposed signature, which made it clear that in secret he was assisting and sympathising with the murderers.

The investigation is an interesting example of the tracing back of these documents to their original source and the breaking down in the witness box of the forger by a masterly cross-examination by Lord Russell of Killowen. It is a classic example of the trapping of a forger by means of a spelling mistake, and it ended in a great political triumph for Parnell at the zenith of his career.

The programme will require two television studios and will include shots of the Phoenix Park murders and the House of Commons in addition to the sittings of the Commission itself. Denis Johnston, who is producing "The Parnell Commission" for television, has probed the thirteen volumes of the Commissioner's Report for the authentic facts.

Mrs. O'Shea appears in only one scene, but it is believed that the characterisation will be more accurate than the popular notion of Parnell's mistress.

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All obtainable from or through Newsagents or from Geo. Newnes, Ltd., Tower House, Southampton St., Strand, W.C.2.

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).

A Four-valver: Station Call Signs

SIR,—In the issue dated Feb. 11th, 1939, you published under "Letters from Readers" a "four-valve Hartley circuit" as used by a Mr. Rumble. Thanks for your assistance in putting me in touch with this gentleman, for with his kind helpful hints I have constructed this set and it is a most useful "job."

While my "short-wave" interest in the past has mainly been concerned with the Yankee transmissions from W2XE, W3XAL and W8XK, this set has given a great impetus to listening to the "amateur bands," and up to date I have logged about 120 to 200 of these on 20 m., including all continents excepting Australia, and this brings me to my main point in writing.

Would not an article dealing with the peculiar S.W. expressions be of interest to many readers: a description of the meaning of letters used and a list of the index letters of various countries?

Recently I have heard SPIRG, CX2CO, LX1CJ, CTIQN, PA?WT, LLG3I, CO8AR and numerous others, but only in a few cases can I find the country of origin.

I seem to recall an article of this nature, which was published a few years ago.—FRANK R. HORSFALL (Leeds).

[You will find the particulars you require, and other useful information on the subject in our handbook, "Wireless Transmission for Amateurs," price 2s. 6d. or 2s. 9d. by post from our Book Dept.—ED.]

Station W1ASK

SIR,—I would be very grateful if any short-wave listener who has heard W1ASK on 20 metres 'phone would communicate with me, giving full particulars.—GEORGE A. BEASLEY, "Ash-ridge," Sketchley Hill, Rugby Road, Hinckley, Leics.

A Good 14 Mc/s Log

SIR,—I read with interest the many excellent logs submitted by your readers. Before I submit my own, here is a description of my somewhat unusual aerial.

I live in a flat, and have had great difficulties in erecting an aerial, having experimented with various types of indoor aerials with no great success. I tried the following arrangement, which works admirably. A short inverted L, about 20ft. long, and slung between two chimneys, was led in through the hall window. As the receiver is in the living-room, a long lead of screened flex is brought round on the picture-rail.

Another screened lead is brought to the receiver from a small "brush" type aerial on the top of the building through the living-room window to the receiver. The two leads, therefore, are from opposite directions and are joined together at the receiver. For short-wave listening only,

the screening is earthed by means of a short length of flex from the earth-wire, which is attached by means of a clip; I found that though the earthing of the screening makes a marked improvement on the short waves, it has a damping effect on medium and long waves.

Here is my log of 14 mc/s amateurs for the first six months of this year; the receiver is an all-wave five, all reception on loudspeaker:

W1(66), W2(73), W3(56), W4(47), W5(14), W6(25), W7(6), W8(63), W9(25); VE(18), PY(19), LU(6), VP6(3), CO(7), TI(4), XE2FC; HK(3), HI3N, VP3CO, HC1FC, HP1A, HR5C, K4(6), YV(7), HH2B, OA4(3), TG5JG, 9BA; CX(3), CE(4), KA1FH, HS—, VU2FA; PK4DO, 1AD; VK2OJ, 3HG, 3BM, 4JP; CT2(3), YM4AR, OKISZ, ES(4), OH(2), ON4(6), F(30); ZB1LE; SV1(4), PAO(3), YR5PB, AA; YL2CG, EA7BA; CT1(21), II(19); HB9(9), YU7(4), LX1AY, AP; SPI(4), SP2(3), HA(21), LY(6), SM(19), OZ(8), LA(8), FASCF, 3HC; CT3AT, SU(9), CN8(12), FBSAH.

