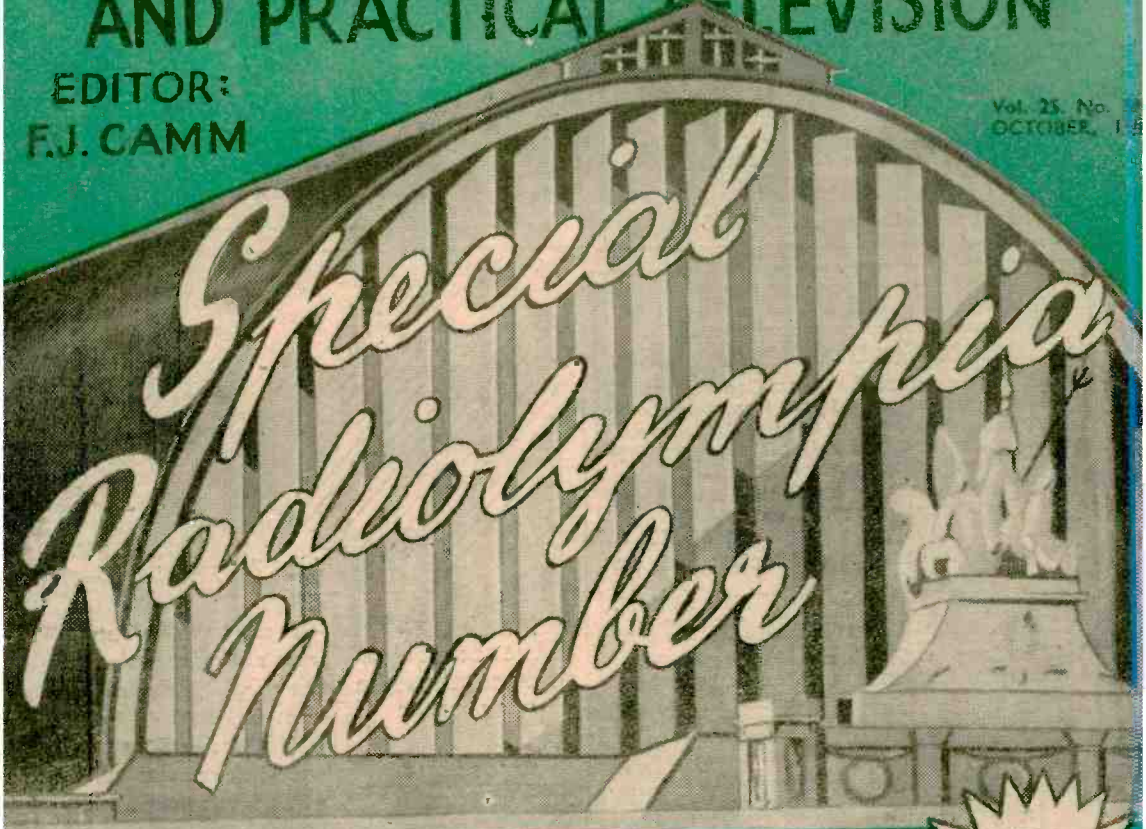
Full guide to the Show

PRACTICAL WIRELESS

AND PRACTICAL TELEVISION

EDITOR:
F.J. CAMM

Vol. 25. No.
OCTOBER, 1



Special Radiolympia Number

IN THIS ISSUE:

D.C. Oscilloscope
Making Transformers and Chokes

Two-band Experimental VHF3
A Simple EHT Unit

9D.

Practical Wireless
and PRACTICAL TELEVISION
17th YEAR OF ISSUE
EVERY MONTH
VOL. XXV. No. 519 OCTOBER, 1949
Editor E. J. CAMM

COMMENTS OF THE MONTH — BY THE EDITOR

Radiolympia

THE sixteenth National Radio Exhibition will be opened by Mr. Herbert Morrison, M.P., Lord President of the Council, on the afternoon of Wednesday, September 28th, and a peal of electronic bells will announce the arrival of Mr. Morrison, who afterwards will be invited to operate them from a keyboard in the control room. Elsewhere in this issue we provide the reader with a preview of some of the exhibits, and a fuller report of the actual exhibition will appear in the next issue.

Radiolympia is really a vast stage show of the trade and, like a West End production, a large amount of preparatory work must go in before the curtain rises. It has its producers and its scene painters, as well as its script writers who in this case keep the Press informed of anything worthy of special attention and mention. Although this is the sixteenth Radiolympia there have been many more exhibitions of radio receivers and components. This is the sixteenth of the series of exhibitions under that title, the first signalising the co-ordination of the industry under the old R.M.A. into a cohesive body.

This exhibition will be a worthy addition to the series of exhibitions which have done more than anything else to enhance the prestige of British radio and to introduce our manufactures into the shops of overseas buyers. For, make no mistake about it, Britain has led the world in radio development, as indeed it has done and will do, indeed must do, in the new field of television.

The Royal Navy, Army and Royal Air Force, as hitherto, will exhibit their radio and radar equipment, for the first time since the war, and the Department of Scientific and Industrial Research, for which Mr. Morrison is the responsible minister, the various research establishments of the Ministry of Supply, the G.P.O. and the Ministry of Civil Aviation are to give popular demonstrations. The Board of Trade will have offices for the reception of overseas visitors.

Of particular interest to Midland readers will be the television receivers specially designed for the new Midland Station. The public will be able to see rehearsals and performances in the B.B.C. television studio or on the screens of television sets of every make which will be working side by side in communal viewing halls. Mobile and business radio, transmission of newspaper photographs by radio, the use of radar and other navigational aids, as well as electronic industrial equipment, will be demonstrated by leading manufacturers. We look forward with zest to meeting once again those many thousands of readers for whom the exhibition provides the one opportunity during the year, not only of surveying the work of individual manufacturers under one roof, but also of visiting our stand, which this year is No. 100, and of exchanging views.

To the industry we should like to say this: The constructor market continues to expand, as is witnessed by the fact that in spite of the increased number of copies printed as from July 1st we have regrettably once again to place this journal on the rationed list. There is a greater demand than we can supply, and in fact the circulation has reached the levels of popular journalism and exceeds by tens of thousands the circulation one might expect to be the ceiling of a scientific journal. We urge them, therefore, not to neglect those hundreds of thousands of enthusiasts, whose experimental work in the early days helped to create the industry and to provide the pool of technical knowledge and technical men upon which the industry was founded.

We extend a cordial welcome and an invitation to every reader to visit our stand during the run of the show. There will be a member of the staff present each day to receive readers and to discuss their problems.

Our technical staff will make a complete survey of the exhibition and report upon it in the next issue. The preliminary details which appear this month are sufficient to indicate the general tendencies. There is nothing very new in the radio field, although television, as dealt with elsewhere in this issue indicates that it is making steady progress.

Editorial and Advertisement Offices: "Practical Wireless," George Newnes, Ltd., Tower House, Southampton Street, Strand, W.C.2. 'Phone: Temple Bar 4363.
Telegrams: Newnes, Rand, London.
Registered at the G.P.O. for transmission by Canadian Magazine Post.

The Editor will be pleased to consider articles of a practical nature suitable for publication in "Practical 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 Wireless," George Newnes, Ltd., Tower House, Southampton Street, Strand, W.C.2.

Owing to the rapid progress in the design of wireless apparatus and to our efforts to keep our readers in touch with the latest developments, we give no warranty that apparatus described in our columns is not the subject of letters patent.

ROUND THE WORLD OF WIRELESS

Broadcast Receiving Licences

THE following statement shows the approximate numbers of licences issued during the year ended June 30th, 1949:

Region	Number
London Postal	2,237,000
Home Counties	1,603,000
Midland	1,667,000
North Eastern	1,844,000
North Western	1,534,000
South Western	1,025,000
Welsh and Border Counties ..	701,000
Total England and Wales ..	10,611,000
Scotland	1,107,000
Northern Ireland	193,000
	11,911,000

The above total includes 147,900 television licences—an increase of 7,050.

Philips Buxton Convention

PHILIPS ELECTRICAL, LTD., held their first post-war convention from July 12th-14th, 1949, when nearly 200 delegates gathered at the Palace Hotel, Buxton—the Derbyshire spa.

The delegates, who included the company's representatives from all parts of the country, arrived by train, coach and car. One of the first things representatives saw when they arrived after dusk was the Palace Hotel bathed in a golden glow of floodlighting with Philips sodium lamps, which were also used to considerable effect for lighting the trees in the hotel grounds.

The purpose of the company's first post-war conference was to foster amongst its sales people the spirit of co-operation, mutual support and friendship. The slogan of the convention was "Together We Sell."

Brentford Evening Institute

CLASSES are held at the above institute, Boston Manor Road, Brentford, for prospective candidates of the London City and Guilds Examination for Radio Amateurs.

The winter session begins on Wednesday, September 21st, and continues until the date of the City and Guilds examination in June, 1950.

The fee for the course is 7s. 6d. and the classes are held from 7 p.m. to 9 p.m. each Wednesday.

Instruction for Television Engineers

THE series of television instruction courses organised by the Radio Gramophone Development Co., Ltd., Bridgnorth, Shropshire, and announced on June 30th last, are now suspended until September. Applications to attend these future courses, which are limited to R.G.D. dealers, should be addressed to the company at Bridgnorth.

High-voltage Test Laboratory

THE illustration opposite shows the 2½ million volt testing laboratory at the Witton Works of the General Electric Co., Ltd. The laboratory was first commissioned in 1930, but since the war has been completely re-equipped and modernised. In addition to providing the specialised information required for the design of very high-voltage apparatus, all the company's equipment for use on high-voltage systems is tested in this laboratory.

Scophony-Baird, Ltd.

MR. JAMES DESMOND PERCY was appointed a director of Scophony-Baird, Ltd., on the 20th July, 1949.

Mr. J. D. Percy was associated with Mr. John Baird, from 1928.

Broadcasting in Sweden

FOLLOWING its progressive policy of improving the medium-wave broadcasting service in Sweden the Swedish Broadcasting Administration is in the process of replacing some of its old-type transmitters by more up-to-date high-power equipment. As a result improved service areas will be obtained for the 6.84 million inhabitants, who are spread over a superficial area of nearly half a million square kilometres, and amongst whom there are more than two million radio-licence holders.

Typical factory works section as erected at exhibitions to demonstrate the use of Multicore solders.

Of three high-power transmitters ordered from Standard Telephones and Cables, Ltd., London, two have recently been put into service—a 150 kW. station at Sundsvall, in the north, and a 100 kW. at Hörby, in the extreme south of Sweden. The third transmitter for Göteborg, on the west coast, is scheduled to be in operation next year.

The new "Standard" type CM9 100 kW. at Hörby replaces an old type transmitter of low efficiency. It is interesting to note that the CM9 installation is accommodated inside the old transmitter, the latter being left in a working condition as a spare. This illustrates in a practical manner the compact, space-saving design of the new transmitter.

Death of Mr. J. H. Runbaken

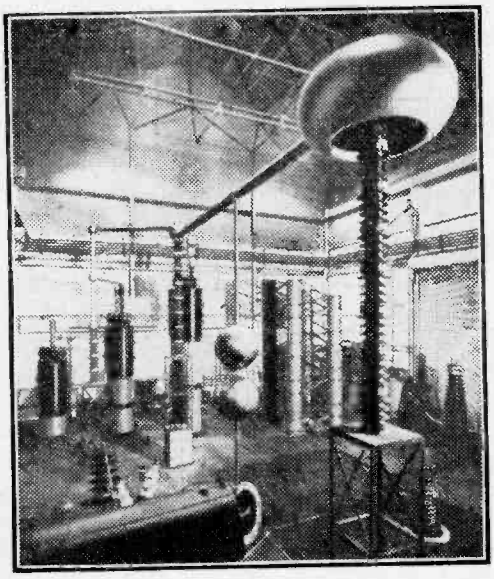
IT is with much regret that we have to announce the sudden death on July 18th of Mr. J. H. Runbaken, founder and managing director of Runbaken Electrical Products, Manchester. He founded the firm over forty years ago and his exceptional ability and enterprise are well known throughout the motor and electrical trades.

Philips Sound Equipment

PHILIPS ELECTRICAL, LTD., announce that their Glasgow agents, Messrs. C. W. Cameron, Ltd., of 57, Oswald Street, Glasgow, have obtained a contract for one of the largest Philips sound installations ever undertaken in Scotland.

The contract is in connection with the group of factory buildings of Messrs. William Collins, Sons, & Co., Ltd., of 144, Cathedral Street, Glasgow, who are one of the largest printers, binders and publishers and stationers in Great Britain. They employ a staff of 2,500 and have a total annual output of many millions of Bibles, general publications for both adult and juvenile, pocket diaries, etc.

The new installation will have three main tasks. It will be used to relay "Music While You Work" programmes, broadcast instructions and messages by executives, and be brought into use for staff location by the use of special signals.



A corner of the new G.E.C. high-voltage test laboratory.

Television in the Midlands

THE GENERAL ELECTRIC CO., LTD., are providing for their Approved Radio Dealers in the Midlands two television training centres, one situated in Birmingham and one in Leicester.

The object of this scheme is to ensure that all G.E.C. Approved Dealers are competent to demonstrate and to maintain the high standard of G.E.C. television receivers long after they have left the company's works.

The course takes five days, the first two being allocated to a brief introductory talk on the fundamentals of television and a thorough technical description and explanation of the circuits involved. The remainder of the period is entirely occupied by practical work and each dealer has ample opportunity of setting up television receivers, also the localisation and rectification of faults.

Beauty Spot and Tv.

IT is reported that many organisations in the north are expected to join the Council for the Preservation of Rural England in opposing the B.B.C. plan to build Britain's third television station at Holme Moss, near Holmfirth, in the West Riding.

The site, about 1,800ft above sea level, is one of the loveliest moorland hillsides in Yorkshire. It lies within the proposed Peak District National Park.

Radio Components Exhibition, 1950

THE seventh annual exhibition of British components, valves and test gear for the radio, television, electronic and tele-communication industries will be held in the Great Hall, Grosvenor House, Park Lane, London, W.1, from Monday, April 17, to Wednesday, April 19, 1950.

Admission is by invitation of the organisers, the Radio and Electronic Component Manufacturers' Federation (22, Surrey Street, Strand, London, W.C.2.).

Many members of the Federation are exhibiting in the National Radio Exhibition ("Radiolympia") in London, as mentioned on pages 385 to 398.

Transformers and Chokes—2

Design and Construction of Mains Transformers, Current Transformers and Chokes

By ERIC LOWDON

TABLE I can be used as a guide to choose a lamination. It gives the dimensions of some commonly used types made by Electrical and Magnetic Alloys, Ltd.

The No. 98 lamination looks as if it might fit the bill, the width of the centre limb is 1.26in. A stack of laminations 1.25in. thick will therefore give the desired area.

The length of the "window" (see Fig. 1) is 1.77in., and if a margin of .125in. is left at each end, 1.645in. will be available for the winding.

The wire tables give the turns per inch of 28 s.w.g. enamelled wire as 62.5; multiply this by the "winding factor." $62.5 \times .95 = 59$ turns per inch.

$\therefore$ Turns per layer $= 59 \times 1.645 = 97$ turns.

$\therefore$ Number of layers required for primary is:

$$\frac{\text{Total primary turns}}{\text{Turns per layer}} = \frac{943}{97} = 10 \text{ layers.}$$

Depth of copper for the primary is therefore

$$\frac{\text{No. of layers}}{\text{Turns per inch}} = \frac{10}{59} = .17\text{in.}$$

Similarly the turns per inch for 34 s.w.g. is given as 100; the effective figure is therefore $100 \times .95 = 95$ and total turns per layer is $95 \times 1.645 = 156$ turns

$\therefore$ number of layers required for high voltage secondary

$$\frac{2{,}870}{156} = 19 \text{ layers.}$$

and depth of copper $\times \frac{19}{95} = .2$in.

20 s.w.g. is given as 26 turns per inch, therefore the remaining secondaries will only require one layer each, the depth of copper for two layers being in the region of .08in.

Thus total depth of copper for all windings is:

Primary	=.17in.
H.V. Secondary	=.2in.
L.V. Secondaries	=.08in.
	.45in. total depth.

Separated Layers

Each layer will be interleaved with thin paper, say .002in. thick. The depth of primary insulation will therefore be $8 \times .002 = .016$in., and of the high voltage secondary $17 \times .002 = .034$in.

Insulation between primary and secondary will consist of paper and empire tape, say .015in. thick, similarly between each of the remaining secondaries, making an additional .03in.

A further .015in. will be added by the insulation round the coil as a whole, and lastly the thickness of the bobbin which is constructed, say, from 1/16in. Paxolin. The grand total is therefore .632in. for copper and insulation.

The window depth of No. 98 laminations is .73, and leaves .1in. to spare; this is not excessive, and may be useful should we wish to add a heater winding at a later date and will in any case take care of winding irregularities which have not been covered by the "winding factor."

It should be emphasised, however, that the efficiency of the transformer will be greatest when the winding space is completely filled, and if the surplus winding space is too large, the design should be suitably modified either by reducing the core area and consequently increasing the turns per volt, or by using larger gauge wire which would, of course, increase the rating of the transformer.

Having ascertained that the laminations will be suitable, we can now carry on with the design.

If there is appreciable resistance in the windings, some voltage will be lost. Volts drop in the primary, for instance, will result in diminished voltage on all the secondaries, whilst the resistance of the secondaries themselves will cause a further volts drop.

For accuracy this effect should be compensated for, and to do this it will be necessary to calculate the approximate *hot* resistance of the windings, which is about 20 per cent. more than the cold resistance.

Consider Fig. 2 a and b, which shows an end view of the wound coil, the dotted lines indicating the mean primary and mean secondary turns respectively.

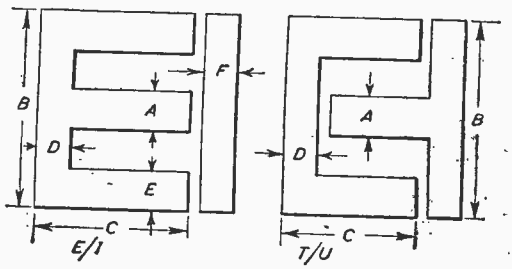


TABLE 1

SELECTION OF STANDARD LAMINATIONS

No.	Type	A	B	C	D	E	F
		in.	in.	in.	in.	in.	in.
35	E/I	$\frac{7}{8}$	$2\frac{1}{4}$	$1\frac{1}{2}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
15	T/U	$\frac{7}{8}$	$3\frac{1}{2}$	2.0	$\frac{1}{2}$		
101	,,	$\frac{3}{4}$	3	$1\frac{1}{2}$	$\frac{3}{8}$		
82	,,	$\frac{15}{16}$	$2\frac{11}{16}$	$1\frac{23}{32}$	$\frac{13}{32}$		
59	,,	$\frac{7}{8}$	$3\frac{1}{4}$	$2\frac{1}{16}$	$\frac{7}{16}$		
24	,,	$\frac{15}{16}$	3	$2\frac{1}{16}$	$\frac{7}{16}$		
46	,,	$1\frac{1}{8}$	$3\frac{9}{16}$	$2\frac{5}{8}$	$\frac{9}{16}$		
29	E/I	1	3	2	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
75	T/U	1	4	$2\frac{5}{8}$	$\frac{1}{2}$		
4	,,	$\frac{15}{16}$	$3\frac{9}{16}$	$2\frac{3}{4}$	$\frac{9}{16}$		
98	,,	1.260	3.960	2.390	.620		
28	,,	1.220	5.000	$3\frac{5}{8}$	$\frac{5}{8}$		
235	,,	$1\frac{1}{2}$	$6\frac{1}{2}$	$4\frac{1}{2}$	$\frac{3}{4}$		
137	,,	$2\frac{1}{2}$	$8\frac{1}{2}$	6	$1\frac{1}{4}$		
41	E/I	3	$9\frac{1}{2}$	$9\frac{1}{2}$	$\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$
70	,,	$\frac{1}{2}$	$2\frac{1}{2}$	$1\frac{1}{2}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$

The four corners together approximate to a circle.

$\therefore$ mean turn $= 2(L+W)+2\pi\frac{D_p}{2}$

$= 2(L+W)+\pi D_p$. (Fig. 2a).

For the primary W = 1.26, L = 1.25, D = .25

$\therefore$ mean turns $= 2(2.51)+(3.14\times.25)$

$= 5.8$.

$\therefore$ Total length of primary $= 5.8\text{in.}\times 943 = 5{,}480\text{in.}$

By dividing this figure by 36 we would bring it to yds., and from this determine the cold resistance. But we desire the *hot* resistance which is, as already stated, about 20 per cent. more. This increase is conveniently obtained by dividing by 30 instead of 36. This will give an effective length of 183 yds.

The wire table gives 28 s.w.g. as being .1395Ω per yd. The hot resistance is therefore $183\times.1395 = 25.5\Omega$.

The volts drop in the primary $E = IR$

$= .295\times 25.5 = 7.5$ volts.

This represents 3.25 per cent. of the input voltage and the secondary voltages will be reduced by this percentage.

A reduction of primary turns of 3.25 per cent. will compensate for this, and so primary turns therefore become $943-31 = 912$ turns.

The resistance of the low voltage secondaries will be insufficient to cause any appreciable voltage drop, but the high voltage secondary will require compensation if accuracy is required.

In this case the mean turn is

$2(2.51)+(2\pi\times.38) = 7.4$ (Fig. 2b).

Total effective length $= \frac{2{,}870\times 7.4}{30} = 710$ yds.

Resistance of 34 S.W.G. $= .3612\ \Omega$ per yd.

$\therefore$ Hot resistance of winding $= 710\times.3612 = 255\Omega$.

$\therefore$ Volts drop $= .1\times 255 = 25.5$ volts.

$\therefore$ Extra turns required $= 25.5\times 4.1 = 104$ turns.

4.1, of course, is the turns-per-volt ratio.

Total secondary turns are now

$2{,}870+104 = 2{,}974$ turns centre tapped.

The complete specification would be

Core: 1.25 in. stack No. 98 laminations (Silcor II or Stalloy would be suitable or any 4 per cent. silicon iron lamination).

Primary Winding: 912 turns of 28 s.w.g. enam.

Secondary Windings: 350-0-305; 2,974 turns of 34 s.w.g. centre tapped enam.; 6.3 v.: 26 turns 20 s.w.g. enam.; 5.0 v.: 20.5 turns 20 s.w.g. enam.

Construction

The bobbin is usually of rectangular section and may be constructed with or without end cheeks. The writer prefers bobbins without end cheeks, mainly because they are more easily made and it is easier to bring the leads out of the coil.

The main advantage of end cheeks is the protection which they afford the coil but they do not offer any advantage so far as the process of winding the coil is concerned. It is, however, a matter of personal taste and the reader must decide for himself.

Standard bobbins are manufactured and may be obtained from Associated Electronic Engineers, Ltd., but they can be quite easily made for oneself from Paxolin, as shown in Fig. 3.