Wishing every success to your excellent journal.—K. I. BROWNE (Peckham Rye).

CUT THIS OUT EACH WEEK

Do you know

- THAT metal gearing or other metallic moving parts can cause noises in some short-wave apparatus.
- THAT a metal chassis or baseboard can introduce losses if the layout is not suitably arranged.
- THAT special battery valves have now been produced to enable the accumulator to be dispensed with in portable apparatus.
- THAT an indoor aerial may be found very inefficient in some buildings, due to the screening effect of the building.
- THAT some highly-efficient short-wave receivers have an H.F. stage which is switched out of circuit on the shorter wavelengths.
- THAT special transformers have been produced for plate-modulation in transmitting apparatus.

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 A. Beasley, Ltd., Toney 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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AERIAL MAST DESIGN

(Continued from page 437)

and this again will weaken the entire structure. A much better material is standard large diameter electric conduit, steam piping, or hot-water circulating system piping. The local builder may also be able to come to your assistance in this connection as the hot-water pipes are often removed from a house which is being demolished, or in which replacement is being effected due to the pipes having furred up. The internal furring will not matter for a wireless mast, and will, in fact, give additional "body" to the structure. Reducing joints are also available for this material, and by using a fairly large number of separate pieces, with suitable reducers, the mast may be tapered to reduce top weight without undue weakening. Paint

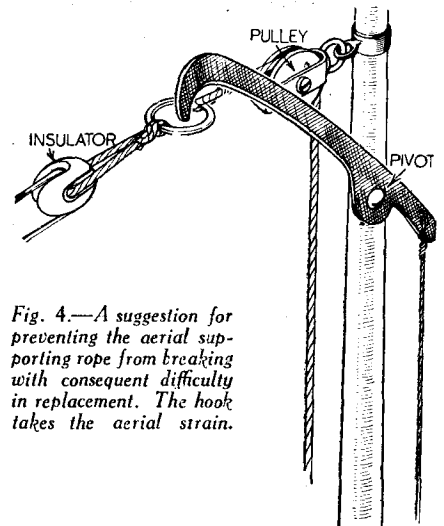


Fig. 4.—A suggestion for preventing the aerial supporting rope from breaking with consequent difficulty in replacement. The hook takes the aerial strain.

will afford protection from rust, but the electrical conduit is obtainable in a galvanised finish which will avoid the need for painting. A point to be borne in mind with regard to metal masts is that they will act as collectors of static electricity and, therefore, they should be efficiently earthed to avoid the risk of discharge. From this point of view they will obviously also tend to weaken signals picked up on the aerial unless the supporting rope is sufficiently long to enable the end of the aerial to be clear of the mast.

Pulley Safeguards

Finally, with all these masts, it must be remembered that in the event of the supporting rope breaking it will be necessary to lower the mast to replace the aerial. Therefore, some safeguard should be provided to enable the aerial to be re-attached or a new supporting rope passed through the pulley. Many various schemes of this type have been described from time to time in our Wrinkles columns, but undoubtedly one of the most satisfactory schemes is to provide an alternative support at the top of the mast so that when the aerial is pulled up into position this can take the strain of the aerial and the original rope freed. One scheme which has been suggested is shown in Fig. 4, where a metal hook is hinged at the top of the mast and provided with a wire or rope by means of which it may be raised to engage in a ring attached to the end of the aerial support. It will then hold the aerial, and the normal rope may be tied back until it is desired to lower the aerial when a pull will draw it back sufficient to enable the hook to fall clear and the aerial is then free again.

NOTES FROM THE TRADE

Marconiphone Olympia Programme

THE Marconiphone Company have announced their Radiolympia programme in which some exceptionally interesting designs will be featured. Of these the new Marconi "Auto-Drive" self-operating tuning device is particularly interesting. A motor-driven tuning condenser is fitted and a "cruiser" disc is provided for use in conjunction with the manual control. Operation of a push-button which has been set to a given station brings into operation the motor which drives the condenser and the receiver is automatically tuned to that station. A separate small motor is also fitted to operate a wave-change switch and this should be pressed for a station on a waveband different from that previously in use, the second motor is automatically brought into circuit and the waveband is changed. When using manual control operation of a control will set the "cruiser" disc working and the direction of condenser movement may be set by this control. As the pointer travels along it may be arrested and accurate tuning carried out by the manual control. Although apparently a lazy-man's device, this automatic tuning selector will be found of great advantage in a powerful receiver when one wishes to find a station transmitting a programme which fits the need of the moment—and detailed programmes of all worthwhile stations are not always readily obtainable.