The four sides are dovetailed together and glued; two or three layers of Empire Cloth are then wrapped and glued round it. The result is an extremely strong former but, if desired, end cheeks may be cut and fitted to the ends.

Before commencing the winding of the coil it will be necessary to devise a jig of some description, and in its simplest form this could be constructed as in Fig. 4. It is desirable, however, to have some form of geared drive, and the writer has found that a small hand grindstone is ideal for the purpose. This is attached to the jig of Fig. 4 as shown in Fig. 5. A revolution counter is attached to the other end of the spindle.

A little time and trouble spent in making such a device will be amply repaid; it is invaluable for coil winding of any description.

A wooden block is now made to fit snugly into the bobbin, a hole is drilled in the centre of the block just big enough to clear the spindle of the jig; it is then pushed into position and screwed tight. The reel of wire may be mounted in any convenient position, a rod clamped in a vice would be suitable.

There are a number of points to be observed with regard to putting on the windings. First the start of the winding must be firmly fixed. This is done by folding a piece of insulating tape over the wire, and winding over the tape as shown in Fig. 6. The end of the winding is fixed in the same way, in this case a piece of folded tape being

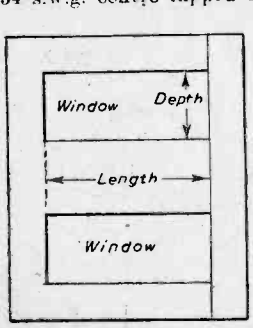
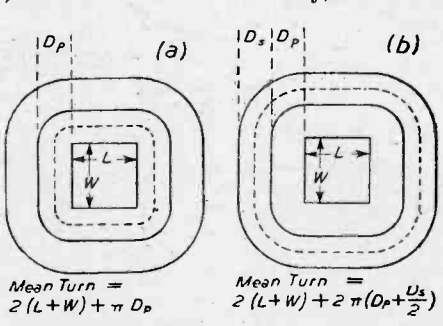


Fig. 1.—Essential details of a transformer, irrespective of the shape of the individual laminations.



Figs. 2 (a) and (b).—Section through a wound transformer (or an end view) indicating the mean primary and secondary turns respectively.

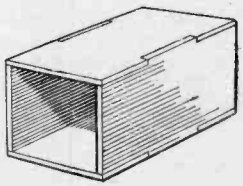


Fig. 3.—How the centre portion of a transformer bobbin may be made up. Note the dove-tailed sides to ensure rigidity.

laid down a few turns before the end of the winding, as in Fig. 7. The remaining turns are then wound over the tape and the end of the winding taken through the loop left for this purpose; the tape is then pulled tight.

Where fairly thin wires are being used, it is best to solder a piece of flex to the beginnings and ends of the winding before bringing them

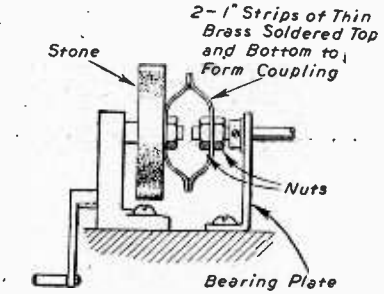


Fig. 5.—A simple geared grindstone may be coupled to the winder (shown below in Fig. 4), as indicated here.

out of the coil. Thick wires may be brought straight out.

Bringing taps out of the winding sometimes presents a problem, especially if thick wires are being used, and the method shown in Fig. 8 is probably the best. The wire is wound on up to the point where the tap is to be made; a piece of copper foil is then laid on the coil and the wire soldered on, the foil is insulated with paper and the remainder of the winding wound on.

The interleaving paper which is wound between each layer should, in addition to insulating the layers, prevent the end turns from slipping out of the winding. The method of putting it on is shown in Fig. 9. The edge of the paper is folded over the wire and the wire and paper wound on together; the following turns are wound over the overlap thus fixing the end turn.

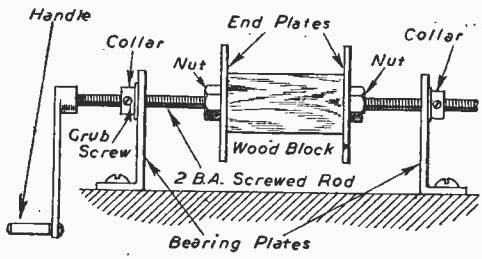
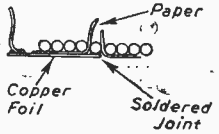


Fig. 4.—A simple form of jig of bobbin winder which may easily be made up.



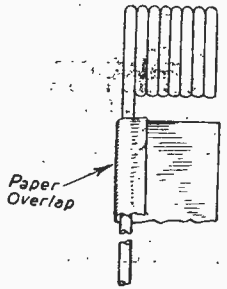


Fig. 8 (above left).—One simple method of making tapping points.

Fig. 9 (above right).—Anchoring the end turns of each winding is important and may be carried out as shown above.

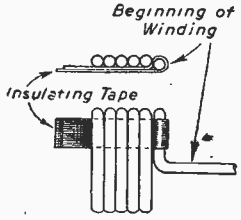


Fig. 6.—Anchor the beginning of the wire with a length of insulating tape, as shown above.

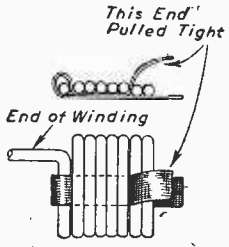


Fig. 7.—The end of the winding may be anchored in a similar manner as shown here.

As indicated in the example of design, insulation is required between secondary and primary, and between secondary and secondary; careful attention should be paid to this point.

The coil is now ready for the laminations and these should be placed so that the butting edges of each pair lie at alternate ends of the bobbin. For example, suppose we are using T and U laminations, then we begin by inserting a T in one end and a U at the other. The next pair are reversed, the T being inserted to lie on top of the U and the U on top of the T, and so on till the bobbin is filled.

The laminations are then tapped with a hide mallet or hammer and block of wood until all the edges are butting together. Any gaps will lower the efficiency of the transformer. The core is then clamped together and the transformer is ready for use.

Screened Primary

It is very often desirable to fit a screen between primary and secondary windings, especially in transformers for receivers or instruments. This is done by winding a complete turn of copper foil on top of the primary, the foil to be the same width as the bobbin. Paper insulation is inserted between the overlapping ends of the foil to prevent electrical contact and the effect of a shorted turn.

The screen is usually earthed.

Design of Iron-cored Chokes

Most iron-cored chokes used in radio are required to carry D.C. in addition to A.C. a fact which gives rise to certain complications necessitating the use of air gaps in the core.

For a given size of core, direct current, and number of turns, there is an optimum gap ratio, the gap ratio being the ratio of length of air gap to total magnetic path length.

The magnetic path length is the mean value round *one* window only and it should be observed that there are two gaps in this magnetic circuit. In calculations the gap is taken as being the sum of these.

(To be continued)

Guide to the Exhibitors

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For the Best Books, Blueprints, Periodicals, and Reader Service, visit our Stand No. 100 Ground Floor!

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RADIOLYMPIA

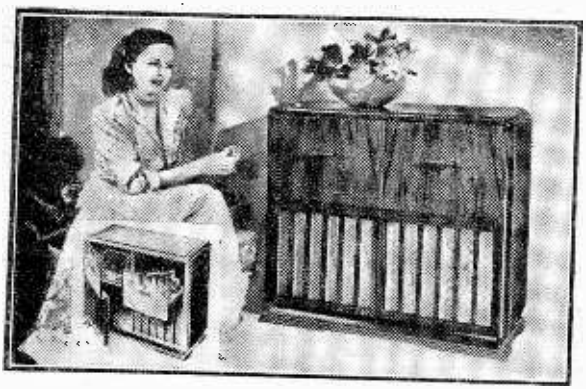
A Guide to Some of the More Important Exhibits

Acoustics Products Ltd.

"LECTRONA" loudspeakers will be featured on this stand, and will show entirely new construction, containing many new features.

The chassis encloses the magnetic system, which is completely dustproof. The magnetic system has negligible external magnetic field, and is thus admirably suitable for television receivers. The efficiency of the magnet system sets a new standard, by the incorporation of the very latest developments in magnetic alloys, and the use of a minimum number of parts.

The magnet is of the ring type, which ensures uniform efficiency throughout its cross-sectional area, and incorporates the new element niobium.



One of the attractive Alba Models to be seen on Stand No. 44.

The saturation effects of a centre pole type of magnet has been avoided, and a very generous magneto-motive force has been made available in an extremely compact design.

The acoustic performance of a well-designed, orthodox speaker has been retained, with a reduction in overall size approaching the wafer of disc type of speaker. The overall depth of this speaker is only 2in. for a total flux of 30,000 Maxwells and 1¾in. for the 5in. for the same total flux.

The vibrating system consists of a main diaphragm and voice coil moulded in one piece. Cemented joints and paper strip formers have been eliminated. The voice coil has a high-frequency diaphragm directly coupled to it, which ensures a good high-frequency response. [Stand No. 208]

The Acoustical Manufacturing Co. Ltd.

ON this stand will be seen a complete range of P.A. equipment and equipment for high-quality reproduction in the home.

The main exhibit this year will be a new type of high-fidelity loudspeaker incorporating a number of new principles, and a sound-proof listening room in the gallery will be devoted exclusively for demonstrating the performance obtained with this loudspeaker.

The loudspeaker utilises a ribbon unit for the higher frequencies which is so arranged to radiate in all directions. This is used in conjunction with a conventional type of cone unit for the lower middle frequencies and a new type of loading for the low frequencies. The whole loudspeaker is the result of some three years' work. [Stand No. 91]

Aerialite Ltd.

MESSRS. AERIALITE will be showing radio aerials; motor-car aerials; mastatic anti-static aerials; mains suppressors, and cables and flexibles, including high-frequency cables. [Stand No. 62]

Airmec Laboratories Limited

SPECIALISTS in electronic instruments, Airmec Laboratories are featuring a frequency substandard of wide application; a D.C. oscilloscope with a time base down to one micro-second; a motor-driven oscilloscope camera; a non-destructive insulation tester which provides indication of ionisation voltage, and the "Telecom," an inexpensive loudspeaking office-communication system of attractive design.

Other instruments displayed include signal generators from 30 c/s to 30 Mc/s; electronic counters; direct reading frequency meter; time interval meter; valve voltmeter; power output meter; H.F. millivoltmeter; bridge amplifier and detector; heterodyne bridge detector; process timer; photo-electric cell equipment; magnetic amplifier and a radiation monitor for detection and measurement of alpha, beta and gamma rays. [Stand No. 156]

Amplion (1932) Ltd.

THE comprehensive Amplion range includes the latest types of battery portables, A.C. and universal receivers and radiograms with both automatic and non-automatic record players.

The unique and world-famous range of Amplion "Convette" mains units enables owners of portable sets to dispose of H.T. batteries. There are four different types as follows:

Convette AD2, Convette M2V, and Convette VA1.

The Convette "Triple Master" is intended to operate an all-dry portable off the mains. Will operate it out of doors without batteries, and will also operate it from the 6 or 12v. battery of your car, boat, wind generator, etc. [Stand No. 20]

Antiference Limited

THIS firm will be exhibiting "Exstat" anti-interference aerials; "Arnine" short-wave aerials; Silmount window aerials; automobile aerials; F.M. aerials; mains suppressors; plugs

and sockets; in addition to special television equipment. [Stand No. 64]

Automatic Coil Winder and Electrical Equipment Co. Ltd.

THIS well-known company is exhibiting a large number of instruments capable of covering practically the whole field of radio engineering. Some models are already well known throughout the industry, whilst the more recent models which have been produced will be of considerable interest to the progressive and discriminating engineer.

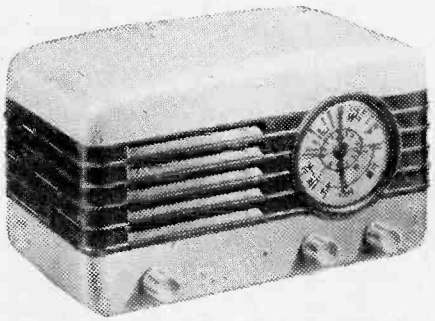
Among the various instruments which will be shown are various models of the Avometer, signal generators, coil winders, etc.

Various other models, such as a new universal bridge capable of covering wide ranges of capacity resistance and inductance, an electronic insulation set, a precision valve voltmeter, an example of testmeter type "W," an 80 range electronic testmeter built for rough usage, and various other specialised instruments will be shown. An example of a prototype resonance test set of novel design will be exhibited which will appeal to all engineers who already possess an "AVO" electronic testmeter and an "AVO" wide range signal generator. [Stand No. 85]

A.W.F. Radio Products

AT stand No. 203 this firm will be exhibiting the following lines:

A.W.F. Loudspeaker Cone Assemblies. "Exact Fit" Field Coils and Transformers. [Stand No. 203]



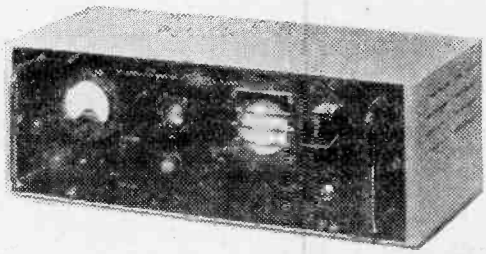
An attractive receiver in the Champion range.

Balcombe, Ltd., A. J.

REGULAR exhibitors at Radiolympia since the early days of radio, A. J. Balcombe, Ltd., once again have on display a complete range of ALBA equipment, which includes the latest developments in domestic radio receivers, radiogramophones and television receivers.

The range includes models for all purposes. For example there is the "smallest all-wave superhet," model C.112, in coloured plastic cabinets, ideal for bedside listening, for use in the kitchen and as a travelling companion. Another "featured" model will be a combined A.C./D.C. battery portable, a most compact and efficient receiver.

There are also standard table models including a semi-portable with self-contained aerial and wide voltage range of 100-120 and 200-250 A.C./D.C. There are also table models—both A.C. and A.C./D.C.—which are typical examples of the high standard of ALBA cabinet work. [Stand No. 44]



A D.C. Ionisation Tester—from the Airmec range.

Beethoven Electric Equipment Ltd.

THIS exhibit will consist of instruments to suit all requirements, including custom-built period radiograms, consoles and television receivers. [Stand No. 11]

Bell and Croydon, John

ON this stand will be found Belclere Monomite single unit hearing aid incorporating automatic volume compression, silver printed circuit, silver rhodium case, and new type long-life L.T. battery. Also to be seen are Belclere Monopack single unit hearing aid in streamlined plastic case; an invisible ear attachment for connection to any standard type of earpiece; mains power pack for supplying a hearing aid without the need for batteries; and Belclere all-mains hearing aid for home and office use. There will also be seen a pure tone audiometer for measuring hearing loss. [Stand No. 3]

Birmingham Sound Reproducers Ltd.

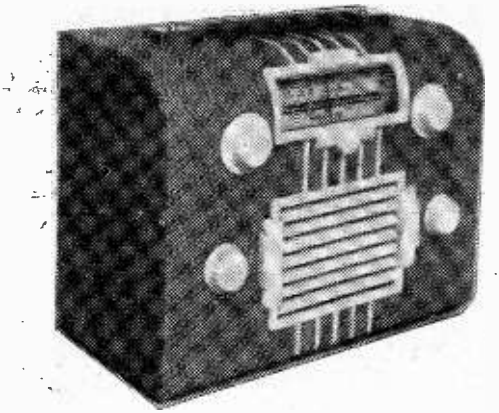
THE two main items of interest on this stand will be the new studio control console for recording work, with its associated recording room equipment, all of which are very new as far as British design is concerned, and also the new multi-way inter-communication equipment. In addition, there will be other sound equipment, motor units, pick-ups, microphones, etc.

British Insulated Callender's Cables Limited

AT this stand (No. 55) will be found a comprehensive display of aerials, capacitors and cables for all radio, television and telecommunications applications. Many of the exhibits are of specialised design to meet the most modern requirements and full use of new synthetic dielectric materials has been made. [Stand No. 55]

British Moulded Plastics, Limited

THIS firm are designers and makers of moulded plastics from all proved types of materials. Moulded articles on this stand include a range of new radio cabinets, radio grilles for motor cars and a wide range of radio components. [Stand No. 22]



Another smart-looking Champion receiver, finished in "airplane cloth."

A. F. Bulgin & Co., Ltd.

THE range of Bulgin standard and miniature products, the largest in the United Kingdom, if not in the world, will be augmented by many new products. Among these, new types of signal lamp fittings are being introduced to cater for popular and easy-to-obtain bulbs, low voltage as well as mains voltage, and new radio-receiver pilot lamp-holders (and holders for use with Bulgin signal lamp bushes), especially all-insulated and shrouded types, may be expected.

The large range of Bulgin "radio" fuses, to B.S. 646B, and like sizes, is being increased, with holders, with many new ratings.

Many new Bulgin control-knobs will be shown, in attractive shapes and proportions and—of course—in colours. New types of switches include nearby-current selectors as well as on-off types, and "jack" or "press-key" types. [Stand No. 1]

Burndept, Ltd.

AFTER many years' experience in electronic research and production of Services equipment, a special department has been organised to handle Service telecommunications problems.

Visitors will find the following electronic measuring instruments of interest: High Resistance Test Set.—Designed for laboratory measurement of high resistances. Range 10^8—10^{14} ohms, direct scale readings. Signal Generator Unit.—High-stability R.F. alignment up to 100 mc/s for rack mounting. Burndept Co-axial Switch. [Stand No. 69]

Champion Electric Corporation

THE receivers shown on this stand will include the Skymaster, a battery-mains portable 4-valve superhet; the Meteor; the Championette, a personal portable 4-valve superhet; the Venus and a 5-valve long-range export model. [Stand No. 26]

Concordia Electric Wire & Cable Co., Ltd.

ON Stand No. 5 will be found a comprehensive range of samples of the undermentioned materials:—

Electric wires, cables and flexibles insulated with enamel, cotton, silk, rayon, nylon, paper, glass, asbestos, rubber, plastic materials, lacquer, varnished cambric, etc. Resistance wires, bare, insulated. Cord-assemblies; Insulating varnishes, etc. [Stand No. 5]

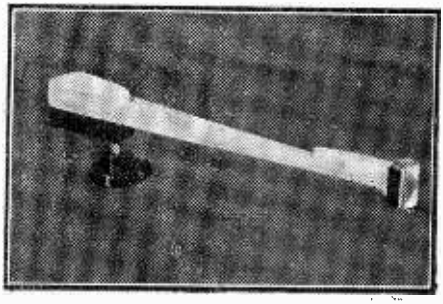
The Chloride Electrical Storage Company, Ltd.

THE Exide and Drydex batteries displayed will be representative of the wide range available, which includes Exide accumulators of the "mass" type, "multiplate" type, and "Hycap" ranges in glass containers, and unspillable and semi-unspillable cells in celluloid containers. Among these is the new Exide JSP 2 non-spill radio accumulator in its moulded polystyrene box.

Drydex high tension and grid bias batteries, suitable for every battery-operated radio set, are included in the range, which embraces plug-in types specially produced for all-dry radio receivers and the light-weight Drydex layer-type batteries. [Stand No. 193]

E. K. Cole, Ltd.

"A MODEL to suit every pocket and purpose" is the theme of the E. K. Cole display. And they make it with characteristic quality, reliability, technical advancement and style. Ekco Radio, Ekcovision (for both London and Midlands, including combined radio-television), auto-radiograms portables, car radio and (on Stand 101) aircraft communication and navigational equipment. The range also includes such "accessories" as extension speakers, television and car radio aerials, amplifiers and attenuators and the interesting new Ekco



The new Cosmocord pick-up, the G.P.20.

Solder Pencil. As usual the company will show models that make history in their technical and design advance—for example the mains-battery portable, the new Wells Coates Ekcovision console and a receiver giving high-quality reproduction with five pre-set stations instantaneously tuned. An

equally comprehensive range of receivers specially designed and manufactured for export will be on view. [Stands Nos. 58 and 153]

Cosmocord Ltd.

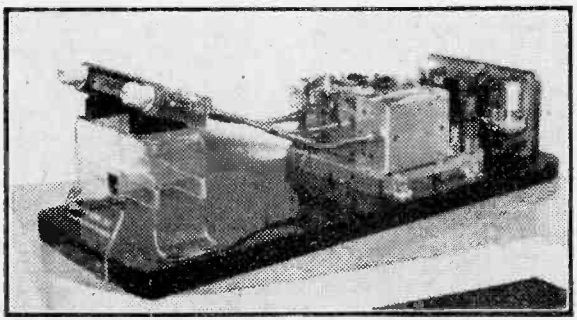
THE central feature of Cosmocord's Stand at Radiolympia will be the display of the new ACOS Microcell pick-up—the G.P.20—which is characterised by a very slender arm and a tiny, light-weight head. This model represents a significant advance in the manufacture of crystal pick-ups. Also the crystal in the G.P.20 Microcell is unbreakable and is unaffected by conditions of extreme humidity. It has provision for an interchangeable clip-on head for long-playing records. This means that when long-playing, fine-groove records come on to the market the music-lover has in the G.P.20 a pick-up which will play *all* his records.

Two other new ACOS products will also be displayed. They are high-fidelity microphones, the Mic 16 and the Mic 22. [Stand No. 7]

Devices Ltd.

THIS firm will be showing their "Rota-Time" Programme Preselector, designed to switch on and off radio and other domestic electrical apparatus to a previously set programme. Provided with 20 individually adjustable switches, this instrument enables the whole day's radio programme to be chosen the previous night, after which the radio is switched on and off for each item.

They will also show the "Rota-Time" Signal Timer, designed for use in shops, factories and offices, to give start, tea-break, lunch and stop signals of adjustable duration to a fixed pre-set programme. Provision is also made for alarm and staff-location signals. Other items will include various photo-electronic devices for sorting and separating articles according to their colour. [Stand No. 103]



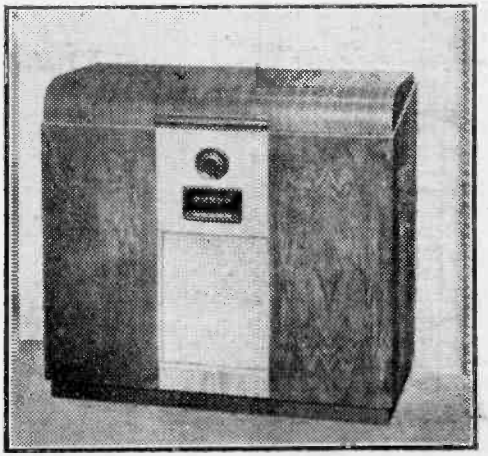
Car radio in show form. See this on Ekco Stand No. 58.

Electrical and Radiological Instrument Co. Ltd.

THE main exhibit on this Stand will be a gramophone unit with fixed speed and variable speed. This equipment is able to reproduce records such as micro-groove records and also standard records. The variation of speed is continuous and is obtained by electrical means. This is an entirely British invention and is causing great interest in America. There will also be a small radio receiver; intercommunicating equipment; sealed transformers; bimetallic radiation recorders; two-phase motor; loudspeakers; pick-up and amplifiers, mixers, etc. [Stand No. 181]

Fitton Ltd., R. N.

THIS firm makes the popular Ambassador range of receivers and this year are specialising in quality reproduction which is strongly emphasised in the 8-valve 849 series. There are two domestic radiogramophones, both of which have record-storage capacity, the lower priced model holding



Simplified control in the new Ekco Model ARG.85.

150 discs and the de luxe model holding over 250. All the 849 models have twin speakers, push-pull output, independent treble and bass controls, flywheel tuning, and the tuning scale is unusually wide, there being an 11in. pointer traverse which greatly facilitates the logging of stations. All the medium-wave B.B.C. stations are grouped separately. The two radiogramophones use mixed automatic record changers taking 10in. and 12in. records in any order. Miniature light-weight pick-up for high-fidelity reproduction puts less than 1 oz. needle pressure on the record surface. These instruments are capable of producing the entire frequency range used in modern recording. In consequence, the comparison between recordings played on ordinary radiogramophones and the 849 is most outstanding. [Stand No. 80]

Garrard Engineering & Manufacturing Company Ltd.

HERE will be seen gramophone units of various types. All the models of the record changers will be demonstrated, and the Model V/AD radiogram unit will be demonstrated playing on a rocking table to illustrate its suitability for use on board ship.

A new introduction is the plug-in pick-up head which is easily interchangeable, enabling the user to use the more sensitive high-fidelity type for his best records, fitting the robust standard magnetic pick-up for general family use. [Stand No. 79]

General Electric Co., Ltd.

THE radio section (Stand No. 38) will be divided into two main parts, a television room in which the company's range of television receivers will be shown, with a demonstration of model BT.1093, 7094 or 9144 and an open section of the stand on which will be displayed all receivers and radiograms made by the G.E.C. for the home market and a selection of the special models made for export. These exhibits will be supported by a comprehensive range of dry batteries and accessories.

The electronics section (Stand No. 175) will carry samples of radio communication equipment, including some of the V.H.F. transmitters and receivers developed for commercial and industrial use and incorporating frequency or amplitude modulation. Airborne equipment will be shown, also the radio compass developed by the G.E.C. in conjunction with the Royal Aircraft Establishment.

Other exhibits on this stand will include a representative selection of Osram products, including cathode-ray and geiger-muller tubes, photocells and valves. The last group will embrace valves in the broadcast range (transmitting and receiving), co-planar valves and magnetrons.

There will be a selection from the very wide range of G.E.C. sound equipment, covering loudspeakers, amplifiers, microphones, rack equipments and the new G.E.C. tape recorder.

[Stands Nos. 38 and 175)

General Post Office

THE G.P.O. will have an attractive display in the gallery of the National Hall to emphasise the part played by the Post Office in the whole field of communications and the contribution made by the Research Station of the Post Office Engineering Department in improving the public services.

The Post Office has always been concerned with radio as a public service and this is reflected in other exhibits on the stand. There will be a reproduction of a Post Office Coast Radio Station and visitors will be shown the way in which distress calls from ships at sea are treated. The P.O. coast stations, in addition, maintain constant radio communication with the coast-wide shipping and the fishing fleets around the British Isles.

The problems of radio interference are also examined. There is an interesting exhibit showing the improvement in the quality of wireless reception which can be effected by the use of a good aerial and by the suppression of interference from outside electrical sources. [Stand No. 301].

Goodmans Industries Limited

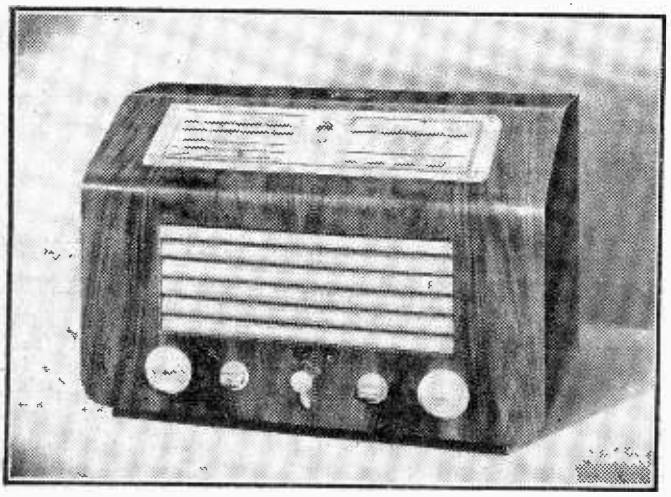
MESSRS. GOODMANS are planning to exhibit on Stand No. 6 in the Grand Hall their well-known "Axiom" high fidelity loudspeakers and the latest version of the medium and heavy reproducers. Among the former, the latest 20 watt twin-cone high-fidelity permanent-magnet loudspeaker "Axiom 22" will prove of special interest to those readers who desire high fidelity and power reproduction combined in one unit. Among the series of medium and heavy duty loudspeakers, the latest 20 watt 12in. permanent magnet loudspeaker R22/12 will represent an interesting addition.

A new portable by Invicta—on Stand No. 71.

Facilities are to be provided on the stand to enable the public to study the wide frequency response range of the Axiom high fidelity unit, and to see a demonstration of one of these units in a sound chamber fed with varying sound waves at low intensity. [Stand No. 6]

Haynes Radio Ltd.

IN addition to the television equipment described on page 30, Messrs. Haynes will be showing a quality radio tuner (two H.F. stages, amplified A.V.C. and tuning meter, chassis form); a quality amplifier, with output stage of two PX4 type valves in push-pull, in chassis form, and other units. [Stand No. 9]



In the H.M.V. range this Model 5201 has a number of novel features.

Hunt Limited, A. H.

ON this stand will be seen dry electrolytic, foil and paper, metallised paper, stacked mica, silvered mica, condensers, trimmers and padders, in a wide range of types for service trade replacement.

The capacitor analyser and resistance bridge will also be seen. [Stand No. 173]

Invicta Radio, Limited

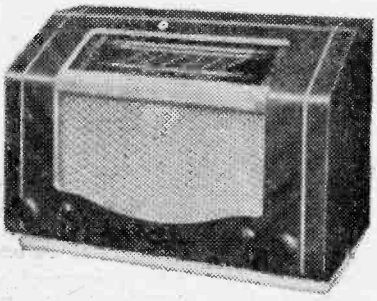
THE various models to be seen on this stand will include:

Model 55, known as the "Twinvicta." This is a battery mains portable receiver retailing at £14, including tax, but not including batteries.

Model 31 has an unusual feature in the incorporation of the trawler waveband. Naturally this set is in great demand in the fishing areas, and amongst the coast guards.

Model 73 is a new model, incorporating the Invicta simplified bandspread tuning.

Model 42 is an all-wave battery receiver with the trawler waveband; full details not yet available.



This is the Invicta Model 73—a 5-valve superhet for A.C. or D.C. supplies.

Model 91G.—This is a luxury auto radiogramophone.

Model 25 is a battery portable receiver. Full details not yet available, but will probably sell at about £14, including tax, but not including batteries.

Models 91, 92 and 72.—These are export receivers. [Stand No. 71]

Kolster-Brandes, Limited

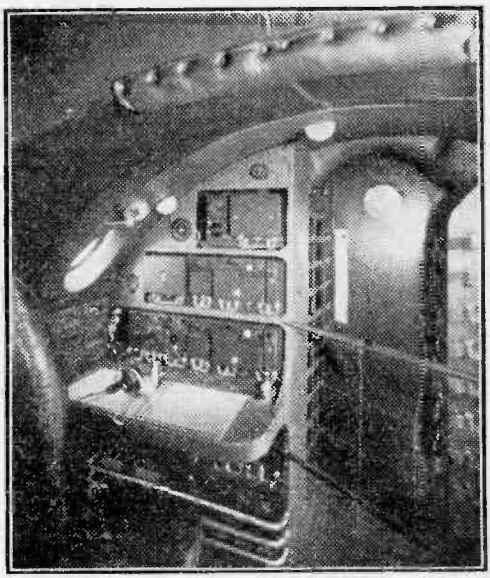
AMONG the many receivers to be seen on the K.B. stand are:

Table radio ER.10, a 5-valve A.C. superhet, long, medium and short wavebands; "natural position" side controls; sockets and switch for gramophone pick-up with visual indicator.

Table radio ER.30, 6-valve all-wave superhet—long, medium and short wavebands.

Automatic radiogram EG.30, 6-valve A.C. superhet, long, medium and short wavebands, spin wheel tuning, cathode-ray tuning indicator, automatic record changer and mixer, record storage space and sockets for external speaker with muting switch.

De luxe automatic radiogram EG.50, 10-valve all-wave A.C. superhet with R.F. stage on all eight wavebands. Push-pull output and special high and low level listening features. 10in. speaker with slot highnote diffuser, magic-eye tuning, automatic record changer with "mixer." Lightweight pick-up, with sapphire needle. Pneumatic lid-closing device.



Marconi lightweight aircraft radio in its operating position.

Table wire recorder EWR.60, high fidelity wire recording instrument including microphone. Simple to operate. One hour's programme can be recorded in whole or part, and any portion played back immediately. Wire can be stored if required, or prior recording erased. [Stand No. 65]

Marconi Instruments, Ltd.

A WIDE range of Marconi test equipment will be displayed on Stand No. 154. Additionally, a representative selection of industrial measuring instruments and electro-medical apparatus will be on view. The exhibits include:

50 c/s visual detector TF 536B, employed as a null indicator in bridge balance determinations at the supply frequency.

Signal generator TF 810A is for use in the range 10-300 Mc/s.

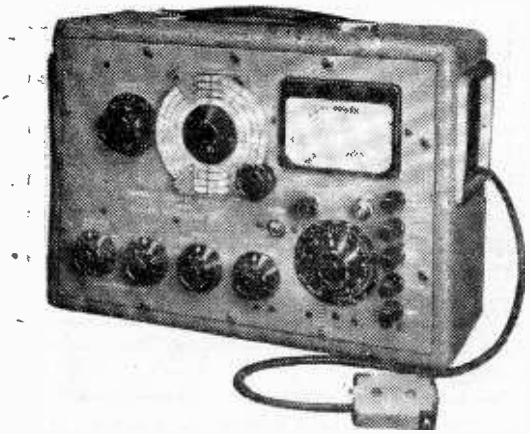
Electrostatic viewing unit TF 816A is primarily intended for the investigation of the performance of pulsed V.F. or R.F. equipment and incorporates a system whereby the time-base is triggered by the signal pulse itself and is not dependent on any auxiliary synchronisation.

Standard signal generator TF 867. Frequency coverage is from 16 kc/s to 30 Mc/s.

Video oscillator TF 885.

Circuit magnification meter TF 886.

Receiver tester TF 888 (in the "Measurtest" class), combines in compact form a wide-range signal generator with internal or external amplitude modulation, a tone source of variable level and an audio-frequency power meter. An auxiliary crystal oscillator is provided for standardising purposes. The 1,000 c/s audiotone may be used for 30 per cent. modulation of the R.F. oscillator or for external tests. R.F. range: 70 kc/s to 70 Mc/s; calibrated output into 80 ohms: 1 v to 10 mv; maximum output: 500 mv. The power meter measures up

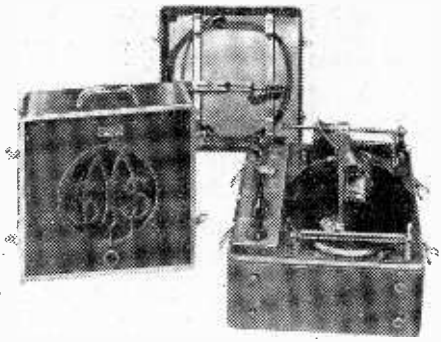


For the laboratory there are some excellent instruments on Stand No. 154—Marconi Instruments, Ltd.

to 1 watt with four input impedances ranging from 3 to 600 ohms. [Stand No. 154]

Marconi's Wireless Telegraph Co. Ltd.

MARCONI VHF equipment is in widespread use by police services, fire brigades, ambulance authorities, road transport organisations, on airports and for harbour communication, etc., for communication between headquarters and a number of mobile units. One of the most interesting applications to which this type of equipment has been put is by national daily newspapers by whom it is in regular use day and night for up-to-the-minute reporting of news and events. [Stand No. 174]



For the professional recorder—the M.S.S. Type PR4/C.

Margolin, J. and A. Ltd.

THIS exhibit will include, in addition to the six Plus-a-Gram models which have been advertised since the end of the war, an entirely new line of metal models which are a complete break away from any previous Plus-a-Gram examples.

These last are genuine Plus-a-Gram, coloured brown, cream, green, blue, burgundy and black; they harmonise or contrast with the colour surrounding of the rooms in which they are to be placed and are specially made to meet the demand for a Plus-a-Gram at a popular price.

Model CE21, which was exhibited at the B.I.F. with its constant-speed motor and long-playing records, is on show again, and a new line in Sapphire needles, for which Messrs. J. and A. Margolin are sole agents, should bring these last into the reach of every Plus-a-Gram or gramophone owner.

[Stand No. 102]

Masteradio Ltd.

IN the items on this stand are a radiogram, model RG.250, a console in Sapele wood with a five-valve, three-waveband superhet with automatic record changer handling 10 records; a domestic receiver in walnut and bakelite, and a combined car and home receiver with six valves and two wavebands. [Stand No. 31]

Metro-Pex Ltd.

THE principal item in this exhibit is a complete range of Magnavista television lenses covering all television receivers. Fitted over the receiver screen the Magnavista lens secures high magnification plus outstanding clarity and a wide angle of view. Guaranteed against discoloration, Magnavista lenses are optically correct, having been designed in collaboration with eminent independent authorities on lens computation.

In addition there is a range of papier mâché masks for television receivers, designed to reduce reflected light and available in all sizes and in a wide range of colours together with other components in papier mâché. Other exhibits include specially designed lenses and accessories for radar development and industrial lenses. [Stand No. 10]

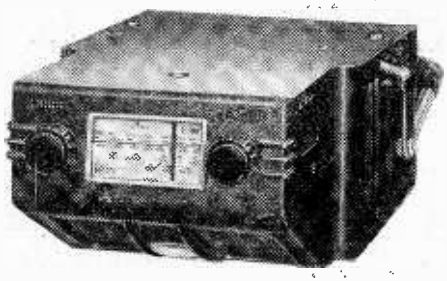
M.S.S. Recording Co. Ltd.

THE range of M.S.S. disc recording and reproducing equipment exhibited on Stand 76 embraces a wide field of applications from home recording to complete broadcasting studio operation. Microgroove recording, the long-playing direct recording disc, is also featured. Special mention should be made of the studio portable recording equipment type SP/2/1, a new design of portable disc recording equipment of great versatility capable of high quality. [Stand No. 76]

Multicore Solders Ltd.

ONE of the most outstanding features ever seen at Radiolympia is staged by Multicore Solders, Ltd., manufacturers of Ersin Multicore three-core solder wire, with the co-operation of E.M.I. Factories Ltd.

Practically the whole of the Multicore island



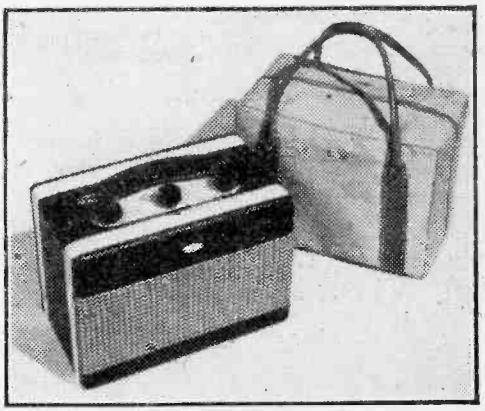
Car radio by Masteradio, on Stand No. 31.

Stand No. 84 is a model factory.

At a factory conveyor line E.M.I. works staff coming from Hayes daily will assemble vision and sound radio frequency units for the H.M.V. television model 1807. Each unit involves the assembly of 47 parts, including eight valves. After 117 Ersin Multicore solder joints have been made the unit is tested prior to despatch to Hayes for incorporation in a complete receiver. The care and precision undertaken at the E.M.I. factories is evident from the manufacturing processes shown on the Multicore stand.

Technicians from radio factories will be interested in the enclosed section on Stand 84 where ingenious equipment from the Multicore research laboratories used for determining speeds and spread of fluxes and alloys is shown. Other apparatus shows how bit temperature of soldering irons may be obtained whilst joints are actually being made.

[Stand No. 84]



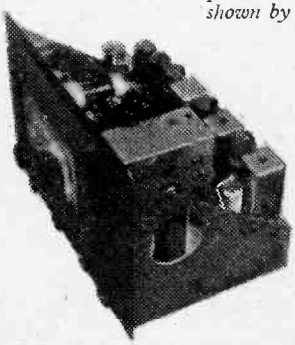
A portable with carrying satchel—produced and shown by Roberts Radio on Stand No. 96.

Murphy Radio

MURPHY receivers to be shown include A122M, a "baffle" receiver incorporating 5-valve superhet. Long, medium and short wavebands with separately illuminated scales, fly-wheel tuning, delayed A.V.C. negative feedback giving compensated response characteristics.

Model A.146c is the first commercial floor type "baffle" receiver. 7-valve superhet; long and medium wavebands; external edge-lit scale; push-pull output; delayed A.V.C.; negative feedback; pick-up and extension speaker sockets. Price not yet fixed.

[Stand No. 56]



A chassis by Peerless Radio. This is Model 1148.

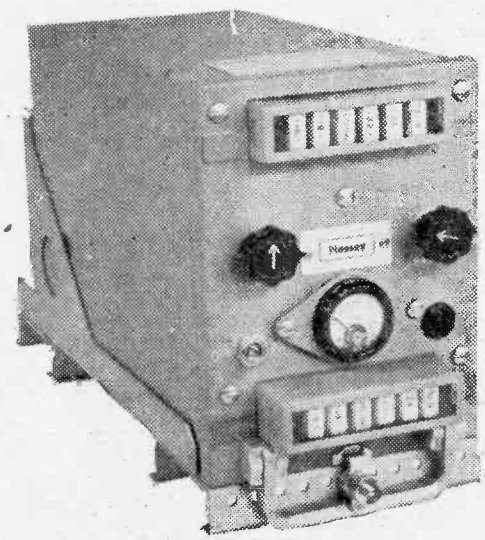
Ossicaide

AMONG the various deaf-aids to be seen on this stand special attention is drawn to the "Osray" model R.P.14, being, it is claimed, the smallest complete valve hearing aid yet produced. It is only 11/16in. thick, and measures about 3½in. by 2in. It employs three valves, crystal microphone, tone and volume controls, and beryllium copper strip circuit wiring. [Stand No. 170]

Peerless Radio Limited

THIS Company specialise in the manufacture of radio receiver and radiogram chassis as distinct from complete receivers in cabinets. Although completed receivers are available, and examples of such will be on show, it is proposed to concentrate on the display of chassis—that is, complete working receivers without cabinets. The 11-valve radiogram chassis type 1148 is specially developed for inclusion in a high-grade radiogramophone, and is easily installed with a minimum of labour into a customer's cabinet.

Another chassis which will be shown is the "Peerless" communications receiver type 1546, which has all the essential features required of a communications receiver, but has at the same time the ability of operating as a high-fidelity local broadcast receiver. [Stand No. 15]



One of the light aircraft VHF sets—produced by Plessey.

Radio Gramophone Development Co., Ltd.

THE range of instruments shown includes television and radio receivers, radio gramophones, record players and loudspeakers.

Seven models of the type 1046G radiogramophone are shown. Four of these are in handsome walnut, mahogany, oak and bird's eye maple cabinets. The three remaining models—the Oxford, the Regency period and the Empire period—make their first appearance at Radiolympia. The chassis of each comprises a 10-valve all-wave superheterodyne receiver circuit operating on five wavebands.

A 10in. dial with each waveband individually edge-illuminated permits accurate tuning, and there is a special logging scale and vernier dial for identification and recording of short-wave stations. Tuning is by a low-geared flywheel with illuminated vernier dial.

Also on view for the first time at Radiolympia is the model 850G pre-set radiogram, which is an 8-valve instrument. Selection of any one of five stations is by means of a switch. All five stations may be on medium waves or, alternatively, two may be long wave. The automatic record changer plays any number up to eight 10in. or 12in. records in any order.

In addition to the above-mentioned exhibits a corner labyrinth type extension loudspeaker is available. [Stand No. 37]

Roberts Radio Co., Ltd.

THIS firm will be showing their models P4D and P5A, in addition to the Junior model. All three models will be seen in standard colours and also in special finishes. They are exported to all parts of the world with modified wavelengths to suit particular requirements.

The Junior portable has the loudspeaker aperture reinforced by a concealed steel mesh, a clearly marked two-colour tuning scale, and a long-life layer-built battery. [Stand No. 96]

Rose (Electrical), Ltd., Norman

MESSRS. NORMAN ROSE are approved stockists of all the leading manufacturers and hope, with their co-operation, to show a comprehensive range of all their latest and main products, thus enabling retailers, service engineers and the general public to see the smaller items, which constitute in the main the backbone of every receiver, in some detail and enable them to view the finished products at some length on individual stands. [Stand No. T.6]

Sangamo Weston Ltd.

SANGAMO Weston will be showing the following ranges of meters, etc., on Stand No. 219: electrical measuring instruments; ammeters, voltmeters, wattmeters, in panel, switchboard and portable types, frequency meters, decibel meters and relays, the latter including both miniature and G.P.O. types. A new portable test set, model S.75, which has 53 ranges, controlled by rotary switches, will also be on show. Of interest mainly to manufacturers, laboratory standard and sub-standard instruments in various forms will be shown. [Stand No. 219]

Scharf, Erwin

THE range of high fidelity and standard magnetic pickups to be seen on this stand will include: the Headmaster pickup with interchangeable pickup heads for every type of record, the "Three Way" pickup for standard 78 and 45 and 33⅓ r.p.m. microgroove long-playing records, replacement cartridges for both standard and long-playing records.

A new popular priced magnetic pickup of modern design with built-in automatic stop will also be seen, whilst a range of Goldring long-playing jewel point sapphire needles and radiogram steel needles, miniature sapphire and steel needles will also be on show. [Stand No. 97]

Scott & Co., Ltd., Geo. L.

MESSRS. Scott are specialists in the production of laminations for transformers and chokes, embodying the wide range of requirements for sound and television receivers.

They are also specialists in the production of laminations for meters, relays and all types of electric motors, dynamos, converters, etc.

Special tools to the customer's design will be shown, as well as laminations insulated or uninsulated. [Stand No. 201]

Stand No. 100

PRACTICAL WIRELESS & PRACTICAL TELEVISION

Geo. Newnes Ltd., Tower House, Southampton Street, Strand, W.C.2.