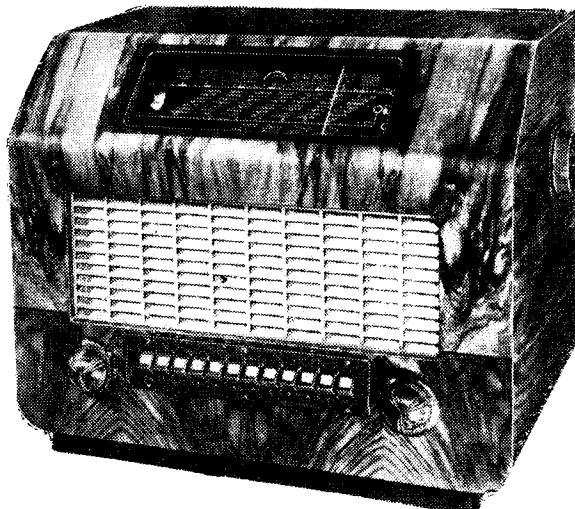
The receivers fitted with these motor-operated devices are at present two in number, Model 880, a table grand, which is illustrated on this page, and a radiogram version, Model 881. The radio chassis are identical and incorporate a seven-valve three-waveband unit covering the 16.5 to 51, 195 to 560 and 750 to 2,000 metre bands. Automatic frequency control is, of course, fitted to ensure accurate tuning with the motor-operated condenser, and a special R.F. stage is provided. The rated output is 10.5 watts and among the many refinements fitted are electronic visual tuning device; external speaker socket-switch device; record player or pick-up sockets, and the usual tone control. The table model is 19½ guineas and the radiogram 44 guineas, but it should be noted that these models will not be released until August 11th.

A wide range of other models will also be released at this time, and these include a six-valve three-waveband push-button radiogram with A.F.C.; a five-valve three-waveband push-button superhet radiogram at 20 guineas; a five-valve three-waveband superhet console for A.C. at 14 guineas; a five-valve three-waveband push-button superhet for A.C./D.C. mains at 14 guineas; a five-valve three-waveband push-button superhet for A.C. mains at 10½ guineas and a five-valve three-waveband superhet table grand for A.C. mains at 9 guineas.

New G.E.C. 20-watt Amplifier

THE range of G.E.C. Sound Reproduction Equipment has been expanded by several new items, the most interesting

of which is a 20-watt amplifier for A.C. mains embodying automatic microphone gain control and bass-treble "uplift" tone controls. The automatic microphone-gain control, which employs two separate valves on the chassis, provides a constant volume level over a wide variation in sound inputs to the microphone. By this means, it is claimed that all the difficulties associated with speakers who are constantly changing their distance and direction from the microphone is overcome and an approximate level is ensured even when the microphone is being shared by two or more speakers or vocalists at varying distances. A further merit is that it allows the volume control to be further advanced without entailing the risk of acoustic feed-back. The tone controls for treble and bass are independent on this amplifier, and serve to increase the response at either end of the



The new Marconiphone Model 880—incorporating the novel "Auto-Drive" self-operating tuner mentioned on this page.

scale to the extent of 10 d.b.; thus amazing brilliance in the upper register can be combined with heavily emphasised bass reproduction.

The amplifier employs a 4-stage circuit using two KT.66 power tetrodes in class A push-pull in the output stage. Input channels are provided for microphone, gramophone and radio circuits, and the output is linear between ± 2 d.b. up to 10,000 cycles. A microphone-input transformer is incorporated, and also a multi-ratio output transformer.

The G.E.C. De Luxe 20-watt Amplifier is available in chassis form, with protective metal cover, at a list price of £28 10s.; as a rack-mounting panel assembly at £31, or in an automatic record-changing gramophone assembly, playing mixed batches of eight 10in. and 12in. records, at £46.