On the PRACTICAL WIRELESS stand you will be able to inspect our full range of technical books on Wireless, Television, Engineering, Mathematics and kindred subjects.

We shall have available for inspection our full list of wireless blueprints, and the Practical Mechanics series of blueprints, as well as our companion journals, *Practical Engineering* and *Practical Mechanics*.

Mr. F. J. Camm and the technical staff will be available to answer readers' queries free of charge.

CALL AND SEE US.

Servisol Limited

THE main exhibit of Servisol Ltd. will be Servisol—the solution for removing resistance in all electrical contacts without dismantling. The great feature of Servisol is that after cleaning it lubricates.

It is restricted for trade use only, a policy much appreciated by the radio trade in this country.

It is used very extensively by leading shipping companies (ships carrying radar and P.A. equipment), aircraft manufacturers, telephone companies, British Broadcasting Corporation, industrial undertakings, apart from the thousands of radio dealers throughout the country.

Other exhibits will be the well-known Uniflex scratch remover kits and Uniflex wax polish, the latter now being packed in quantities of three dozen. [Stand No. 216]

Standard Telephones and Cables Limited

THE exhibits on this stand will be representative of the company's activity in the fields of radio and television engineering, and comprise: microwave radio link, time sharing multiplex radio link, and a point-to-point transmitter.

Also shown will be valves, crystals, rectifiers, cables and sound reproduction equipment, and television equipment as described on page 31. [Stand No. 173]

Stratton & Co., Ltd.

A RANGE of specialised receivers will be shown by Stratton & Co., Ltd., under the Eddystone trademark.

Prominent in this range is the Eddystone "680" receiver, a full communications model employing

(*Continued on page* 397)

(*Continued from page* 394)

a total of 15 valves, the majority being of the modern miniature type.

The "670" marine receiver covers the principal short wave broadcast bands, the 150 metre shipping band, and medium waves. Being of the A.C./D.C. type, the "670" can be operated from practically any mains likely to be available on board ship or on land.

The "659" model is a short and medium wave broadcast receiver for A.C. mains.

Of particular interest to the overseas listener who lacks electricity supply mains is the new All World Six receiver (model 710) which combines high performance, adequate audio output and low current consumption. The drain from a six volt accumulator averages only 2.5 amperes—hence long service is secured from an accumulator of reasonable size before re-charging becomes necessary. No H.T. battery is required.

A receiver which has become very popular with radio amateurs is the Eddystone "640" receiver. Production of this model has now ceased, and to take its place an improved communications receiver, to be known as the "750," has been designed. It is hoped to have this new model on show at Radiolympia, but the receiver will not be generally available until the end of the year.

Eddystone short wave components possess a fine reputation among amateurs and constructors. The range to be seen on the Eddystone stand is most comprehensive. [Stand No. 182]

Sugden & Co. (Engineers), Ltd., A. R.

MESSRS. SUGDEN are, of course, well-known for their Connoisseur high-fidelity pick-up. This pickup will be shown in the form of standard and long arm transcription models with high and low impedance coils, and also in the form of plug-in heads for post-war Garrard automatic record changers.

It is of the miniature magnetic moving-iron type, using lightweight replaceable steel needles. The response curve of this pickup is substantially flat from 50 to 9,000 cycles, within ± 2 dbs. The downward pressure required for correct tracking is 1¼ oz., and is obtained without counterbalancing or springs.

A new model will be on show, which will give a flat response curve from 30 to 14,000/15,000 cycles. This again is of the moving-iron type, and is manufactured with a low impedance (25 ohm) coil only.

The armature system is a composite unit constructed from a small base of soft iron and balsa wood, with top point suspension, the magnet jaws being on the underneath side of the pickup head. A semi-permanent sapphire type needle is used, and the whole armature system is easily replaceable when necessary. The pickup head fits into the arm with a bayonet type catch, to enable it to be easily removable.

There will also be record-player units, amplifiers, and recording equipment. [Stand No. 207]

The Telegraph Construction & Maintenance Company Ltd.

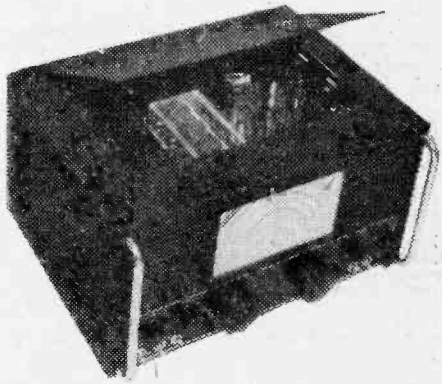
THE results of extensive research to meet the demands of the radio and television industries are well illustrated in the range of radio frequency feeders displayed on this stand.

In all present day Telcon R.F. cables, both solid and air-spaced, Telcothene low-loss dielectric together with Telcovin outer sheathing are combined to produce cables suitable for frequencies as high as 10,000 Mc/s.

A redesigned 300-ohm transmission line, having stabilised electrical characteristics in varying weather conditions, has been introduced.

Various plastic insulated, screened and unscreened low-frequency cables are also exhibited, including a miniature screened lead for pick-up use and high-voltage cables for cathode ray H.T. leads.

The Telcon metals exhibits consist of specimens and applications of alloys which are used in the radio and television industries. [Stand No. 30]



The latest Eddystone communications receiver—a Stratton product—to be seen on Stand No. 182.

The Trix Electrical Co. Ltd.

STAND No. 101 will show sound reproducing equipment of all types, from the portable, battery operated, 5 watt amplifiers to the rack-mounted installations of several hundred watts output, which are used in such diverse locations as railway stations, hospitals, ships and factories. Also on show will be the very latest model of the Intervox A.C./D.C. inter-communication equipment. [Stand No. 101]

Truvox Engineering Co. Ltd.

THIS will be a specialised exhibit in which the Truvox loudspeaker will be featured. Among the various models the extra thin Wafer speaker will probably attract most attention. The 6½in. diameter model, for instance, has a thickness of only about 1½in. and will handle 3 watts. "Centre-pole" speakers are also to be seen in models ranging from midgets to auditorium 12in. models. [Stand No. 18]

Vidor Ltd.

A COMPREHENSIVE range of Vidor radio, hearing aid and lighting batteries, radio receivers and television receivers, are shown on this stand.

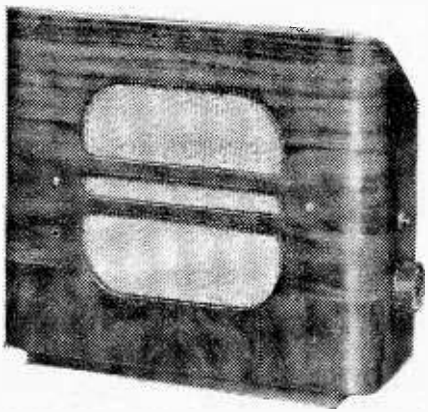
Vidor batteries are available in types to suit a wide variety of applications, and in addition to the new "layer" batteries, of particular interest will be the recently introduced and revolutionary Vidol

Kalium cells—cells which give approximately four to seven times the life of a normal dry-cell of equivalent size.

The new Riviera 4 valve all-dry battery superhet portable, CN.379 is available in a choice of three colours, green, maroon or lizard skin leatherette, has three wavebands (including short-wave band 16 to 50 metres), and a performance normally associated with large table models.

A power unit, CN.366, to operate Riviera all-dry battery portables or similar sets directly from A.C. mains is displayed.

The Vidor attache portable, CN.381, an all-dry battery personal model, is finished in a choice of four colours, green, maroon, navy and lizard skin leatherette. It employs a two-wave band superhet circuit, and includes separate Vidor H.T. and L.T. batteries specially designed to give longer life.



The well-known Stentorian loudspeaker in cabinet form—produced by Whiteley Electrical.

A similar receiver with interesting additional features is the combined A.C. mains/all-dry battery attache model, CN.396, finished in maroon leatherette. [Stand No. 69]

Westinghouse Brake & Signal Co. Ltd.

A COMPLETE range of metal rectifiers for broadcast and television receivers, and for electronic and associated apparatus used in production and testing, will be shown.

Type 36EHT rectifiers are miniature high-voltage rectifiers housed in an insulated tube 7/16in. diameter, with tag ends for easy soldered connection and are so small in size that they may be suspended in the receiver wiring. They will withstand a peak inverse voltage of approximately four times that of a normal selenium rectifier and are primarily dosigned for use in voltage multiplier circuits to provide E.H.T. for various purposes.

Four models of the "Westeht" are now available. This unit provides E.H.T. from the 350-0-350 volts winding of the standard mains transformer and takes up less space than the E.H.T. rectifier valve and transformer it replaces. Positive outputs of 5, 3 and 1.7 kV are provided, the 3 kV also being available as a negative potential.

Miniature "Westectors" for use in high-frequency circuits, copper-oxide rectifiers for use with electrical measuring instruments and a range of H.T. and L.T. rectifiers for broadcast receivers, battery eliminators and chargers will also be on show. [Stand No. 177]

Whiteley Electrical Radio Co. Ltd.

FEATURED prominently will be the new Stentorian "baffle" extension loudspeakers, the company's first post-war design. The range consists of three models, the Beaufort at 75s., Bristol at 59s. 6d. and Bedford at 45s. Each has an ingenious multi-tapped transformer (the method pioneered by this firm) rendering it suitable as an extension speaker with any receiver on the market. These speakers have Alcomax magnets, a new type of cone perfected and manufactured in the firm's Mansfield Works, and dio-cast chassis. All models are complete with volume control, that in the first two mentioned being of the constant impedance type. Each is housed in an attractive modern-styled cabinet of highly-polished walnut.

Another interesting item is a new high-quality Duplex loudspeaker, consisting of a high-flux, permanent magnet cone unit and an independently controlled horn-loaded "tweeter." This instrument is mounted in a polished walnut console cabinet, "lagged for the elimination of unwanted resonance." An extremely high performance is claimed. Price is not yet available.

A wide range of permanent loudspeaker chassis is also shown, in sizes from 2½in. to 18in. in diameter, and with flux strengths up to 14,000 lines per sq. cm. on a 1½in. pole piece. The magnets themselves are produced within the W/B organisation, and form a separate exhibit.

A now rango of service replacement, extension loudspeaker chassis is also exhibited here for the first time.

A range of smallor components is also exhibited, including carbon and moving coil microphones, transformers and small switches of various types. [Stand No. 77]

Wingrove & Rogers Ltd.

WINGROVE & ROGERS specialise in the manufacture of variable condensers, air and mica dielectric trimmers and slow motion drives, which are supplied to set makers at home and abroad. The constructor can obtain 2- and 3-gang condensers types C.1602 and C.1603. [Stand No. 212]

Wright & Weaire Ltd.

ON Stand No. 63 (Grand Hall) will be seen coils, coil packs; vibrators; vibrator power supply units; mains transformers; A.F. transformers; I.F. transformers; ceramic switches; and magnetic tape recorder apparatus and components. All of the above have been exhibited previously at "trade" exhibitions, but two items are exhibited publicly and made available for the first time to users other than equipment manufacturers.

1. Coil packs, types 705 and 706.
2. Tapo recorder apparatus.

Demonstrations of the latter will be given during the exhibition in Room D.21 and for this purpose it will be coupled to a typical amplifier suited to general-purpose recording work.

Stand No. 63 will be primarily devoted to illustrations of some of the diverse applications of recording on magnetic tape. [Stand No. 63]

On your Wavelength

by THERMION

Car Television

I NOTICE that the Standing Joint Committee of the R.A.C. and the A.A. decided at a meeting to take action, *inter alia*, on the subject of car television. The resolution read: "To follow developments resulting from the Minister of Transport's acceptance of the Committee's proposal that the Motor and Radio Industries should mutually agree now on road safety precautions with regard to the fitting of television sets in cars and thereby avoid the need for restrictive regulations at a later date." I have not yet seen a car equipped with television, nor do I think that such is feasible at the present time on a commercial basis. It is wise, however, for manufacturers to take voluntary action now rather than to invite regulations later on. It is my view that the installation of television in a motor-car presents far greater problems than the installation of a radio set, and that presented a few headaches in the early days. It is possible now reasonably to suppress interference caused by the dynamo and other electrical equipment. With television, however, interference which may not be audible may certainly be visible in the form of fantastic shapes on the end of the tube. If any of my readers have experimented with car television I should be glad to hear from them.

Radio Controlled Models

I UNDERSTAND that at a Council meeting of the Radio Controlled Model Society my comments in the August issue were discussed, and as a result the secretary was asked to express the Council's disapproval of my statement. As long ago as the 12th May, 1947 the Editor of this journal wrote to the secretary stating that he would be unable to find space for notices of the Radio Controlled Society. That was as a result of complaints he had received from readers who, as a result of our notices, had written to the secretary but without response. That, indeed, was my experience and of other members of the staff, and it was that which I had in mind when writing my comments in the August issue, as well as the failure of the Society to send this journal Press notices up to May, 1947. I am now informed that at a Council meeting held in September, 1948, it was decided that publicity regarding the Society should be restricted until it was felt that the Society was in a position to deal fully with a vast number of inquiries. Then why send notices to the Press as the Society says that it has done, although we did not receive them for more than a year after? We in this office had discovered that the Society was unequal to the task it had set itself. The Society overlooks the fact that readers complain to us when, as a result of our notices, their letters are not answered. The attitude of the Society seems to be not that the Press is granting a privilege in publishing its notices, but rather that the Society is obliging us.

They now tell me that they are in a much stronger position and we shall be hearing much more about them very soon, as they have reached a more advanced stage and have several ventures under way, including the organising of an International Radio Controlled Contest. It had a stand at the Model Engineering Exhibition. This is pleasant to know and I shall await the fructification of these hopes.

Radio and the M.E. Exhibition

APART from the exhibit referred to in the previous paragraph there was little of radio interest at the recent Model Engineering Exhibition. I cannot understand why, because radio lends itself admirably to certain branches of model engineering. Electronics received but scant attention at the hands of the exhibitors.

Radio-telephone Expansion

EQUIPMENT made by New Zealand radio manufacturers will be used in a big expansion of the radio-telephone service to mobile vehicles operated by the New Zealand Post Office.

One of the largest peacetime orders for specialised radio equipment ever to be placed in New Zealand has just been given by the Post Office to a Wellington manufacturer. The equipment provides for fifty mobile radio-telephone base-station units which will be built to a prototype designed by Post Office engineers.

A few of the units will replace modified war surplus equipment at present in use in the mobile telephone services at the four main centres and some of the units now in use by the Police Department, but most of them will provide service for new mobile subscribers, such as the Fire, Traffic and Ambulance Services, and for taxis, carrying firms, and other private utility concerns.

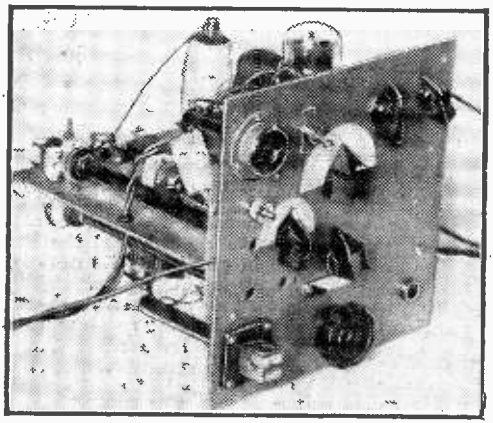
Communications for public and private utilities will continue for a time to be on the party-line system, which is operating in the four centres. Later, should users of the service wish it, the selective calling of mobile units will be possible. (This will mean that they will be able to call the unit they require without other units hearing the call.)

A future development forseen by the Post Office is the provision of a public telephone service for mobile units. This means that a mobile unit could be connected to any number in the telephone system. Work now being done in establishing remotely-controlled radio stations will form a valuable basis for the mobile-unit-to-public-telephone system.

Two-band Experi

A Simple-to-build Receiver L

By F



Three-quarter front view of the finished receiver.

BY making use of an Output Tester Type 2 (an easily-obtained piece of ex-service equipment) the construction of this receiver is greatly simplified. The Output Tester contains most of the necessary parts (see component list), including insulated brackets and extension spindles, coil formers, chokes, switches, pilot lamp holder and small variable condensers. There is also a strong plate-type chassis and a well-finished panel with chrome fittings, and no further drilling will be necessary. At a very moderate price (including valves) it is worth while using this unit as a basis for the constructional work, and a very satisfactory layout is possible on it.

In its original form, the unit covers a frequency range of 22 to 85 Mc/s. in a number of pre-set circuits with diode detectors. For normal purposes this is useless and the unit should be partly dismantled. Leave the three-wafer rotary switch in position, and also the 10 pF. variable condensers with extension spindles, which will be used for aerial, R.F. coupling and bandspreading. One on/off switch is also left. The other two are removed to make room for two 50,000 ohm potentiometers.

Two of the valveholders are left in position, but the front one is changed for a five-pin type to take the output pentode. The parts taken off should be retained, including the ribbed coil formers with brackets, which are very suitable for the new coils which will be made.

The Receiver

As finally made up, this tunes two bands covering 5 to 12 metres. Other waveranges might be used, as will be explained. In some parts of the country the lower band may offer little of interest and a coil covering higher wavelengths may be more suitable. The wavebands could then extend from, say, 9 to 25 metres, thus embracing two of the most interesting amateur bands.

In any case, the use of two wavebands considerably increases the scope of the receiver, and the user should experience no difficulty in arranging the coils to cover those frequencies in which he is most interested.

Main tuning is carried out with a 10 pF. condenser, with a 100 pF. capacity for bandsetting. With this arrangement tuning was found easy. A reaction condenser of 100 pF. is provided, but the 50,000 ohm variable resistor mounted near the top of the panel (see Fig. 3) is used for a finer control. As the circuit in Fig. 1 shows, this resistor enables the detector anode voltage to be adjusted, and this provides easy and accurate adjustment of reaction.

The positions of the other controls will be seen from Fig. 3. The earth terminal, pilot lamp holder, and jack socket are already present on the panel of the Tester. The jack is not suitable for the ordinary type jack plug, and if no suitable plug is to hand, then a new jack will have to be fitted, or the contacts on the existing jack will have to be rearranged to provide projections which will engage an ordinary plug.

The variable aerial and R.F. coupling condensers are not provided with control knobs, but can be adjusted with a screwdriver from the panel (see Fig. 3). For these components, this is quite satisfactory, and they can be left in this form.

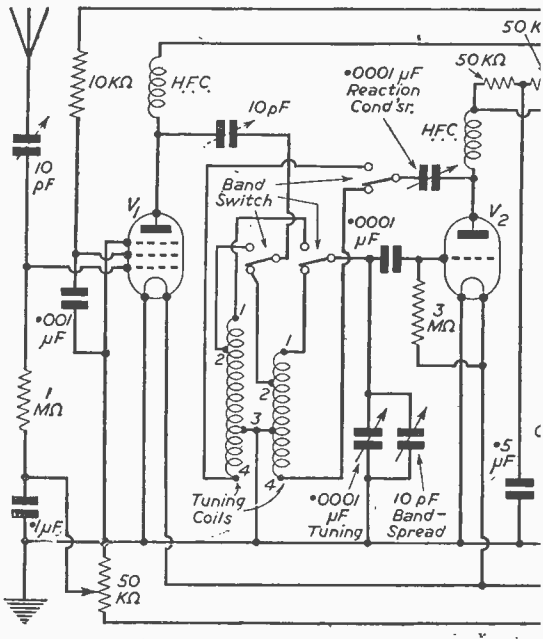


Fig. 1.—Theoretical circuit showing all sw

ntal V.H.F. Three

Ex-service Unit as a Basis

YER

For bandspreading, bandsetting and reaction, control knobs are required. To fit these, the split keys should be removed from the ends of the insulated extension spindles and short pieces of ¼in. diameter rod fitted in. The knobs are placed on the projecting ends of these rods.

As the split keys provided leave a little backlash or free movement, they should be removed and small bolts, tightly screwed up, can be used to replace them.

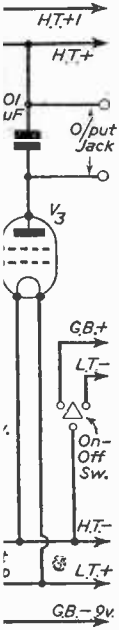
The Tuning Coils

These are wound on notched formers, and they may be retained as used in the Tester, provided the tapping positions are altered. The tappings are made by soldering on 18 S.W.G. tinned copper wire, and two are required, as illustrated in Fig. 2. Here, point 1 goes to the detector grid condenser (via switch); point 2 to the R.F. coupling condenser (via switch), and point 4 to the reaction condenser (again via the switch). Point 3 is returned to the chassis. Both the coils are connected in this way, though naturally a similar number of turns will not be used.

For the smallest coil four turns can be used between 1 and 3, double spaced. Point 2 is centrally placed, and three and a half turns are used between points 3 and 4, wound in each notch (i.e., not double spaced). For the larger coil six turns can be used between 1 and 3, with the R.F. tapping 2 two or three turns from point 3. Five turns will be required between 3 and 4.

The waveranges can be modified easily if the following is noted. The number of turns between points 1 and 3 govern the waverange tuned. Increasing the number of turns here will enable a higher wavelength to be tuned, and vice versa. Point 2 is the R.F. tapping on the winding between points 1 and 3. Moving this tapping towards point 1 will increase volume, slightly reduce selectivity, and, in some cases (e.g., on very high frequencies) reduce the ease with which the detector oscillates. The turns between points 3 and 4 act as reaction winding, and increasing them or moving them nearer the other section of the coil will increase the violence of reaction. However, more turns should not be used here than are present between points 1 and 3, or peculiar effects will arise.

In practice, it will be found easy to modify the positions of the tappings without removing the coils from the receiver.



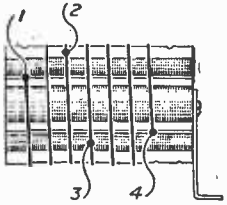
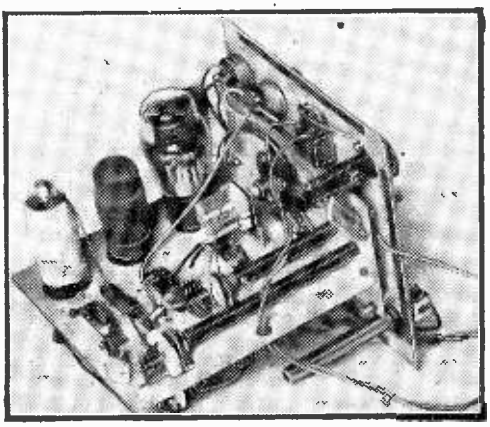


Fig. 2.—This diagram shows the method of tapping and numbering the coils of which two are required.



Three-quarter rear view of the receiver.

COMPONENT LIST.