To operate with this amplifier, and with all other amplifiers in the G.E.C. "De Luxe" Range, there is also being introduced a new G.E.C. moving-coil microphone. This model has been specially developed for public-address work, and has a carefully regulated frequency response designed to minimise feed-back and boom, without loss of bass, and with a total

absence of harmonic generation and inter-modulation. Measured across the secondary of a 50:1 step-up transformer its sensitivity is minus 50 d.b. at 1,000 cycles, which allows it to be used with a medium-gain amplifier, while its frequency response is substantially linear between 50 and 6,000 cycles, and effective up to 16,000 cycles.

The microphone is finished in matt black with a contrasting bright nickel-plated front ring, and an extremely interesting feature is the method of mounting that is employed. A recessed rubber-mounted socket with bayonet fitting is provided in the base of the microphone, giving immediate positive connection to the two specially-designed microphone stands that are available. One is a table stand, the other a floor stand. Both are black and chromium and fitted with a spring-loaded self-locking bayonet type mounting device connecting with the resilient socket in the microphone base.

Once placed in position the microphone head is firmly and securely held proof against shocks and cannot be accidentally dislodged, although it can be removed in a second by releasing the spring grip. This mounting device also allows the microphone head to be tilted backward or forward so that it may be adjusted at a suitable angle without being raised to a height that would obscure any part of the speaker's face. Both stands are adjustable in height with an easily-secured locking device, and the necessary connecting lead is taken internally down the tube through a cable entry that does not allow the cable to get lost inside.

The list price of the BCS. 2280 G.E.C. Moving-Coil Microphone is £6 5s., while the BCS. 2247 Table Stand is listed at £2 10s., and the BCS. 2248 Floor Stand at £3 15s.

G.E.C. Fit Television Suppressors

THE General Electric Co., Ltd., has arranged for television suppressor equipment to be fitted on all G.E.C. vehicles operating within the television area. Not only are all vans and lorries, as well as the fleet of sales cars, being so equipped, but the same procedure has been made available, free of charge, to all private cars belonging to members of the staff.

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By F. J. CAMM

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TELEVIEWS

C.R. Tube Deflection

AN immense amount of work is being directed towards the whole question of cathode-ray tube beam deflection for providing the requisite scanning field essential for the reproduction of satisfactory television pictures. Changes in tube design, especially in so far as the overall length and shape of the glass bulb is concerned, bring in their train new problems for the designer of the time-base generator equipment and the deflection apparatus. In many cases the scanning voltages required to produce full deflection within the mask area reach uneconomical limits, and various schemes are resorted to in order to produce the effect desired without unduly adding to the costs involved. One method which was disclosed recently for enlarging the scanning dimensions in either of the line or frame directions or both, if desired, used permanent magnets positioned between the front fluorescent screen and the deflecting plates of an electrostatically operated tube. It was stated that the magnetic field provided in this way increased the degree of deflection of the cathode-ray beam without adding to the amplitude of the deflecting voltages. This was said to give greater accuracy in the formation of the saw tooth deflection voltages and reduced the risk of non-linearity by keeping the working stroke within the correct charging limits.

An American Delay

IN spite of every effort it is now learned that the television transmissions of the Columbia system of America which were scheduled to commence with the opening of the World's Fair at New York, will not start until a few weeks later. At the present moment, Mr. Gilbert Selde, the director of television programmes to that company, is on a visit to this country. Naturally, much of his time has been spent at Alexandra Palace, and he has been loud in his praise of what he has seen, and admitted that the truth is that but little is known of television except what is being done in England. Apparently, one of the biggest difficulties which confronted the Columbia engineers was the installation of the transmitter in the Chrysler Building. The actual radio transmitter equipment is accommodated on the 73rd and 74th floors of the building, and over six tons of cable for electrical power had to be brought from the ground level to furnish the necessary supplies. Added to that was the fact that the aerial itself had to be anchored to somewhat flimsy steel plates which form a decoration to the dome of the tower, and yet it has to withstand a wind velocity of over 150 miles per hour. These are the main contributory causes of the delay, but it is hoped that once started the television transmissions will be satisfactory.