Three 10 pF. low loss variable condensers.
Three 1 megohm resistors. 50,000 ohm resistor. 10,000 ohm ditto.
Three .001 μF. condensers.
Pilot lamp holder.
Two Mazda octal valveholders.
3-point on-off switch.
3-pole 2-way low-loss switch.
Two ribbed coil formers.
Two short-wave chokes.
Insulated brackets and extension spindles.
(The above are present in the Output Tester Type 2, available from the Mail Order Supply Co.)
In addition the following parts are required:
Two .0001 μF. low-loss variable condensers.
.0001 μF., .1 μF. and .5 μF. fixed condensers.
Two small-type 50,000 ohm potentiometers. (M.O.S.)
5-pin valveholder.
Knobs, small stand-off insulator, etc.
Valves: Mazda VP23 grid-cap pentode, Mazda HL23 triode, 5-pin battery output pentode. (Cossor 220HPT or similar.)

Top of Chassis Details

As will be seen from Fig. 4, the first small variable condenser is connected in series with the aerial. It must, therefore, be insulated from the bracket, and the insulating washers present should be

retained. With the other two variable condensers shown here no such insulation is required. To ensure good earthing, a short lead is taken from the moving-plates tags to the chassis.

So as to clear the sub-panel the two 50,000 ohm potentiometers should be of the small type. They are fitted in the holes previously used for the two unrequired toggle switches. The .5 μF condenser is returned to the chassis. A 1 μF. condenser is provided in the tester, but there is scarcely space for this now.

The bandswitch is so mounted that some of the contacts project above the chassis. These are not shown in Fig. 4, because they are not required and can be disregarded.

Only one lead passes through the chassis—that from the .0001 μF. condenser to point four on switch wafer "B" below.

The forward valveholder is removed and a five-pin one bolted in its place. Leads from the output jack go to the anode and screen-grid sockets of this holder.

The extreme corner of the aerial series condenser should be bent over so that moving and fixed plates short-circuit when the plates are fully intermeshed.

Below the Chassis

Here, the R.F. coupling condenser must be insulated from the chassis, and also the reaction condenser. The brackets already fitted will prove suitable for this.

In two or three places vacant tags on the valve-holders have been used to support wiring points. Two insulated tags are also used to hold the L.T. positive and Grid Bias 4.5 volt leads.

All the bandswitch connections will be clear on reference to Fig. 6. The rear wafer switches the R.F. coupling condenser circuit. The centre wafer switches the detector grid circuit, and the front wafer deals with the reaction circuit. Point three on each coil is returned to the chassis. All the grid and anode leads, and those associated with the coils and variable condensers, should be as short and

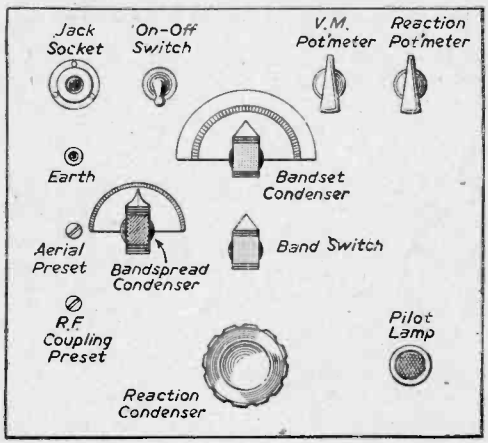


Fig. 3.—Panel and control details.

direct as possible. Stray wiring and unnecessary capacity between leads and chassis should be avoided or some difficulty will be experienced in reaching very low wavelengths. If, however, reception below about nine metres is not intended, then a great deal more latitude is permissible here. The aerial-rod holder fitted to the panel can be ignored or used to bring out the aerial lead.

Suitable scales and knobs should be fitted to the band-spreading and bandsetting condensers. No dials are required for the reaction controls, or for the V.M. potentiometer. The bandswitch is marked "H" and "L" ("High" and "Low"), and does not require alteration. The on/off switch is also fitted with an indicating plate.

The small plates screwed across the other panel holes to prevent unauthorised adjustment should be removed. The large chrome terminal can be left for earthing.

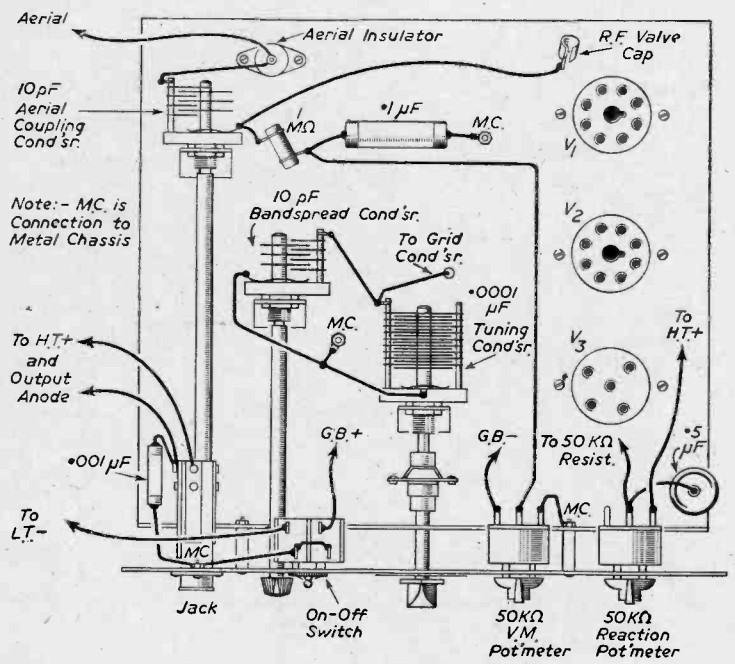


Fig. 4.—Top of chassis wiring details.

Adjusting and Operating

If available, an earth is connected to the earth terminal on the panel. In view of the sound screening and presence of an R.F. stage it is not likely troublesome hand-

capacity effects will be caused, even if no earth connection is used.

For general short-wave reception a high outside aerial well clear of earthed objects is satisfactory. Though the aerial cannot influence the efficiency of the detector it is worth while providing as much signal pick-up as possible. As is usual on these frequencies, employing a very long aerial will convey no advantage, and for the shorter wavelengths it should certainly not exceed about 30ft.

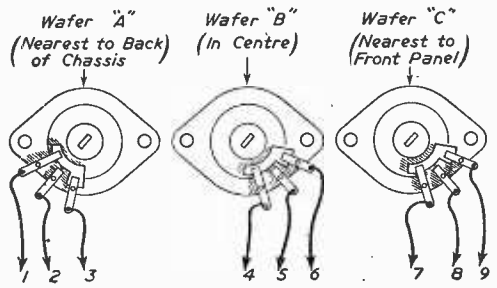


Fig. 6.—Bandswitch wiring key.

With batteries and 'phones connected, and the aerial taken to the small stand-off insulator, the receiver should operate immediately when switched on. (The pilot lamp should also light.) The reaction condenser can be used in the normal way, or set to such a position that reaction can be controlled by means of the 50,000 ohm variable resistance, which makes more critical adjustment easy. When tuning to a considerably different wavelength, the reaction condenser will need adjustment as one capacity is unsuitable for all the frequencies covered by both ranges.

In the event of there being insufficient reaction on either range it will be necessary to increase the number of turns on the reaction section of the coil. If the coils have an extra turn or two the point at which the reaction lead is soldered on can easily be modified.

For ordinary tuning purposes the bandspreading condenser is used, and the bandsetting condenser should be fitted with a knob and dial which enables accurate settings to be obtained. Various frequencies and stations can then be found without difficulty.

The V.M. potentiometer should give a smooth control of volume from zero to maximum and the effect of modifying the voltage applied to H.T.1 should be tried. About 72 volts will probably prove most suitable. The grid bias may also need modifying, as some output valves will require a slightly different voltage from that (4.5 volts) shown.

The Preset Condensers

These are adjusted from the panel by means of a screwdriver. With both fully closed, volume will be at maximum. But if the tapping on the smaller coil is rather near the grid end of the winding such a setting of the R.F. coupling condenser will reduce the ease with which the detector oscillates. It will be seen, therefore, that optimum coupling on *both* bands depends upon both the setting of this condenser and the position of the coil tapping.

With the smaller coil a position about midway is suitable for the tapping. To provide an equal degree of coupling on the larger coil the tapping should be rather nearer the grid end of the coil (the condenser provides looser coupling as the frequency is reduced). Actually, no difficulty should arise and satisfactory results may be obtained at once.

Moving the R.F. coupling condenser tapping towards the centre of the coils will increase selectivity, as will decreasing the capacity of the condenser.

If it is desired to use one range for higher wavelengths, then a condenser of about 50 or 100 pF. should be wired to the vacant contacts on the rear section of the switch in such a way that it provides additional coupling with the larger coil, where 10 pF. will cause a reduction in volume.

A satisfactory setting of the aerial condenser should be very easy to reach. With short aerials it should be closed fully so that the plates short-circuit. With longer aerials it can be opened, but this will cause some reduction in volume, especially on higher wavelengths.

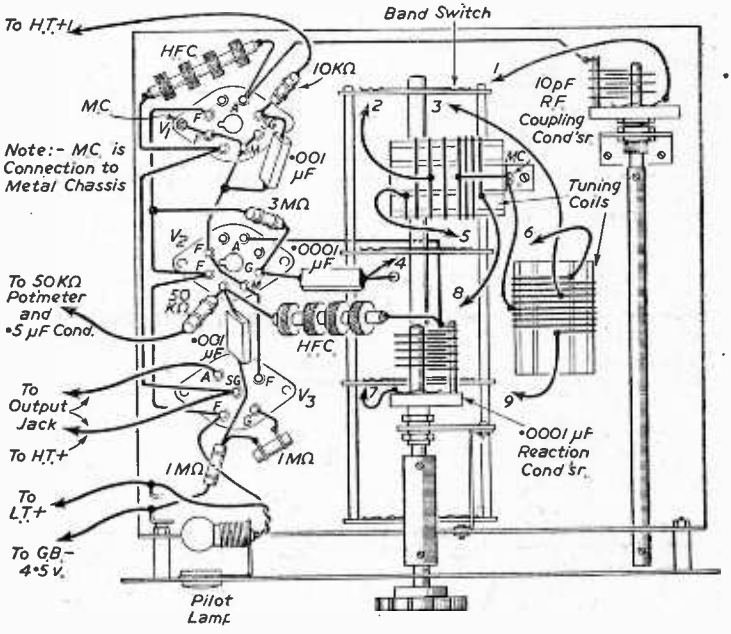


Fig. 5.—Under-chassis wiring details.

Programme Pointers

Recent programmes reviewed by our Music Critic MAURICE REEVE

"SOUNDS OF SUMMER," a shortened version of which came over on June 29th, was not particularly successful. I did not hear the original full-length show, but from what I gather from those who did it was even more boring. An almost endless succession of bird warbles, and the clank and clatter of most of the numerous impedimenta of the season, both serious and pleasurable, failed to evoke in me what I could have easily experienced for myself by taking a short bus ride to any one of numerous places, or by going into my garden and cutting the hedge, rolling the lawn and watering the plants, not forgetting to bang the watering-can down on the path to emphasise the gravity and intensity of the then prevailing heat wave. Furthermore, the commentator's broken English whine was no more evocative of the English summer than of the Icelandic winter.

A Good Play

"POISON PEN," adapted by G. S. Thomas from Richard Llewellyn's highly successful play, came over extremely well. The gradual unfolding of the identity of the Rector's sister as the wielder of the pen, and the unhappy woman's sacrifice of her brother and the world he had so lovingly built around himself, were very moving. Gladys Young was not quite so "poisonous" or blood-curdling as Flora Robson, but she and the whole company were very competent.

Opera

ALL music lovers are not able to attend Covent Garden when their favourite operas are due for performance. But most would make big efforts to hear a full-length broadcast, especially of Wagner from the continent. "Tristan and Isolde"—from Zurich on June 24th—was, with Don Giovanni and the Eroica Symphony, one of the three greatest landmarks in musical history. Not only did each exploit the then known resources of the art to a greater degree than had ever been imagined possible, but each was a guide post pointing down the road it was to take in the future. Each was "music of the future" as we use the term to-day—sniffed at by many, execrated by the pedagogic champions of orthodoxy, but finally winning through to such universal acceptance that even Promenade programmes are unthinkable without them; great chunks of the two operas and the symphony, of course, in its entirety.

The broadcast gave us much to enthuse over, notably Kirsten Flagstad as Isolde. Her superb voice and dramatic fire were, as always, memorable. She is one of those rare artists who manage to radiate their personalities, as well as their technical skill, over any medium through which it may be projected at any given time. Whether radio, record or film, her notes could not possibly be mistaken for those of anyone else, any more than could Casals' 'cello or Krejsler's violin. There is only a little handful of artists capable of this; what it is, is scarcely known even yet; less still can we imagine—whatever it may be—how it gets "picked up" and sent round the world. The sound waves of individuality; personality plus diminished sevenths. Let's leave it at that.

There was one horrible mix-up, however, and what the best answer to its prevention in the future is, I wouldn't like to say at the moment. Something went wrong with the transmission in the last act and the performance was taken up in the studio on records. But when things were righted, we were returned to Zurich. A horrible break and mix-up.

Sunday Morning Prom

I ALWAYS enjoy Sunday Morning Prom, when, personally, I find it one of the rare periods when I can listen to full scale works with little fear of being interrupted. Much music is included which we don't hear elsewhere. And always by the finest artists on superb records.

This season's Proms. are rightly honouring the jubilee of a notable English musician who has enriched our native repertoire with some lovely and strikingly original works, to wit, John Ireland.

Cheltenham Festival

SIR JOHN BARBIROLLI conducted the Hallé —I nearly said "his Hallé"—in an interesting programme of contemporary British music from the Cheltenham Festival. But, though Alec. Rowley's "Suite for Strings" and, more notably, Richard Arnell's symphony, are highly original and attractive works, it was Vaughan Williams's "Serenade to Music" which stood out in the "masterpiece" class. An orchestral version was beautifully played and rapturously received.

Listeners' Favourites

"DOWN YOUR WAY" seems a most peculiar series. We get so many programmes in which listeners' favourite musical works are performed that I should have thought this one was well-nigh redundant. When I listened to it, the B.B.C. mobile recording unit, complete with Richard Dimbleby, was visiting the 48th Mixed Heavy A.A. Regiment at Bulford Camp. Why they should have to go all the way down to Bulford, and frequently much farther even than that, just to tell us that Gunner So-and-So would very much like to hear such-and-such a song, or W.A.A.C. So-and-So her favourite dance number, puzzled me not a little when, as I say, we hear the same thing from studios and cinema organs many times a week. Also, Wilfred Pickles is undoubtedly the master at that type of interviewing. By the way, I don't know whether the Commanding Officer of the 48th Mixed felt embarrassed at some of the questions Mr. Dimbleby put to him regarding the respective value to him of the male

(*Continued on page* 406)

(*Continued from page* 404)

and female members of his regiment; he sounded most horribly so!

Water Bus Trip

I ENJOYED "London Water Bus" very much. I suppose it can be compared with the recent bus ride we were taken. As a radio trip it was better. Naturally, the river would see to this if no one else did. Criticism was heard in some quarters that the trip wandered too far away from the river and that we didn't get enough of Old Father Thames and actual life and happenings on his ageless, placid tides. I think this is partially true though not so true as to say the broadcast was spoiled. More might have been made, for instance, of barge life, and the enormous trade done in the maintenance, by river traffic, of the multitudes of businesses and factories situated on the river. A visit to a newspaper office in Fleet Street, no matter how interesting, is, I feel, rather inaccessible to a river bus.

"Berlin Story"

"Berlin Story," on the other hand, like "Summer," I found boring. Again we had far too many set pieces—housewives telling of the scarcities of the provisions and necessities of life, and of how the air lift relieved them of some of their worst anxieties; and of air lift pilots and crews telling us of their troubles, too, and of how the plucky Berliners stood up to it all. Everybody seemed all lined up and ready to say their little piece as soon as the "ready" was given them; there seemed little reality in the whole thing. Who cares, anyhow, what Frau Schmidt has to pay for her cabbages, or whether she has any cabbages at all? All we do know is that she hates and reviles all who helped smash her world and reduced it to rubble around her, and that the mealy-mouthed sentences she recited into the B.B.C. mike were not her true or real thoughts.

Talks

NO matter how standardised it is made, B.B.C. pronunciation is bound, occasionally, to be confronted with hard nuts. But I was amazed to hear, in his talk on Sir Max Beerbohm, Wynford Vaughan Thomas, of all people, refer to Sir Max's "ca-*rica*-tures"! Surely that one didn't emanate from the pronunciation committee!

Radio Newsreel

RADIO NEWSREEL maintains its very high standard. It is very interesting, instructive and entertaining to have a short and authoritative explanation immediately after we have heard something in the news that may not otherwise be quite clear to us. References in the bulletins to such things as points of law, international treaties, or what you will, might be incomprehensible without a little explanatory detail to follow; we are not all walking encyclopædias!

News from the Clubs

DERBY AND DISTRICT AMATEUR RADIO SOCIETY

Hon. Sec.: F. C. Ward (G2CVV), 5, Uplands Avenue, Littleover, Derby.

THE society continues to meet fortnightly. Recent meetings have included a demonstration of a home-constructed television receiver by Mr. C. M. Swift, who succeeded in affording fellow members of the society their first opportunity of looking in on Alexandra Palace television transmissions, and a lecture and demonstration by Mr. C. W. Cragg and Mr. W. W. Storer on the "Commander" Double Superhetrodyne Communications Receiver.

Mr. C. E. Woolley, of the Post Office Engineering Dept., will give a talk and demonstration entitled "Radio Interference" at a later meeting.

STOURBRIDGE AND DISTRICT AMATEUR RADIO SOCIETY

Hon. Sec.: W. A. Higgins, 28, Kingsley Road, Kingswinford, Nr Brierley Hill, Staffs.

AT a recent meeting at King Edward's School, Stourbridge, Mr. David Hudson, of Dudley Model Aero Society, gave a very interesting talk on "Radio Control of Model Aircraft." Various models and ancillary equipment were on show, and members had an opportunity of seeing some very fine midget apparatus in action.

THE SOLIHULL AMATEUR RADIO SOCIETY

Hon. Sec.: G. Haring, 121, Bradbury Road, Olton, Birmingham.

MEMBERS were treated recently to a very enjoyable lecture, entitled "Electrical Measuring Instruments," by Messrs. Westwood and Evens, and many home-made instruments of varied descriptions were exhibited for members' benefit.

A subsequent Sunday marked the second D.F. contest of the season with the T.X. in the capable hands of G8QY.

The club is now busy moving into new headquarters, put at their disposal by the kindness of G5TU, and hopes are high at having a Tx on the air in the very near future.

Membership continues to grow at a very pleasing rate, and all are welcome at the new club room, c/o Tucker Switches, Ltd., King's Road, Tyseley.

TORBAY AMATEUR RADIO SOCIETY

Hon. Sec.: K. J. Grimes (G3AVF), 3, Clarendon Park, Tor Vale, Torquay.

MEMBERS of the society, for their annual outing, visited the B.B.C's West of England transmitter at Start Point, where an interesting afternoon was spent. At their meeting in June R.S.G.B. films were shown, followed by a "rag chew."

The club under the call-sign G3AVF participated, unofficially, in N.F.D., and an interesting winter programme is being arranged.

The well-attended meetings are held every third Saturday in the month at the Y.M.C.A., Castle Road, at 7.30 p.m.

"Hams" visiting Torquay and neighbourhood during the holidays, and at all times, are welcomed.

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).

Home-made Televison Receivers

SIR,—Much has been written on the conversion of the R.1355 unit for T.V. reception; as yet, though, I look in vain for any 'gen' on the Admiralty "Responser" unit Type W.4790B. I have converted one of these to the vision frequency with little difficulty, but am not entirely satisfied that the best is being obtained, particularly with regard to the 4 Mc/s bandwidth as advertised.

I wonder if any other readers have had experience of this unit and what alterations they have found necessary, other than the tuning of the R.F. Unit; being very much an amateur, signal generators, etc., do not form part of my equipment.

Using this unit in conjunction with a VCR97 tube supplied with 2kv. E.H.T., it was not possible to get adequate picture width without a push-pull amplifier on the line time base (two SP61s). In an endeavour to economise on valves I rotated the tube 90 deg. as advocated by some experts, and although the picture "subject" is enlarged the sides disappear long before the outside diameter of the tube is reached, apparently behind a "shadow" from the plates. Is this normal? And is it possible to overcome?

If not, there seems little to be gained, unless one doesn't mind a square picture and missing what goes on in the wings. Since David Wayne, in his article, "Round or Rectangular" (August issue), speaks of using the full diameter, I presume I've got something "wrong." A further snag I came across was E.H.T. hum. This took the form of shaded dark horizontal bands passing up or down the screen when signal was "off"; when "on," this would lock to form a dark band on the picture. Increased smoothing at the E.H.T. power pack did not entirely cure this, but fitting a 2 μF condenser in place of the usual .1 μF between tube cathode and earth did. Any theories or condemnations are welcome.—KENNETH A. PEEL (Sevenoaks, Kent).

SIR,—Judging by the many letters that have appeared in PRACTICAL WIRELESS many readers have difficulty in obtaining a picture when using ex-W.D. equipment. I, too, was faced with this problem and perhaps the solution to my difficulty may be of assistance to others.

I first connected earphones across the video output terminals of the receiver and adjusted the coil cores for maximum output. The distinctive sound of the video signal eliminated this part of the receiver from suspicion.

The formation of a raster proved that the time bases were functioning, therefore the sync-separator came under suspicion.

For efficient separation the screen voltage of the sync-valve is fairly critical. I therefore replaced the screen feed resistor by a variable component. By careful adjustment of this resistor and the frame and line hold controls, a picture was obtained.

If any readers in the North London area are interested in the formation of a television constructors' club would they communicate with me at the address below.—WALTER CHANNON, 2, Fotheringham Court, Enfield, Middx.

Measuring Meter Resistance

SIR,—Re Mr. E. D. Bradley's letter in the August issue of PRACTICAL WIRELESS. He quotes an accuracy of 0.3 per cent. in his experiment to find the internal resistance of a meter.

This, of course, is impossible, as the standard resistor used was only of 1 per cent. tolerance, which means that he can only quote the resistance of the meter to an accuracy of 1 per cent., which is insufficient to check the accuracy of the equation. —H. CHADWICK (Leeds, 7).

Parallel-rod Oscillator

SIR,—Mr. A. F. Giles is under a wrong impression when he states (August issue) that his oscillator, using a DET 20 valve, operates from 16 to 130 cms. (1,875 to 231 Mc/s). He no doubt means by this that the lengths of the parallel wires between the sliding contact and the valve are 4 and 32.5 cm. respectively. The resonant wavelength of parallel rods is equal to four times their physical length only when there is no capacity or inductance across their open ends.