French Progress

THE recent action of the French Chamber's Finance Committee in approving a proposal to vote another £50,000 for television foreshadows further interesting developments in the service of that country. This sum of money is to be diverted from another section of the Post Office budget, but the important point is that progress is being made, whereas this country is still marking time with its developments. The actual programmes which are now radiated from the Eiffel Tower transmitter in Paris have taken on a very varied character, and total 1½ hours daily. Items

of interest and amusement for Parisians have improved the entertainment level to a large degree, while the French still have the satisfaction of knowing they possess the most powerful ultra-short-wave television transmitter in the world. The full rating of aerial power for peak white in the signal is 45 kW, although it is run normally at two-thirds rating for the present service.



Van Straten, the popular band leader from Quaglin's restaurant, who is often heard over the radio with his band.

Focusing Compensation

WHEN the beam of electrons in a cathode-ray tube is focused either by electrostatic or electro-magnetic means, the original diverging stream emerging from the anode orifice is made to converge so that in the plane of the fluorescent screen it is a minute, sharply-defined area of

brilliant intensity. If a cross-section of the beam was taken in the plane of the main tube axis, the parameters of the beam would be very similar to that of light, and beyond the plane of the screen the beam would start to diverge once more. Over a short axial length in the neighbourhood of focus, however, it will be found that the beam is substantially parallel. The higher the magnitude of the final accelerating anode volts, the greater is the axial length of the beam where the uniform cross-section is maintained, and this acts as a form of compensation when the screen distance from the focusing coil is not radially the same. In addition, when cases arise where the screen is obliquely mounted to the axis of the electrode system, this compensation allows the beam to remain in focus over the whole area of the screen without the necessity for electrical devices to maintain focus. At the high anode voltages used in projection tubes where this oblique scanning is resorted to, this natural focus maintenance means that the only correction which has to be employed is that for keystone distortion. This is a relatively simple matter and requires a progressive reduction in line scan width from the top to the bottom of the screen.

Americans Urged to Foster Television

ONE of the members of the American Federal Communications Commission, when addressing the R.M.A. recently in Chicago, urged both the radio manufacturers and the broadcasting authorities to foster the development of television, otherwise they will not be in a position to urge for protection when someone else undertakes the work. This may have been a hint at the English interests who are known to be making praiseworthy efforts to prove that British equipment for either big screen working or home reception is capable of giving good results in that country. Following up his opening remarks, the speaker went on to point out that it would be unwise for the industry to lead the public into the belief that television has reached a stable service on a national or even a regional scale. The year 1939 is only witnessing the early stages of practical technical development, and it would be several years hence before they reach the standpoint of stabilised operation of a satisfactory service on anything approaching a nation-wide scale.

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

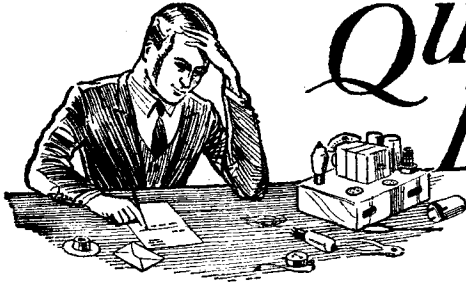
- 18429.—Ashton, H.—Antenna for radio broadcasts. June 24.
 18788.—Baird Television, Ltd., and Willans, P. W.—Electron discharge devices for use in television, etc., systems. June 27.
 18801.—Belling and Lee, Ltd., and Hodby, A. L.—Dipole aerials. June 28.
 18701.—Burndept, Ltd., and Holmes, R. G. D.—Radio-receivers. June 27.
 18333.—Carter, T. M., and Engray, G. V.—Superheterodyne radio-receivers. June 23.
 18349.—Hazeltine Corporation.—Automatic control system for television receivers. June 23.

18192.—McDonald, E. F.—Loop antenna. June 22.

Specifications Published

- 507839.—General Electric Co., Ltd., Bligh, N. R., and Bloch, A.—Wireless receiving apparatus.
 507840.—Nicoll, F. H.—Cathode-ray tubes.
 508065.—Scophony, Ltd., Sieger, J., and Okolicsanyi, F.—Supersonic wave light modulating devices.
 507667.—General Electric Co., Ltd., and Espley, D. C.—Apparatus for transmitting television and the like.
 507668.—Howe, A. B., and Macnamara, T. C.—Television.
 508076.—Leonard, J.—Television scanning.
 508048.—Marconi's Wireless Telegraph Co., Ltd., and Bohm, O.—Aerial systems.

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.