In this particular case there is the grid to anode capacity of the valve (3.6 $\mu\mu$F) plus strays, and also the inductance of the leads, both inside and outside the valve (.05 μH. at least). Thus the frequency of operation, even when the rods are completely out of circuit, is not greater than 400 Mc/s (75 cms.). Thus, when the length of rod in use is 4 cm., the frequency is 250 Mc/s (120 cms.) (calculated) and when the rods are 32 cms. long it is 150 Mc/s (200 cms.).

Thus, due to stray inductance and capacity, the maximum frequency of oscillation of valves types DET20, 7193, etc., is in the region of 300-400 Mc/s, but due to transit time effects it may even be less than this.

However, these valves were used at up to 200 Mc/s in Service equipment.—R. JENKIN (Exeter).

[I apologise for the error pointed out by Mr. R. Jenkin. The grid to anode capacity is, however, given by the manufacturers to be approximately 2.1 $\mu\mu$F. and, using the estimate of .05μH for the inductance of the leads, a maximum frequency of about 500 Mc/s can be calculated. A frequency of 530 Mc/s has been obtained and measured with Lecher wires using a grid leak of 47,000Ω. The value of grid leak may be varied for different requirements, the stated value of 4MΩ used for receiving but a lower value used for transmitting.—A. F. G.]

Tape Recording

SIR,—I note your correspondent, "Tape Edging," is looking for a supply of magnetic recording tape. It is possible that he might get a reel of "Emitape" from H.M.V. Factories, Hayes, Middlesex.

Should he also be interested in wire recording Messrs. Boosey and Hawkes, of Regent Street, market reels of wire as used on their "Wirek" recorder, for about three guineas, giving a recording time of over one hour.

I have been carrying out experiments for some years now with magnetic recording, and should be very pleased to correspond with any readers interested in this fascinating branch of electronics. —F. C. BLAKE, 21, Highfield Road, High Brooms, Tunbridge Wells.

Disc Recording Equipment

SIR,—We have a copy of the August issue of PRACTICAL WIRELESS to hand in which you review the B.S.R. recording equipment, but we should like to point out that the type number of our recording machine is DR.33M and the equipment you reviewed seems to be that of our old model.

The new recording machine is now produced in the new silver-grey crystalline finish and is fitted with a "Decca ffrr" pickup, together with a special transformer and matching network. The whole of the lead-screw and tracking mechanism is now covered whilst an easily accessible device has been added to further facilitate the setting of the cutting stylus. The recording machine is supplied complete with inter-connection leads and monitor/playback loudspeaker, which are all enclosed in the same case, which is a teak leatherette covered instrument case.

The recording amplifier should be type AR.15C and, apart from the facilities you mentioned, also has a monitor output with its own separate volume control, and provision is also made for continuous twin channel recording without any modification.

The complete recording outfit is known as the DR.66M and comprises the recording machine, recording amplifier, full playback facilities and all inter-connection leads, and the list price of the complete equipment is £210.

One of the latest additions to the B.S.R. recording range is a completely portable recording and mixing control unit which has three electronically mixed input stages which can be used for either microphones or pickups, together with "pre-fade" monitoring facilities and a studio signal lamp system. A separate monitor amplifier is built into this piece of equipment which can be fed either from the output of the recording amplifier, the output of the pickup (thus monitoring directly from the disc being cut), or it can be used as a "talk-back" amplifier, enabling the operator to keep in contact with the studio. Twin output sockets are provided for operators' headphones. The list price of this piece of equipment is £45. —BIRMINGHAM SOUND REPRODUCERS, LTD.

SIR,—I have just seen the August issue of PRACTICAL WIRELESS. On page 318, at the beginning of the article on Disc Recording Equipment, it is said:

"By all means *experiment* with old moving-iron pick-ups as cutter heads . . . but do not expect to make high-quality recordings by such means."

Actually, a very fair cutter indeed can be made from an old pick-up, as mentioned and demonstrated by myself as part of a lecture to the British Sound Recording Association in London on March 25th, 1949.—DESMOND ROE (Stourbridge).

TV Results Abroad

SIR,—It may be of interest to hear that the A.P. television signals are received regularly in Bruges, Belgium. Whilst on holiday in Bruges I met the viewer, a Belgian amateur, M. van Exe. Although subject to considerable fading at times, and a good deal of interference from passing trams and cars, the results are surprisingly clear. During the three evenings when I "looked in," although conditions were not good, I was able to take some photographs, copies of which I enclose.

Although handicapped by lack of technical data, M. van Exe built the receiver in about nine months. He uses a 31 cm. Philips tube (7 Kv. H.T.), the focus and deflection coils he had to wind himself. He had also to make up his own I.F. transformers.

Unfortunately we had to carry on our conversation through a third person, and technical terms are not the easiest things to translate; however, from what I could see the receiver itself follows a normal pattern but is fed through two pre-amplifiers, one mounted on the antenna itself, and the other at the set end of the feeder.

I hope these few lines will interest and perhaps encourage TV set builders who are well outside the service area.—B. S. MUNCASTER (Portsmouth).

[We regret the photographs were not good enough for reproduction, but they showed a very clear picture with good definition.—ED.]

C.R. Tube Supplies From D.C. Mains—2

This Month a Complete D.C. Oscilloscope is Described by E. M. BRADLEY

THE unit is now ready for testing on a C.R. tube.

Before connecting the tube heater to L3 check the current drawn by the tube when connected to a normal 4-volt source, using the thermo-ammeter. Although tubes are rated at 4 volts 1 amp. there are often slight discrepancies—the true current may be 0.95 or 1.05 amp. or so. This is of no account when the tube is operated from a mains transformer, but in the present case, where working conditions are set by the current, the point is of some importance—the tube life and operation are both dependent upon correct heater current.

The tube and the thermo-ammeter should, therefore, be connected in series across a 4-volt accumulator, battery, or other source capable of supplying the current without potential drop (*not* dry batteries) and the true heater current of the tube measured. When the tube is connected into the power unit, this current should be passed through the tube and measured by the thermo-ammeter. The instrument reading may be taken as substantially accurate at the working frequency of the unit.

If the tube requires a current higher than 1 amp. so that R2 is advanced a little beyond its test setting the EA50 heater may be slightly over-run, so that a turn might be taken off the L4 coil. If the tube requires a little under 1 amp. the EA50 will be slightly under-run, but this is of no consequence.

In most cases R2 will be run practically at the end of its travel—i.e., with nearly minimum resistance—but the exact setting will depend on the mains voltage. Tests on the original unit were made with exactly 200 volts applied; if the mains voltage is higher than this R2 will be reduced a little and the E.H.T. will be a little higher. If the mains voltage is low it may be necessary to put on a turn or two extra on both heater coils.

Whether the unit is used separately or is built into an oscilloscope the thermo-ammeter should always be included and the heater current should always be checked when first switching on. It is a good plan to mark the usual setting of R2, then to bring the full resistance into circuit when first starting up the unit as a safeguard against fluctuating mains voltages.

Valve and tube heaters supplied with R.F. power appear to take longer to heat up to operating temperature than when supplied normally, and so the current drop as the tube heater warms up is slow. For the same reason the E.H.T. builds up slowly as the EA50 warms up.

If the thermo-ammeter is situated on the front panel of the unit chassis, as provided for in the layout of Fig. 3, or on the front panel of an oscilloscope into which the unit is built, it is possible to keep a close check on the tube heater conditions. The stability of the power system is marked, but at the same time it is desirable to guard against fluctuations caused by mains variations.

In Fig. 4 is shown the circuit of a complete D.C. oscilloscope designed around the supply unit described last month, whilst by the incorporation of the A.C./D.C. power pack shown in Fig. 5 the oscilloscope may be used on either A.C. or D.C. mains. The original model employed a VCR139 tube and the trace on the screen was bright and clear even in sunlight.

Once again anticipated difficulties did not arise. It was felt that there might well be interaction between the R.F. unit and the time-base and amplifier, but although wiring was made intentionally long to encourage any form of pick-up which might be present, no trace of interaction either by induc-

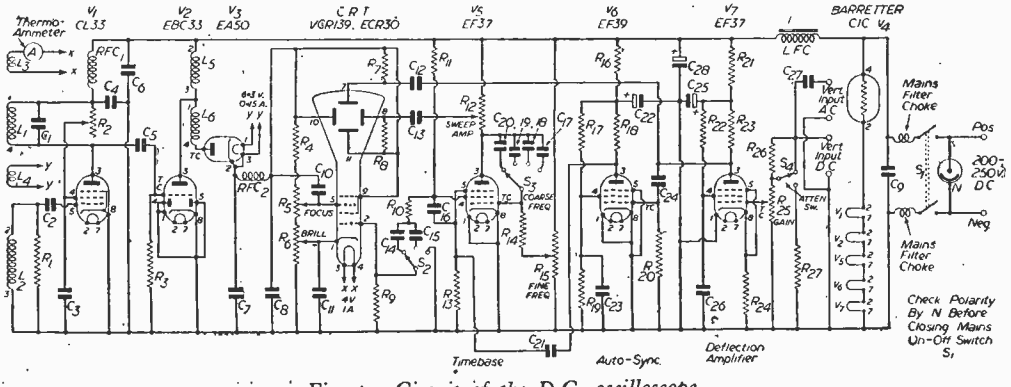


Fig. 4.—Circuit of the D.C. oscilloscope.

tion or via the heater leads could be discovered. The circuit as shown certainly appears to be the complete solution for all constructors who require a D.C. or A.C./D.C. oscilloscope.

To the power unit and C.R. tube are added a time-base with a frequency range of from 10 c.p.s. to approximately 200,000 c.p.s. in four steps, a simple high-gain amplifier for the normal frequency range, and an automatic sync. stage. Beam blanking is provided by a simple circuit which feeds pulses from the screen of the time-base valve to the C.R.T. grid and no squaring diode is used; the constructor who desires to include a squaring diode can employ the circuit shown in Fig. 1 of "Build

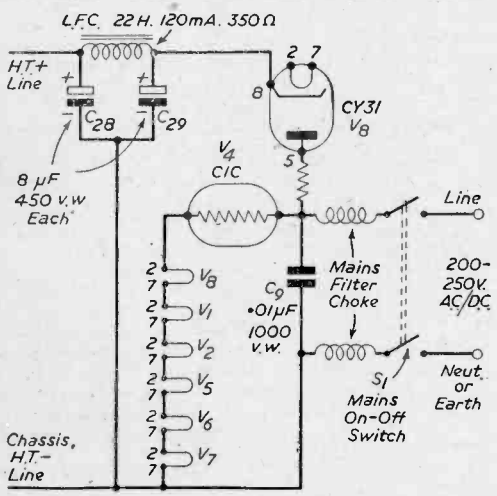


Fig. 5.—A D.C./A.C. power pack for use with the oscilloscope.

the Superscope," by E. Sowden, PRACTICAL WIRELESS, September, 1948. Some variation of the cathode bias on the diode will probably be necessary for best results, but a potentiometer across the H.T. supply with the diode cathode taken to the slider will permit of ready adjustment.

Component Values

The component values in the automatic sync. stage of the D.C. oscilloscope will appear somewhat unusual—the grid resistance and coupling capacitor are both low in value, whilst the coupling capacitor between the sync. valve anode and the time-base is of only 0.001 μF capacitance instead of the more usual 0.25 μF. It was found that this stage is very effective, and greater degrees of coupling gave a lock so strong as to restrict the time-base frequency range. Experimenters wishing to photograph screen traces might therefore increase the degree of coupling to an amount determined by trial, when a rock steady trace over a long period can be obtained.

The amplifier is not provided with linearisation up to high frequencies since this was not required on the test model, but the application of video amplifier techniques is permissible in this stage if high-frequency traces are to be inspected. A fairly high degree of current negative feedback is provided by leaving the cathode bias resistor unbypassed; a 25 μF 25 v.w. electrolytic capacitor across R24 will increase the amplifier gain considerably.

An input attenuator to the amplifier is switched into circuit when S4 is thrown to the down position, R26 and R27 then working in conjunction with R25 to give an attenuation of 20 : 1. With S4 up the attenuator is out of circuit and the full input voltage is applied to V7. Input sockets for both D.C and A.C. signals are provided.

In order that the time-base, amplifier and sync. valves may be included in the 0.2 amp. heater chain, EF37 valves are used in the first two positions with an EF39 in the third.

Particular attention must be given to the fact that to cut down expense electrolytic capacitors are employed in the smoothing and bypassing circuits. Paper capacitors are to be preferred in D.C apparatus since no damage can then be caused by an accidental reversal of polarity, but the cost of two or three paper 8 μF capacitors is prohibitive. To protect the circuit, therefore, a small neon

EXTRA COMPONENTS LIST FOR THE D.C. OSCILLOSCOPE, FIG. 4.

C10, C15—0.1 μF, 500 v.w. tubular. T.C.C. 543.
C11, C23, C26—0.1 μF, 350 v.w. tubular. T.C.C. 346.
C12, C13—0.1 μF, 1,000 v.w. tubular. T.C.C. 2043.
C14—500 pF, 750 v.w. mica. T.C.C. M3U.
C16—0.01 pF, 750 v.w. tubular. T.C.C. 645.
C17—0.006 μF, 750 v.w. mica. T.C.C. M4WU.
C18—0.001 μF, 750 v.w. mica. T.C.C. M3U.
C19—100 μF, 750 v.w. mica. T.C.C. M2U.
C20, C24—50 pF, 750 v.w. mica. T.C.C. M2U.
C21—0.001 μF, 350 v.w. mica. T.C.C. CM2ON.
C22, C25, C28—8 plus 8 plus 8 μF, 450 v.w. T.C.C. CE38P with clip S3372.
C27—0.25 μF, 750 v.w. tubular. T.C.C. 743.
R4, R14, R26—1 megohm, ½ watt.
R5—1 megohm variable, Focus control.
R6—0.25 megohm variable, brilliance control.
R7, R8—2.2. megohms, ½ watt.
R9, R13—100,000 ohms, ½ watt.
R10, R23—220,000 ohms, ½ watt.
R11—68,000 ohms, ½ watt.
R12—100,000 ohms variable, sweep amplitude control.
R15—0.5 megohm variable, fine frequency control.
R16, R19—10,000 ohms, ½ watt.
R17, R27—47,000 ohms, 1 watt.
R18—33,000 ohms, ½ watt.
R20—3.3 megohms, ½ watt.
R21—22,000 ohms, ½ watt.
R22—470,000 ohms, ½ watt.
R24—4,700 ohms, ½ watt.
R25—1 megohm variable, gain control.
L.F.C.—22 Henrys 120mAs., 350 ohms. Partridge C22/120.
N—Low power neon bulb, 200 volts working, with holder.
S2—S.P. 3-way rotary switch, beam blanking.
S3—S.P. 4-way rotary switch, coarse frequency control.
S4—S.P.2-way switch, Y input attenuation.
V5, V7—Mullard EF37.
V6—Mullard EF39.
3 octal holders.
C.R.T.—VCR139, or equivalent, with holder.
Chassis and metal case, grid clips, 7 control knobs, sleeving, wire, nuts, bolts, etc., etc.
Input terminals or sockets.

bulb N is shown connected across the supply lines before the mains on-off switch S1. Before this switch is closed the polarity of the supply lines can be checked by observing the neon bulb whose glowing plate will be that connected to the positive line. For complete safety the oscilloscope should be built up in the A.C./D.C. form when the rectifier gives complete protection under all conditions, a good return for the small extra cost of the rectifier valve and reservoir capacitor.

S2, the beam blanking switch, has three positions, and should be coded :—

Position 1 : Blanking Soft.
Position 2 : Blanking Hard.
Position 3. : Blanking Off.

It is often found that different degrees of blanking are desirable, especially with the Miller time-base, depending on the sweep frequency, and the two capacitor values given provide good compromise values. With the switch at position 3 the C.R. tube grid is directly grounded to the oscilloscope chassis. Alternatively, the third position of S2 may be employed to bring the C.R. tube grid out to a socket on the control panel, when modulating voltages could then be applied to the grid for "wheel" or "dot" frequency tests and similar applications.

Chassis

The chassis and case used for the oscilloscope may be obtained from surplus gear—surplus tubes are often purchased in cases of a type and size suitable for this oscilloscope. The circuit arrangement is non-critical, although the normal precautions must be taken, such as mounting the L.F. choke behind the tube, employing short leads in the deflection circuits, and screening the amplifier grid circuits. The R.F. power generator may be built up on a corner of the chassis and tested for interference with a nearby receiver with the metal case of the oscilloscope in place. Extra screening can be fitted to the power unit section if found necessary, but the oscilloscope case will in most cases be found to provide all the screening needed. The case must be a good fit on the chassis if perfect screening is to be attained.

For A.C./D.C. operation the extra components needed are a rectifier valve (valve rectification is preferred to metal or selenium rectification), a reservoir capacitor and a protecting resistor, as shown in the circuit of Fig. 5 and detailed below.

ADDITIONAL COMPONENTS FOR THE A.C./D.C. OSCILLOSCOPE POWER PACK (Fig. 5).

C29—8 μF, 450 v.w. electrolytic. T.C.C. CE25P.
1 Resistor—33 ohms, 1 watt.
V8—Mullard CY31.
1 octal holder.

The half-wave rectification on A.C. mains is perfectly satisfactory, and good smoothing is given by C28, the existing 8 μF capacitor. If there are traces of hum in the circuit this capacitor could be shunted by a further 8 μF to give 16 μF.

(To be continued)

B.B.C. Studio at Radiolympia

RADIOLYMPIA rings up the curtain on the studio side of radio—both sound and vision —to show visitors how programmes which flow with such apparent smoothness from radio and television sets are rehearsed and presented with painstaking care before the microphones and cameras.

Television, as the latest form of radio entertainment, naturally takes precedence, and the whole of the B.B.C. studio at the Exhibition is a reproduction on a large and improved scale of the studios at the London television station at Alexandra Palace.

From a glass-panelled gallery skirting the studio at a height of 25ft. you can look down on the brilliantly lighted stage covering 7,200 sq. ft., on which spectacular presentations such as Café Continental, Music Hall, Ice Parade and Grand Ballet are being radiated at the moment of performance to more than 150,000 television receivers in London and the Home Counties.

You see the camera crews at work, "tracking" the ultra-sensitive "C.P.S." cameras to and fro to choose intimate close-ups of the artists or more distant shots of the complete spectacle.

Visible behind the tiered seats which have been provided for the small audience in the studio is the glass-walled control room in which the producer, surrounded by technicians, can be seen directing operations. As he watches his own television monitor screens, selecting appropriate pictures from each camera in turn, he can be seen talking on his desk microphone to the headphoned camera men and studio managers. He is in sole control, like the player at the console of a huge organ, with the difference that he conjures with waves of light as well as sound.

From the gallery, too, you can see all the background activities that go to the making of a television programme. There are the make-up girls with trays of powder, mascara and foundation cream, applying finishing touches to the artists before they face the lights and cameras. Across the floor the dressers hurry their charges to the quick-change dressing-rooms on each side of the stage. The announcer paces to and fro, rehearsing a greeting to the viewing audience.

On Wednesday, September 28th, the opening day, you can see the rehearsal and performance of a spectacular Ice Parade which involves "freezing-up" a miniature ice-rink on the television stage. On the next afternoon a television fashion parade is being arranged, followed the same evening by the sound broadcast of "Twenty Questions." Friday, September 30th, is dedicated to television's "Music Hall," featuring stars famous in both sound and vision, while Saturday brings "Café Continental," a television favourite, introducing guest artists from Europe.

During Sunday the stage will be re-frozen for a new edition of the Ice Parade, to be given on Monday, October 3rd. Tuesday will be devoted to the popular sound feature, "Alhambra of the Air."

Ballet-lovers have an opportunity on Wednesday, October 5th, to see how grand ballet is produced for television.

R.S.G.B. TECHNICAL PUBLICATIONS. "R.S.G.B. Bulletin" Monthly Journal; current issue 1/6, five recent back issues 2/6. "Valve Technique," 104 p.p., 3/9; "V.H.F. Technique." 96 p.p., 3/9; "Microwave Technique," 68 p.p., 2/3; "Transmitter Interference," 32 p.p., 1/6; "Service Valve Equivalents." 32 p.p., 1/3; "The Transmitting Licence," 32 p.p., 1/-. All prices include postage. RADIO SOCIETY OF GREAT BRITAIN, 28, Little Russell St., London, W.C.1.

"PERSONAL PORTABLES" is the title of E. N. Bradley's latest book. The first of its kind, it describes the building of a series of miniature personals, including the first-ever all wave personal set. Illustrated with circuits, layouts, drilling constructional and point-point wiring plans of fully tested sets of loudspeaker type, the book costs 2/6 (2/8 posted) from BRADBOOKS, Sennen, Penzance, Cornwall.

RECEIVERS & COMPONENTS

MIDDLESBROUGH radio enthusiasts . . . large stocks of Radio components, Test Gear, Constructors' Manuals, etc. Denco, Eddystone, Raymart at PALMERS, 114, Waterloo Road, Middlesbrough.

TEST PRODS, w/leads, 2/6 pr.; 75 pf and 100 pf Ceramicons, 6d.; Midget Output Trans. for 3S4, etc., 4/-. List 2½d. Catalogue 7½d. CARTER'S, 67, Bell, Lane, Marston Green, Birmingham

FRITH RADIOCRAFT, LTD., offer:—R.C.A. Transmitters, type ET 4336, brand new in original cases; coverage 2 to 20m/cs, 807 crystal osc driving pr 813's in parallel, band-switched final, input 250/350 watts; front panel has all tuning, meters, switches for tune/operate, phone/cw, modulation indicator; chassis carries filament and bias supplies, keying relay, etc.; requires external HT power transformer and modulator; will run very comfortably at 150 watts with 1,000 v. and one 813, or up to maximum rating with 2,000 v. and pr. of 813's. Less valves, £12/10/- c.p. New lists giving 35 "Dollar Bargains" are now available free on request. FRITH RADIOCRAFT, LTD., Leicester.

AMAZING RADIO BARGAINS.—Colossal purchase of Transmitter and Receiver Units enable us to offer these sensational bargains.—Type 19 Army Transmitters: partly stripped by the Ministry to conform with regulations, but containing a host of useful components, including 4 gang .0005 tuning condenser, single .0005 condenser, each complete with slow motion dials, 13 valve holders, HF chokes, trimmers, condensers, resistors, 3 I.F. transformers, volume controls, Yaxley type switches, etc., and contained in a strong metal carrying case; price only 8/6, inc. carr. Type 25 Receiver Unit: this unit which is well known for easy conversion to a domestic receiver (see PRACTICAL WIRELESS, August, 1949), needs no introduction, it is complete less valves; price, only 7/6 inc. carr. 1196 Transmitter: for use with above unit, partly stripped; price only 5/6. SCR.522 Transmitters: With very little conversion covers the 2 metre amateur band and contains a host of equipment suitable for experiments on this band; for only 5/- inc. carr. The Ministry have again partly stripped these units, but we have been fortunate to obtain:—Modulation Transformer and A.F. Choke, 5/- per pair. Meter Switch complete with Knob, 2/- each. WALTON'S WIRELESS STORES, 203, Staveley Road, Wolverhampton.