QUERIES and ENQUIRIES

periphery to prevent movement. The weight so afforded will enable the dial to be "spun" and it will then quickly traverse the scale and is easily stopped at the approximate position required.

Signal Strength Meter

"I am very interested in your recent article on signal measurements, but I am not certain what is the best way to include such a meter in my home-made superhet. The combination is R.F., F.C., I.F., followed by second detector and L.F. circuits. Would a standard 1 mA do in this case, and what do you recommend as the best circuit for it? I believe it is possible to use a special valve for the meter in some cases, but this was not explained in the article."—L. F. E. (Newcastle-on-Tyne).

YOU do not state whether your second detector is of the D.D.T. type providing at the same time A.V.C. If there is no A.V.C. a signal meter is not a simple proposition, if really reliable indications are to be given. If there is A.V.C. then, as explained in the article, the change in anode current of a controlled valve is the most satisfactory signal strength indication, and therefore the meter should be joined in the I.F. circuit where the signal strength is obviously strongest. Either the anode or screen-grid forms a suitable feed to the meter, arranged in a bridge circuit as already described—in such a circuit we would prefer the S.G. feed. A valve can be fed from this stage to give increased current readings, but this refinement is not generally called for with a simple type of receiver such as you describe.

Simplified Tuning

"I have built a reasonably good T.R.F. short-wave receiver, but am up against a difficulty which I see you often speak about, namely, tuning. On the 20 and 30-metre band, for instance, there are dozens of stations, but all so close together that I find it very hard to separate them out. I borrowed a very expensive slow-motion drive from a radio friend, but with this it took such a long time to go from one end of the scale to the other that I could not consider using this in the set. Can you give any idea of a suitable idea which you may perhaps have given in your Wrinkles pages at some time?"—C. V. (Bexhill).

THE difficulty is certainly one which is not easily overcome, although the band-spread idea is a very good compromise. Undoubtedly one of the most satisfactory ideas is to build your own drive and scale, making the latter the full length of the panel in a horizontal form. With a vertical pointer travelling on a cord, and with the aid of the small pulleys used in a well-known constructional toy, you can obtain very high-ratio gearing to give you the desired critical adjustment. Then, to overcome the difficulty of turning from one end of the scale to the other we suggest that you make flywheels to mount on the main spindles. These are easily made by taking a 2d. blacking tin, putting the desired spindle through the centre of the tin, and filling it with lead. Stand it on a gas ring till the lead runs freely and afterwards punch at one or two points round the

S.W. Coil Spacers

"I am trying to make up some air-spaced short-wave coils, but for the purpose I have in view I must have adequate insulation and air spacing. Most ideas I have seen include some insulating material as a support, and I am afraid that this might not be good enough for the particular coils I have in mind. Is there any special idea you could recommend, such, for instance, as might be adopted in transmitting coils, which would give me the desired results?"—L. W. T. (Harrow).

WITHOUT knowing your exact requirements we cannot give definite advice, but we would suggest that you use a fairly small diameter former made from paxolin

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.

or ebonite, and then wind your coil with thick wire, obtaining the necessary support and spacing by means of beads, such as are employed in high-voltage electrical apparatus. These could be placed over the wire and held at intervals to give the desired support. Ordinary cheap glass beads might be suitable, although they may not offer the same insulation properties as the special beads sold for electrical purposes. On the other hand a ceramic coil former, such as is employed for transmitting tank coils may be perfectly satisfactory for your purpose. These cost 4s. each and measure 2½ in. in diameter and 5 in. in length, and have spiral grooves to take 26 turns of wire up to 12 gauge.

International Call Signs

"The other night whilst listening on a newly-made short-wave receiver I heard an amateur calling who said he was VQ2 something or other. Is it possible to tell what country he was in, and is there any book which will give me the various countries' call signs so that I can log all these

amateurs whom I may pick up?"—K. S. (N.W.9).

THE amateur in question would have been in Northern Rhodesia. We have published the amateur prefixes and other code data, but if you are desirous of reporting to the amateurs you should obtain a copy of the Amateur Call Book from F. L. Postlethwaite, of 41, Kinfauns Road, Goodmayes, Essex. This costs 6s. post free and gives the addresses and other data of amateurs in all parts of the world.

Modifying a Transformer

"I have a new transformer, the ratio of which is 3 to 1. Can I make it into a 5 to 1? If so, how can I do this?"—W. G. (W.1).

THE ratio of a transformer is dependent upon the relation between the turns in the primary and secondary. Therefore, to increase the ratio the primary must be decreased or the secondary increased. In the former case you would probably find that the amount of wire left after stripping down to obtain the desired ratio would be insufficient to provide a suitable inductive load for the valve with which it is used and it would thus be inefficient. On the other hand you will probably find that there is insufficient room on the bobbin to accommodate the necessary extra wire to load up the secondary to the required ratio. We therefore advise you to leave the component alone and you will probably find that the ratio will not be of great importance in the average circuit.

I.F. Design

"I see on looking through some catalogues a reference to air-tuned I.F.s. I should be glad if you could explain what this means and what advantage they have over standard transformers of this type."—D. R. (Spalding).

THE standard type of transformer utilises small mica pre-sets for trimming purposes. The air-tuned type of transformer, on the other hand, has a small variable condenser with air-dielectric as the trimming medium. This obviously reduces some of the losses ordinarily encountered, and in most cases the advantages of the condenser are augmented by utilising special wire or methods of winding for the actual transformer.

Radio Control

"I am anxious to make a small radio transmitter for the control of a boat on a pond. I believe that a licence is not needed for such a purpose and should be glad if you could give me details of the type of apparatus which would be permitted."—F. L. K. (S.W.9).

WE understand that for the purpose you mention a licence is not required. You must not, however, use a spark transmitter, and as the apparatus you use may cause interference with the reception of broadcasting by local wireless receiving stations or with other wireless services, you will no doubt take adequate steps to avoid this. The P.M.G. advises restriction of transmission during broadcasting hours, a limitation of the power to a maximum of 2 watts and the use of a wavelength between 100 and 150 metres.

The coupon on page iii of cover must be attached to every query

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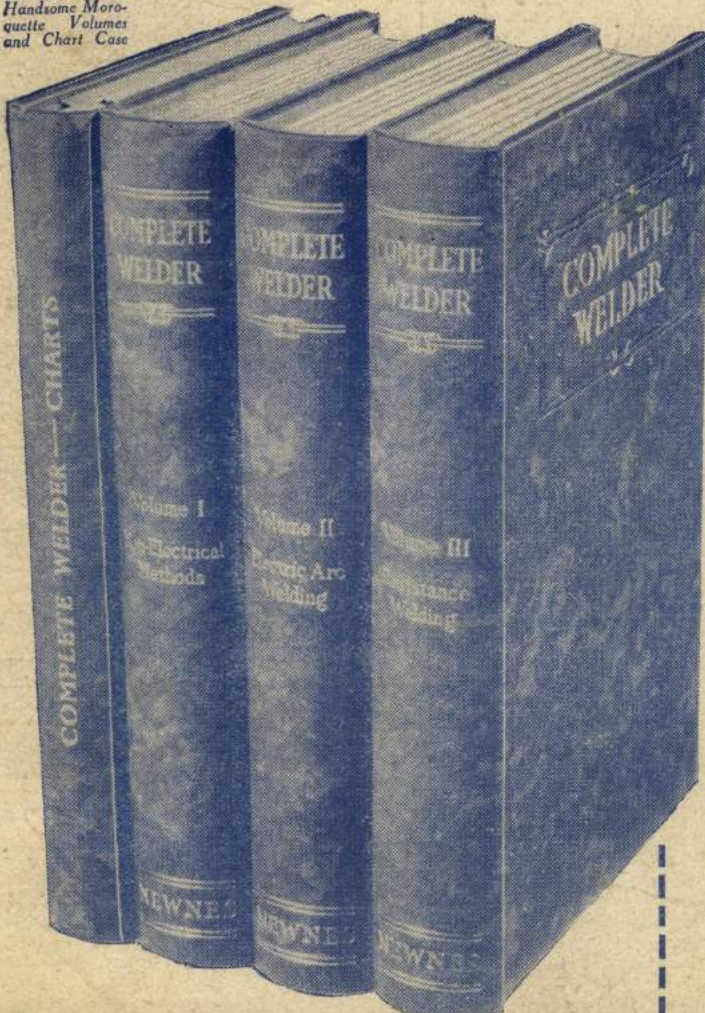
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