RATES: 3/- per line or part thereof, average five words to line, minimum 2 lines. Box No. 6d. extra. Advertisements must be prepaid and addressed to Advertisement Manager, "Practical Wireless," Tower House, Southampton St., Strand, London, W.C.2.

CRYSTAL SET KITS. 200-550M., 3/9; Matchbox size, 3/3; guaranteed. Dry Portables with valves, £2. List 1d. ALEXTONE, Hillworth, Longdon, Glos.

EVERYTHING for the wireless constructor. Send stamp for price list.—H. TABNER, 118, Nightingale Road, Hitchin, Herts.

EVERYTHING for Radio Constructors, Condensers, Coils, Valves, Resistors, etc. Send stamp for list.—SMITH, 98, West End Road, Morecambe. Quick service.

PANORAMIC RECEPTION greatly extends the range of communications on domestic receivers by giving simultaneous reception of all SW stations working in any band. Tells at a glance which are CW and which phone, also frequency separation and signal strength. The high performance and technical excellence of the Hely-Mann Panoramic Monitor result from exhaustive development to a rigid specification. Available completely assembled or as a superb kit of parts with elaborate constructional manual. Technical description, circuit and illustrative drawings give full explanation. 3/6 post free. HELY-MANN ELECTRONICS LABORATORIES, 116, Grove Road, London, E.17.

TUNING UNITS. Full range of Denco, Lowther and Eddystone goods available. 5 to 10 wave-band gram. chassis covering 3 to 60 mc/s. 150 to 1,500 kc/s. Amplifiers for every use. Television kits, radio kits. TELEVISOR, £51, working at 150 miles range with good results. S.A.E. for leaflet of single items or illustrated 54-page catalogue, price 9d., to MASON'S (P.W.), Wivenhoe, Nr. Colchester.

"TELEVISION," T-H Products presents model E.S.3 "Twin-Deck" Television for the home constructor; uses V.C.R. 97 (not radar conversion). Send large s.a.e. for illustrated brochure. T-H PRODUCTS, 92, Leathwaite Road, S.W.11. (Battersea 4889.)

ESSENTIAL TELEVISION complete RF Oscillator Section for modification or complete construction signal generators, range 100 K/cs-100 M/cs ready to incorporate circuit illustration, complete instrument supplied 58/6; matched scales and all other parts. RADIO DEVELOPMENT CO., Moretonhampstead, Devon.

SUPERHET COILS, 3WB 465KC with diagram, 2/6 pair. Kit of Parts for L.M.S. (iron cored) coil pack 465KC. 9/6. 8mfd. 450 Electrolytics, 2/-. Droppers, 1/-. Assorted Eyelets, Eyeletags and Solder Tags, 6 gross 6/-. 50pf Trimmers, 4d. Send for cheapest list in England. SUSSEX ELECTRONICS LTD. (P), Riley Road, Brighton, 7. (Tel.: 4446.)

COULPHONE RADIO PRODUCTS. Standard size Mains Transformers, 250-0-250 v., 60 mA, 6.3 v., 3A, 5 v., 2A, or 4 v., 4A, 4 v. 2A, 15/6, plus 1/- post. and pkg., c.w.o. or c.o.d., from COULPHONE RADIO, "The Return of Post Mail Order Service," 53, Burscough St., Ormskirk, Lancs.

CHASSIS, Panels, Racks and Metal Cabinets. Stock sizes or made to specification in steel or aluminium; wrinkle finishes available. REOSOUND ENGINEERING AND ELECTRICAL COMPANY, Coleshill Road, Sutton Coldfield.

WESTERN ELECTRIC R1585 Receivers, for UHF or medium wave car radio conversion; the latter requires no coil alteration or additional components, the main item is filament mods from 24 to 12 or 6 vts., plus a suitable power supply; receiver contains 12 valves, 3 x 6AK5, 7 x 9001, EBC33, 12A6; condition unused and as new in cartons with control box and mounting rack; size 11in. x 6in. x 5in.; circuit diagram and mod details included, £4/10/- ea. Circuit Diagram 2/6. Mod details 2/6. R.F. Units, type 24 and 24 mod 27 at 9/9 ea., 25 at 12/6 ea., 27 at 22/6 ea. TE-149 RCA Crystal Wavemeters, 250 kcs-25mcs, brand new, £6/15/- ea. Ditto slightly damaged, 1 hrs. work and a piece of perspex (supplied) will put them right. £5/5/-. Set of 7 UHF Coils with dust cores and ceramic rotary trimmers, 5/-. Toggle Switches, 1/-. Bulgin Rotary, 1/6. Meters: 0-40v. 5/-, 0-5m.a. 6/-, 20-0-20a. 5/-, 50-0-50a 5/-, 2½in. flush 0-100, 200, 300, 500 (state which), 9/6, 0-15 v. A.C. 10/-. Lamps: 12 and 24v., most types, at 15/- doz. Suppressors, small, 3/6; medium, 8/6; very large for motors, etc., 30/-. Valves: EF50, EF54, EF36, EF39, 5/-; 6AK5 12/6; 9001 7/6; Pen.46 10/-; SP41, SP61, 3/-; EA50 3/-; D1 3/-; 955 7/6; 956 10/-; 6SH7 5/-; 12A6 6/-. Numerous others. Send S.A.E. for our lists. Are you interested in Telescopes, Binoculars, Projectors, Epidioscopes, Microscopes, Stereoscopes, Enlargers, Telescopic Rifle Sights, in fact, anything that uses glass lens and prisms. If so, our new publication, "How to use ex-Gov. Lenses and Prisms," which gives lens layouts and general data on all the above will interest you, price 2/-. Optical lists free on receipt of your S.A.E. H. ENGLISH, Rayleigh Rd., Hutton, Brentwood, Essex.

MAINS TRANSFORMERS, fully interleaved and impregnated; screened primaries 200-230-250 v. 50 c/cs; fully shrouded 425-0-425 v. 200m.a. 6.3 tapped 4 v. 3 a, 5 v. tapped, 4 v. 2 a, 5 v. tapped 4 v. 3 a, 39/9, p. & p. 1/9. 350-0-350 y. 100m.a. 6.3 tapped 4 v. 3 a, 5 tapped 4 v. 2 a, 21/9. Half shrouded drop through type 350-0-350 v. 80m.a. 6.3 v. 3 a, 5 v. 2 a, 15/9. 250-0-250 v. 60/70m.a 6.3 v. tapped 4 v. 3 a, 5 v. tapped 4 v. 2 a, 15/6. Midget type, 2½-3-2½in. 250-0-250 v. 50m.a, 6.3 v. 1.5 a. 5 v. tapped 4 v. 2 a, 14/9. Smoothing Chokes, 80m.a 15H 350 ohms, 4/11. Electrolytics, Can 16-32mfd. 350 v., 3/3 ea., 30/- doz. Selenium Rectifiers, 600 v. 30m.a., 3/6 ea., 30/- doz.; 250v. 65m.a., 3/6 ea.; 250 v. 90m.a., 4/9 ea., 48/- doz.; 120-0-120 v. 100m.a., 1/9 ea., 18/- doz.; 12 v. ½a. H.W. C.T., 1/6 ea., 12/6 doz. Receiver Chassis, undrilled, 16s.w.g., aluminium, 10-5½-2ins., 3/-; 11-6-2½in., 3/9; 12-8-2½in., 4/6; 16-8-2½in., 5/6; 20-8-2½in., 6/9. EF50 Valve Holders, 5/6 doz. Plessey 5in. P.M. Speakers with trans., 11/9. Push Pull Output Trans., 10 w. Suit 6V6, 6L6, PX4, etc., 14/9. Preceding goods current stock. Following are ex-Govt. items:—Charger Rheostats 1.2 ohm. 14 a., 6/6; Rotary type 58 Ohms 1 a. with large knob, 3/6; Unused Valves: D1, 1/- ea., 9/- doz.; 6H6 1/6 ea., 12/- doz.; SP41, 8D2, 6SH7, 2/3 ea., 3 for 5/6; HL210 2/9 ea.; RK34 2/9 ea., 3 for 6/6; EF36, PM22A, 4/3 ea., 3 for 11/6; 6C5G, SP2, 4/11 ea., 3 for 13/9; KTW62, 5U4G, 5R4GY, 5Z4 (Met), 5/9 ea., 3 for 15/11; 6SN7GT, 5/6 ea., 3 for 14/11; 6K7 (Met), 6V6 (Met), 6V6G, 6/9 ea., 3 for 18/-; 6K8 (Met), 6Q7G, 6/11 ea., 3 for 18/11. All goods guaranteed. Full list of bargains 2½d. Trade supplied. C.W.O. or C.O.D. over £1. Postage extra. RADIO SUPPLY CO., 15, Queen Square, Leeds, 2.

97/6 CHARGING SWITCHBOARDS, 12/32v., 500 and 1,260 volts, amps., cut-outs, fuses, resistances, etc., 4 take-offs, superb unit, in case, **75/-**; Dynamos, 24v., 1,000 w., 9in. x 7in., ¾in. spindle, **75/-**; Electric Motors, 230v./1/50 1/5 h.p. Incorp. 1.260c. converter. **58/-**; Mains Transformer Switchboards, 230v. A.C. to 12v.; 5 separate take-offs, complete dist. panel, switches, fuses, amps., new. From **£15.** Rotary Converters, from 1-12 kw., 110 and 220v. D.C. to 230v./1/50 A.C., from **£15.** Motor Generators 1-6 k.w., 110 and 220v. D.C. to 24/35v. D.C. **£5-£59**; Mains Transformers, ¼-18kva., all types. BENMOTORS POWER SUPPLIES, Summerley St., Earlsfield, London, S.W.18. WIM. 3833 (100 yds. Sn. Electric Line, 10 mins. Waterloo.)

ASTOUNDING OFFER in Bargain Parcels. Each parcel guaranteed to contain the following items: Condensers and Resistances in various sizes, Switches (Toggle and Yaxley), Chokes, Transformer, Microphone, Valves, Morse Key, Potentiometers, Bulbs and Holders, Sistoflex, a 24 volt A.C. Motor and a miniature Moving Coil Speaker. The whole parcel sent post free for **£1.** Send cash with order to BENSAMON RADIO, Dept. W/O, 272, Romford Road, Forest Gate, London, E.7. Send 1d. stamp for list of other bargains.

CHOKES, 60m.a. **7/6,** 90m.a. **10/-,** 100m.a. (ex-Govt.) **4/-,** 150m.a. **14/-,** 250m.a. **18/-.** Transformers. Speaker, **4/6.** I.F. Standard, **10/-** pr. Filament 6.3v. 1.5 amp., **7/6.** 3 amp. **9/-.** Condensers: 8 x 500 **3/9,** 16 x 350 **2/3,** 32 x 350 **2/3,** 25 x 25 **1/3,** 2 x 350 **1/3,** 16-8 x 450 **4/-,** 8-8 x 450 **4/6,** .002-.1 **10d.,** .1 x 7000 **14/-,** .0005 twin gang **7/3.** Speakers P.M.: 5in. **13/6,** 8in. **17/6,** 10in. **21/-.** Valves: EF50, **6/6,** EA50 **3/6,** SP41 **2/6,** 6J5 **4/6,** 6Q7, 6K8, 6K7, 6V6, 5Z4, **8/-** each. Wirewound Pots: 1, 2, 5, 10, 20, 25K, **2/-.** V/C with switch, **5/11,** less switch **4/-.** Also Television Components. S.A.E. lists. C.W.O.postage please. A.R.K., 4, Queen Square, Brighton, Sussex.

SOUTHERN RADIO'S WIRELESS BARGAINS

Car Radios, 200/500 metres, modified from BC454 and BC455 receivers; with power pack and speaker; ready for use off any 12-volt supply. **£6,** carriage paid. Bendix Command Receivers, BC454 (3-6 megs.) and BC455 (6-9.1 megs.), 6-valve superhet 12SK7 (3), 12SR7 (1), 12A6 (1) and 12K8 (1), new, **36/6.** Control Boxes for BC454 and BC455 Receivers, with three dials and slow motion drives, three 50.000 ohm vol. controls and six rotary switches. In maker's sealed cartons. **13/6.** Control Cables for BC453/4/5, 14ft. long, **9/6.** Direct Drive Adaptors for BC453/4/5, for slow motion drive on existing spindle, **2/9** each. Radio Compass Indicators, with Selsyn motor, 3in., 360 degree dial. Black crackle finish. Ideal for beam indicators. Brand new, in maker's cartons, **13/6.** Throat Microphones, low impedence; with 3ft. lead and plug, **3/6.** Delco Hand Generators, brand new, in maker's cases with spare brushes, 6 volts, 4 amps., **17/6.** Lufbra Hole Cutters, adjustable to 3½in. dia., **5/6.** Westectors, W.X.6 and W.112, **6/4** per dozen. BC929 Indicator Units, 2½in., 3BP1 tube, non-persistent valves, 2x2 (1), 6X5GT (1), 6H6 (2), 6G6 (1), 6SN7 (2), with switching motor, etc., in black crackle-finished case, **45/-.** R.A.F. Bombsight Computers, brand new. Contains gyro. motors, rack and worm gearing, barometric bellows, differentials, counters, etc. Ideal for experimenters and modellers, **60/-.** SOUTHERN RADIO SUPPLY, LIMITED, 46, Lisle Street, W.C.2. (GERard 6653.)

NEW "QUALITY" Radio Tuners and Amplifiers.—Constructional Manuals: No. 1 L. & M.-wave T.R.F. Tuner with illum. dial, glass and escutcheon, radio/gram. switch, **3/6**; No. 2, 3-waveband Superhet Tuner with large, elaborate dial assembly, exceptional range combined with quality, radio/gram. switch, gain control, **3/6.** Both above suitable any amplifier incl. highest fidelity. Absolutely Complete Kits with valves: No. 1 **90/-,** No. 2 **155/-.** Ready-built Tuners: No. 1 **£5,** No. 2 **£8/10/-.** New AC Quality Amplifiers: No. 1 4-watt, pickup and tuner inputs, volume, tone and feedback controls, 6 v. valves; No. 2, 12 15 watt. twin gram/mike inputs and tuner input, volume mixing, tone control, push-pull output incl. trans. for 3, 7.5 and 15 ohms, 6 v. valves. Constructional Manuals: No. 1 **2/6,** No. 2 **4/6.** Complete Kits: No. 1 **110/-,** No. 2 **£9.** Built Amplifiers: No. 1 **£5/19/6,** No: 2 **10 gns.,** fully guaranteed. 10in. high Flux Speakers, **19/6** extra, 12in. **45/-.** Bargains in Radiogram Equipment: Collaro AC47 centre-drive Motors with 12in. non-magnetic t.t. and speed regulator, our price **£5;** AC/DC ditto **£9/4/10,** as above but with unit plate, pickup and autostop AC **£7/10/-,** AC/DC **£12/10/-.** The latest Collaro AC49 Motor Pickup/Autostop Unit with 10in. t.t., **£5/3/6.** The sensational new Collaro A.C. Mixed Autochanger in black and chrom., with hi-fi crystal pickup—our special offer, **£14.** Above for 110-250 v. mains. All goods sent by return c.w.o. or c.o.d. P.W. Illustrated bargain list 2½d. N.R.S., 102, Parkhill Road, London, N.W.3. Gulliver 1453.

AIRCRAFT INTAKE MAGNETOS, **12/6.** Landing Lights, type B, **5/-.** Fuel Booster Pumps, 24 volts. **20/-.** All carriage paid. H. BROWN, 102, Cleveland St., Doncaster.

CHASSIS, PANELS. Varley and R.T.S. Transformers. W.D. surplus. Lists.—HUDSON, 3B, Winner Street, Paignton.

SURPLUS.—Transformers. RCA. full shroud, 190/250 v. to 400-350-0-350-400 200m.a. 6 v. 4a., 5 v. 3 a., **37/6.** Driver/Mod. CT. Primary, twin secs, each 1:1.74, impedance P500/Ss3k. 2 Kv. insulation. **10/-.** The pair, **42/6** boxed. Ferranti PP Driver; twin secs. each 2½:1, **7/6.** Vibrator Packs DC 6 v. to 190 v. 80m.a.; smoothed, **22/6**; 12 v. to 250 v. 100m.a., **17/6.** Slydlock Fuses 5a **1/-**; Knobs various, **6/-** doz. Jones Plugs, 6F 8F, **1/6.** Belling Plugs, mated, **2/6** pr. Jackplug, mated, 2 way, **1/6** pr. Beehive Standoffs, 2in., **1/3.** Resistors, new, 25 values, 50 asstd., **5/6.** Bakelite Pulleys, 3in., mounted, **9d.** Silver Contact on threaded rod, **2/6** doz. Transformers, all 230/250 v. 50 c. input, ouput 48 v. ½ a., **8/6** (matching met. rectifier, **7/6**); 260/340 v. 100-m.a. **8/6;** 20 v. 20m.a. **5/-**; 195/250 to 230 v. 2½ a. **12/6;** 610-0-610 v. 185m.a. **20/-,** 6 v. 1 a (2), 7 v. 5 a., 4 v. 6 a. **15/-,** 20 v. 3 a. **7/6,** 4 v. 7 a. **8/6.** Power Packs. 190/250 input, 350 v. 120m.a., output D.C., less rectifier, **40/-.** 2 metre Convertors. Valves: CV66,EF54 (2), EC52, inching relay, etc., **25/-.** Valves at **5/-**: 5R4GY, 6SN7, 6SL7, EF50, 12SK7, 12SR7, 12SG7, 12AH7, 9003, 9002, EF36, 6K7M, EBC33, 3B24, 2051, EF39. At **3/6.** 6SH7, SP61, SP41, 6B8M, 12J5, 12C8. At **3/-**: 6H6, EA50, EB34, 7193, CV6. At **6/6:** 5U4G, 5Z4M, 6X5, VR-150, 6L7M, 12K8, 6SC7M, 6SA7M, 6AC7, 6J7, 6SJ7, VU133, VU120A. At **7/6** 6V6, ECH35, 6K8M, EK32, 6F7, 807, EF54, EC52, CV66. Terms: C.W.O. Carr. paid. S.A.E. enquiries please. W. A. BENSON, 308, Rathbone Rd., Liverpool, 13.

VALVES at **3/6** and upwards, all the popular types, and lots that aren't so easily obtained. 6K8, 6J7, 6K7, 6V6, at **6/6** each, not ex-Government; 5Z4, **6/-** each; Phillips 2½in. speaker, again available at **10/-**; 12in. P.M. speakers at **39/6.** Television magnifying lens, 9in., **50/-,** and 6in., **25/-.** Complete radio receiver kits, dual wave with cabinet, all valves and small components and circuits, **£4/19/6.** Write for fully detailed list to DUKE & CO., 219, Ilford Lane, Ilford, Essex.

AMAZING VALUE: .0005 Twin Gangs, **3/9**; .2 amp Droppers, **1/-**; 16 x 16, 350v., **1/9.** Send for lists. Other outstanding bargains. T. G. HOWELL & CO., 29, McWilliam Rd., Brighton, 7.

REPAIRS to loudspeakers. Cones, coils fitted. Fields altered, rewound. Output transformers, clock coils. Prices quoted. Satisfaction guaranteed. L. S. REPAIR SERVICE, 49, Trinity Rd., Upper Tooting, S.W.17. 'Phone: Balham 2359.

TUITION

THE BRITISH NATIONAL RADIO SCHOOL offers you a career. Write to-day for free booklet describing our wide range of training courses in Radio, Radar, Telecommunications Principles, Mathematics, Physics, and Mechanics; correspondence classes for the new series of C. & G. examinations; we specialise in turning "operators" into "engineers," and for this purpose our "Four Year Plan" (leading to A.M.I.E.E. and A.M.Brit.I.R.E., with 9 C. & G. Certificates as interim rewards) is unsurpassed; our "guarantee has no strings attached."—STUDIES DIRECTOR, B.Sc., A.M.I.E.E., M.Br.I.R.E., 66, Addiscombe Road, Croydon, Surrey.

MERCHANT NAVY AND AIR RADIO. Here is an opportunity to train as Radio Officer for merchant ships and the air. The big liners are open to you, but you must first qualify for the P.M.G. Certificate. Established 30 years. We can put you through in the minimum time. Day, evening and postal instruction. Prospectus from Director. THE WIRELESS SCHOOL, 21, Manor Gardens, Holloway, London, N.7. ARC. 3694.

WIRELESS (sea and air) TELEVISION. Broadcasting, Radar, etc., offer tremendous opportunities. Students, both sexes, age 14 upwards, trained for appointments in all branches of Radio. Low fees, boarders accepted. 2d. stamp for pros.—WIRELESS COLLEGE, Colwyn Bay.

WIRELESS, Television. Postal Courses for Amateur Radio Transmitting Licence also Television for Radio Trades diploma. Apply BRITISH SCHOOL OF TELEGRAPHY LTD., 179, Clapham Road, London, S.W.9. (Forty years' experience in training students in Wireless and allied subjects.)

TELEVISION.—The Gothic Television School specialises solely in training in television. Courses assume no previous television knowledge and provide guaranteed training for Brit.I.R.E. and R.T.E.B. examinations. All tutors possess university degrees and/or corporate membership of professional institutions and are appointed individually to postal course students to ensure complete and thorough training. Principals, M.B.E., B.Sc., M.Brit.I.R.E., education committee members, etc. Numerous well-known companies have adopted the School's Basic Television Course as standard television training for their staffs. Moderate fees. Details from GOTHIC TELEVISION SCHOOL, 13, North Avenue, London, W.13.

Practical Television

Vol. 1. No. 8 NEW SERIES OCTOBER, 1949

Televiews

THE chief television exhibits at Radiolympia have been segregated from our usual Radiolympia survey, as the industry has now reached the stage where it requires separate treatment. This year television has made further advances, as may be seen by comparing the number of exhibits with those of last year. Moreover, the prices are in most cases less. Television is undoubtedly seen to be inserting the thin end of its wedge into the market. It is having its teething troubles and it has not yet reached a stage of perfection comparable to radio. The second stage in its development will occur when the Sutton Coldfield station is opened later this year. It may be some time before the third stage occurs. Television still suffers from the limitations of studio technique and to some extent to the lack of development in television cameras. Pictures do not appear on the end of a tube in so natural a form as on the pictures, and there is still a regrettably shallow depth of focus. No doubt, all these things will be rectified as the years go on. Even in its present state of development, however, television offers excellent entertainment value, and receivers may be purchased with the knowledge that they are not likely to be rendered obsolete by any capricious changes on the part of the B.B.C. If prices are high, it is because of the comparatively small demand. It is doubtful, indeed, whether any manufacturer is yet making a profit out of it, so that even at present-day prices the purchaser is getting something for nothing.

This country is tied to the present system of transmission for several years to come. Some missing links have yet to be forged before any radical change can take place, and not the least of these is a system, apart from delayed film, of recording television programmes on wax, wire or tape. At present, owing to the wide frequency-band involved, that difficulty seems well-nigh insuperable, but then, so have so many other difficulties which finally have been solved. Unless there is a bolder Government policy in the matter of spending money on development and regarding it as an investment rather than as an immediate profit-earner, television technique cannot make rapid progress. For the granting of a monopoly to the B.B.C. on the transmitting side destroys the incentive of private enterprise to spend large sums of money developing new transmitting systems, when they have no assurance that if successful it will be taken up by the B.B.C. That is the danger of all monopolies, and the Government is always the biggest monopolist of all.

Television Publicity

MOREOVER, there will have to be a considerable change of B.B.C. policy in dealing with those who help to provide programme material. One of those changes relates to the publicity it should give in return for services rendered. We give a case in point. For the purposes of our stand at the Model Engineer Exhibition we constructed a master battery clock controlling slaves. This work took some months, and it was of sufficient interest to the B.B.C. to ask to be allowed to take it to Alexandra Palace on the opening day of the exhibition to illustrate their review of the exhibits in their "Picture Page" feature. This we consented to do, and thus were deprived of the publicity value of this interesting mechanical exhibit on what is the most valuable day of the exhibition. The clocks were called for at four o'clock in the afternoon and were taken over by two members of our staff, who remained until they were finished with at nine p.m., and then returned them to the Exhibition, arriving home close on midnight. No word of publicity to the proprietors, nor to this journal, was given for this service, and we are wondering what sort of mind it is directing the television programmes which presumes that business people are prepared to create interest for B.B.C. television programmes without acknowledgment of any sort.

It has long been the policy of the B.B.C., which seems less enlightened than other countries in this respect, that publicity is an ugly thing and must be avoided at all costs. Yet it does not fail to take full advantage of its monopolistic control of broadcasting to advertise its own books, periodicals and publications.

Marconi lightweight television equipment can be mounted on a control table or any other convenient place. Shown in this illustration is (top) left to right: Mobile switching and communication unit, master monitor, two camera control and pre-view monitors. (Below) left to right: Regulator power supply units and synchronising generator.

Television At Radiolympia

Details of Some of the Speciel Exhibits—See also Pages 385-398

Aerialite Ltd.

THE principal lines which will be of interest will be the new range of DPO television aerials, at the very low price of 47s. 6d. In the past television aerials have been fairly expensive, but by a simple method of assembly which cuts out labour, both from the point of view of the manufacturer and the user, Messrs. Aerialite have been able to cut costs. [Stand No. 62]

Antiference Ltd.

AMONG the specialised television aerial equipment to be seen on this stand may be mentioned the streamlined moulded junction unit which gives a totally enclosed and waterproofed cable termination—one of the weak spots in many aerial systems. For long-distance reception the model "D5" has a reflector and director and it is claimed that the signal gain compared with a standard dipole is approximately 7 dB (2—1). A new plug and socket for coaxial cables will also be seen here. [Stand No. 64]

Balcombe, Ltd., A. J.

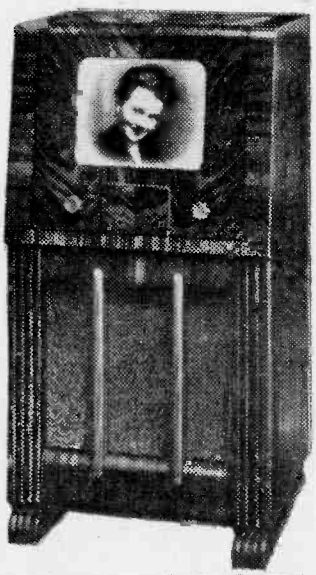
THE new 1949 Alba television receivers will be demonstrated on the stand, in the communal television sections, and in the special Alba demonstration room, No. D.18 in the main gallery. Among these Alba television sets will be found the latest "projection" models which provide an unusually large picture from a tiny cathode ray tube. [Stand No. 44]

Champion Electric Corporation

THE main exhibit on this stand will be a de luxe television incorporating radio and utilising the new 12in. cathode ray tubes of the latest design, housed in console cabinets with space for automatic record changer and record storage space. Available in a wide choice of finishes, including walnut, mahogany and birds-eye maple, in modern and in period designs after Chippendale and other designers. [Stand No. 26]

Fitton Ltd., R. N.

WHAT is claimed to be one of the most outstanding television receivers in the exhibition is to be found on this stand. It is outstanding not only because of the efficient performance of the instrument itself, but its



One of the Season's new Television Consoles. This is from the Alba range.

magnificent burr walnut cabinet which has been designed to fit into the corner of a room. The picture size is 10in. by 8in. There are three controls only for sound volume, picture brilliance, and picture contrast. Although this model is just over £100 it can be termed "inexpensive."

They are also introducing a new table receiver and console model to coincide with the opening of the exhibition. These use 12in. picture tubes but the receivers are only for use within the field strength area of the television transmitter, although at a small extra cost a pre-amplifier can be supplied. [Stand No. 80]

Haynes Radio Limited

ON the Haynes Radio stand will be seen:

1. Television receiver type HR.88.

2. Television receiver with radio and gramophone. A new model with 14in. aluminised C.R. tube working at 9Kv. Type HR.95.

3. Scanning units, having windings to suit the various needs and in particular windings of adequate impedance for use with choke fed output circuits giving improved efficiency with low surge potentials. The new types have ribbed bakelite moulded centre tubes and moulded end flanges giving the necessary protection against brush-over between windings and C.R. tube anode terminal.

4. Focus coils of 15,000 or 23,000 turns.

5. P.M. focus rings, two types to meet varying field strength requirements. Adjustable gap and knurled ring control.

6. R.F., E.H.T. unit. Two types for outputs up to 12.5Kv. [Stand No. 9]

Hazlehurst Designs Limited

ON this stand will be found R.F., E.H.T. units for outputs between 5 and 25 Kv. Positive or negative E.H.T. Stabilised units and a complete 25 Kv. variable power supply, fully stabilised for operation from A.C. mains, positive or negative output. 1-25 Kv. breakdown tester with fully enclosed safety compartment. A full range of high-voltage coils and filament transformers. [Stand No. 205]

Invicta Radio Ltd.

THE two Invicta television models to be seen on this stand are a table model T.102 and a console model T.103. Chassis are identical and incorporate a 9in. tube. No mains transformer is used, and the sound and vision circuits are of the T.R.F. type. Blocking oscillators are used in both time bases and interference suppressors are fitted in both sound and vision circuits. The table model is 43 gns. and the consol 52 gns., both plus P.T. [Stand No. 71]

Kolster-Brandes Ltd.

HERE will be seen a sound and vision receiver for A.C. mains, 12in. aluminium backed C.R. tube which gives 80 square inch picture size, bright picture for daylight viewing, simple controls, no expensive aerial required, will operate satisfactorily on a simple indoor aerial. High quality directional sound. Handsome two-tone mahogany cabinet. High sensitivity makes it suitable for normal or fringe areas. Also available for Birmingham transmitter, model EV 30B.

A console model with specification precisely similar to above with 80 square inch picture and additional refinements such as large speaker and handsome cabinet of sleek modern design, is also to be shown. Also available for Birmingham transmitter, model EV 40. [Stand No. 65]

Marconi's Wireless Telegraph Co., Ltd.

VISITORS will see, on the Marconi stand (No. 174 in the National Hall), the latest Marconi television equipment for radio and mobile use, where it will be a working display.

The television equipment in use on the stand will comprise two Image Orthicon cameras and associated control equipment, a picture control unit, and a picture monitor. Scenes inside the exhibition will be televised by the cameras and shown on the screen of a monitor receiver installed in a special viewing tunnel. Visitors viewing the screen of this receiver will, therefore, have a televised view of the crowd of which they themselves are a part.

[Stand No. 174]

Murphy Radio

HERE may be seen the V.120, a console model television receiver of superhet type suitable for London or Sutton Coldfield transmissions. Twelve-inch tube, giving 10in. x 8in. picture. Efficient limiters give high standard of suppression of interference on sound and vision. Suitable for A.C. mains 200-250 volts 50 cycles. Price £71 10s. 8d., including purchase tax.

The V.118 is a luxury television receiver with 12in. tube giving 10in. x 8in. picture. Suitable for London or Sutton Coldfield frequencies. Incorporates many refinements for ensuring the best picture quality, including high E.H.T. voltage with good regulation, sound and vision limiters, etc. Full length doors are fitted to the cabinet, completely covering the receiver when not in use. Price £98 13s. 4d., including purchase tax. [Stand No. 56]

R.G.D.

SUITABLE for either the London or the Birmingham areas, the television consoles are available as separate instruments or as components of the three-in-one combinations which will be shown. Each set has 23 valves and the 12in. cathode ray tube is fitted with a focus and scanning coil unit. The tube employs magnetic deflection and focusing; it produces a picture 10in. x 8in. The controls comprise focus, brilliance, contrast and volume. A figured walnut cabinet mounted on castors is supplied and has a hinged front to permit cleaning of the cathode ray tube and the inner surface of the front glass plate. Dimensions are 39in. high x 22in. wide x 19½in. deep. [Stand No. 37]

Standard Telephones and Cables Ltd.

AMONG the equipment on this stand will be the special Vestigal Sideband Transmission apparatus developed by this firm.

British standard 405 line television signals comprise frequencies from 0 to 3 Mc/s. Economical transmission between locations, transmitting stations for instance, makes double sideband modulated carrier technique desirable, and requires a 6 Mc/s overall bandwidth. Special experimental cable to carry this bandwidth has been laid for the G.P.O. by "Standard" between London and Birmingham, but most of England is covered by smaller "Standard" coaxial cables capable of carrying economically a bandwidth of 4 Mc/s only.

It is very costly to suppress one sideband completely, but since the bulk of the energy is transmitted in the band below 500 kc/s it is possible, without undue distortion, to transmit one sideband completely and the other up to 500 kc/s only, the lower frequencies being responsible for the shapes of objects seen.

Thus with the equipment demonstrated, the smaller cables can be efficiently used and the original B.B.C. signal before and after transmission through the system can be compared.

[Stand No. 173]

Vidor Ltd.

VIDOR was first to introduce the television receiver designed to receive the Alexandra Palace or Sutton Coldfield transmissions by means of a simple switching arrangement, and any of the six models exhibited can be seen working in the Vidor Demonstration Room No. D.3, upstairs in the gallery. The CN. 370 console television has a two-station circuit, provision for pre-amplifier, and 12in. cathode ray tube, giving a 10in x 8in. picture of particularly clear definition. Its distinctive modern cabinet is beautifully finished in mahogany, having two full length doors with attractive sycamore handles. When the doors are open, only two controls are visible, the auxilliary controls being housed under an ingenious sycamore roller bar, which, when not in use, forms part of the cabinet. Four other console models having cabinet work of novel design combining a book shelf compartment finished in dark mahogany, are available with either 9in. or 12in. tubes.

An entirely new development, the Vidor large screen projection console television receiver, is on view for the first time, and giving a picture size of 15in. x 12½in. should attract interest.

[Stand No. 69]

Wolsey Television Ltd.

AMONG the various types of television aerial to be seen on this stand is the "All-Ways" indoor aerial. This costs 25s. and has Polythene insulation and swivelling elements, thus enabling the user to obtain maximum results. Various outdoor models are also exhibited, together with brackets and lashings. [Stand No. 13]

Underneath the Dipole

Television Pick-ups and Reflections. By "THE SCANNER"

THE "Technical Hitch" is an expression commonly used by announcers when making an apology for a breakdown or delay which is primarily due to an equipment failure. On television such troubles may occur on either picture or sound, and for this and for other reasons one may expect a much higher percentage of "technical hitches" than on sound radio. Even making allowances for these facts and for the somewhat experimental character of the equipment, however, the number of technical hold-ups on the Alexandra Palace transmissions seems to have been excessive during the last month or so.

Drama Behind the Scenes

IT is difficult for the impatient viewer to visualise the "drama" which may be taking place behind the scenes at the studio or transmitter during the period of a "technical hitch." The engineers, acutely aware of the vast waiting audience, feverishly check circuits in the complex amplifying network, or line up alternative television cameras in replacement of unstable ones. The newest types of cameras, incidentally, have not yet got through their initial teething troubles and are liable to come "unstuck" with light of too great an intensity. Like the little girl with the curl in the middle of her forehead, when they are *good* they are very, very good —but when they are *bad*, they are horrid!

I must say that I am full of sympathy for the Tv engineers at such moments of tension. The nightmare of maintaining stability when there is an intermittent crackle on the equipment—which might be due to valve, condenser or resistor trouble—is something which almost defies description. It is an agony sometimes experienced in film production by soundmen or cameramen during the taking of special scenes which cannot be repeated, especially on newsreel work. With fingers crossed, they watch the footage counter and pray that the film will last out the shot; that there won't be a crackle on the mike or a jam-up of film in the camera mechanism.

Stand-by Programmes

THE B.B.C. could, however, minimise the effect of such breakdowns by having available reserve Tv entertainment of interest and quality. On the Sunday evening when the play "Elizabeth of Ladymead" was to have been presented, for instance, the "technical hitch" was confined to the studio from which this particular play was to have been transmitted, and films were put on while the backroom boys got to work tracing the trouble. After a couple of newsreels and a C.O.I. magazine film had been put on as a stop-gap the fault was still not rectified, and it was decided to abandon the play for the evening and to substitute a feature film, "The Missing Million." This film might have got by as a second feature for uncritical audiences when it was first made many years ago, probably as a "quota quickie." But to present it to a vast Sunday night television audience as a consolation prize for having stayed at home for "Ladymead" was taking things a bit too far!

It is quite obvious that the B.B.C. needs first-class stand-by material, and this can surely be found without such superannuated feature films of dubious excellence. One or two of the really snappy musical revues which have already been televised, such as those starring Cliff Gordon, Sonnie Hale and Claude Hulbert, should be photographed in film and kept in cold storage for stand-by use. The great advantage of a revue for this purpose would be that it could be terminated at any time in the event of the technical hitch fault being cleared and the normal programme able to proceed.

Tv Ballet

IT is a curious fact that few of the B.B.C. producers seem to have mastered the technique of putting over dancing shows or ballet. There is a great tendency to introduce high shots giving a view as from the front row of the Circle, which, with the wide-angle lenses in general use, results in an ugly foreshortened angle on the dancers' legs. Far more effective are shots with the cameras lower than normal, both from long shots and close-up. Changes from camera to camera should be closely related to the music and made with the utmost precision. Care taken in such matters imparts a slickness, polish and professional touch to the presentation and rivets the attention of the viewer.

Popularity of ballet on Tv has suffered on account of the choice of material for many of the ballet shows, which have tended in many instances to be of the experimental type, exhibitions of posing, surrealist décor and the ugliest of modernistic music. Such examples of pretentious choreography should be confined to the precincts of the Mercury, Unity or Lindsay theatres, where the arty-crafty can let their hair down and swoon with rapture. Or, better still, kept from public gaze within the four walls of the dancing academy. On the other hand, I found the classroom series entitled "Ballet for Beginners" an admirable exposition of the elements of ballet, presented in a manner which could be easily understood by non-balletomanes, and of definite help to viewers who would like to enjoy the ballet programmes more fully. Generally speaking, ballets which have a story background, non-futuristic settings and which give the principals opportunities for displaying real dancing virtuosity come over best.

The Gaiety Theatre

ONE of the most important theatrical events of the winter will take place in December or January, when the Gaiety Theatre in the Strand reopens. The fact that the famous old theatre, derelict for so many years, is being renovated and restored through the enterprise and energy of that great little comedian, Lupino Lane, will raise the hopes of viewers that they will be able to take part in the reopening. Veteran viewers will remember that television history

was made in pre-war days when Lupino Lane's successful musical show, "Me and My Girl," was relayed from the Victoria Palace. I can't recall that there was any opposition from theatrical managers at that time to the televising of extracts of shows, and the general idea seemed to be that such transmissions had great publicity value. The late Sir Oswald Stoll co-operated with the B.B.C. on many occasions, and Emitron cameras paid quite a number of visits to the London Coliseum. Sir Oswald followed the progress of television closely, being the owner of a receiver when the public television service first started, and before that time, at his theatres, he gave opportunities to John L. Baird to demonstrate the first crude examples of big screen television, relayed from the Baird laboratory in Long Acre.

Newsreel Progress

NOBODY can say that the B.B.C. newsreel stands still. It has steadily forged ahead of most of its contemporaries of the cinema and is able to give a freshness of treatment to many of its "stories" which would be impossible with the time and footage limitations imposed upon its rivals. Some of the cameramen seem to be outstandingly good, particularly the man who sends first-class material back from various parts of the continent—Charles de Jaeger. First-class newsreel cameramen, like press photographers, always get their pictures somehow or other, frequently under terrible lighting conditions. But the man who can also give that something extra—that slightly "arty" touch, those wonderful clouds, or that choice of "set-ups" which cut together so smoothly—is a person of great rarity. There once was a time when newsreel cameramen were chiefly noted for their thirst and their bowler hats, when their competence was judged by their ability to keep the camera handle turning steadily and keep the lens pointing roughly in the right direction. Their imagination and enterprise rarely strayed from the well-tried annual events, such as the Mayor of Whitstable eating the first oyster of the season, tossing the pancake at Westminster School, or the Stock Exchange walking race to Brighton. Modern newsreels are in a very different class, with their slick cutting, their crisp commentaries and their occasional interpolation of directly recorded synchronised sound. Royalty has always been prominent in the newsreels, and rarely a week goes by without its film report of some function attended by members of the Royal Family. In this respect, possibly, the Television Newsreel lags slightly behind its cinema counterparts. And, by the way, isn't it about time we had the National Anthem on television? I would like to suggest that it should be added to the end of the newsreel or, alternatively, that a National Anthem film be transmitted just before the recorded version of the ten o'clock news is broadcast. Television viewers are just as loyal as the listeners to the Home and Light Programmes. As for the Third Programme, with its Soviet point of view—well, well, the name should be changed to the Fifth (Column) Programme, and it should carry a nightly bed-time story for evil little quislings!

A Simple E.H.T. Unit

A 5 kV. Unit from Government Surplus

By G. A. THOROGOOD

THE E.H.T. supply to be described was constructed entirely from Government surplus and cost under £2, and gives an output of 5 kV sufficient for a 9in. tube. The output voltage can be further raised simply by adding further stages, the extra cost being about 10s. per added 1,000 v. whilst a unit of fewer stages can be used to provide supplies for a VCR97 tube.

The principle used is that of the Cockroft-Walton voltage multiplier, and by using metal rectifiers has the advantage that "first cost is last cost" and also that there is no drain on the H.T. supply as in the case of R.F. E.H.T. units.

The circuit consists of a series of half-wave rectifiers, in which the ripple voltage of the first circuit is rectified by the second and added to the D.C. voltage produced by the first rectifier. This process is repeated until the desired output is obtained. The ripple on the last stage is removed by the rectifier marked R on the

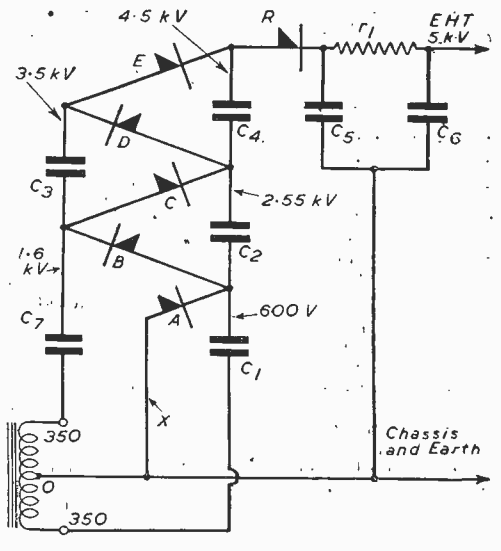


Fig. 1.—Circuit of the E.H.T. Unit. The component in the lower left-hand corner is a power transformer secondary. Note that the voltages shown are those actually obtained with an electrostatic voltmeter under no-load conditions.

diagram. The final output is full-wave rectified, thus enabling an economy to be made in the size of the final reservoir condenser.

The rectifiers used are Westinghouse type J50, rated at 400 v. 2 mA. Since the rectifiers B, C, D, E must withstand 700 v. R.M.S. these sections are made by strapping two J50s together (as shown) and connecting in series. Alternatively, type J100 could be used, but as these are

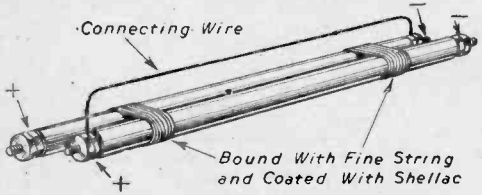


Fig. 2.—Method of strapping together two rectifiers.

longer the unit could not be made as compact.

Components

The condensers are preferably tubular, single-hole fixing type, which can be mounted on vertical strips of $\frac{1}{16}$ in. (or thicker) paxolin, obtained by removing the tags from tagstrips, and bolted to the side of the receiver chassis. A paxolin crosspiece should be bolted to the top of the vertical strips to provide lateral strength, and the reservoir condenser C mounted on the chassis in such a manner that rectifier R can be directly connected to this and the uppermost condenser of the chain, thus providing a mechanical stay to prevent swaying.

Increasing Output

There are two alternative connections for the lead marked X. If taken to H.T. (as shown) the output is 5 kV. If taken to the cathode of the power rectifier (i.e., 350v.+) the output will be increased by 350 v.

The capacity values of the condensers are not critical, but larger valves of any except C5 and C6 will give greater output voltage, and care should be taken that the working value of C5 and C6 is not exceeded.

LIST OF COMPONENTS

J50 rectifiers—10 off (see text).
C1—.1 μF. 1.5 kV.
C2, C3, C4—.03 μF. 2 kV.
C5, C6—.02 μF. 5 kV.
C7—.25 μF. 2 kV.
r1—.5 MΩ or 1.0 MΩ.

If an output in excess of 5 kV. is required more stages can be added between C4 and rectifier R. In this case, C5 and C6 must either be replaced by higher voltage components or the scheme shown in Fig. 3 adopted. In the

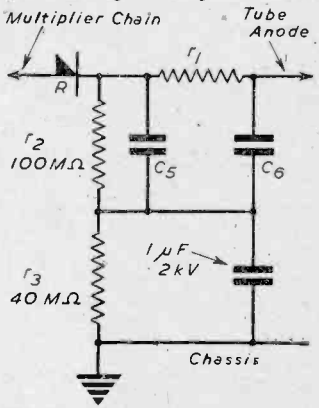


Fig. 3.—Modification to be adopted when a higher output is required. r2 should be made up from four 25 MΩ resistors in series (1 watt rating). r3 should consist of two 20 MΩ resistors.

latter case the two resistances must be added to ensure that the potential on the condensers is properly distributed.

Telenews

Midland Reception

AS we go to press the first report of the satisfactory reception of the test signals from the Sutton Coldfield transmitter comes from a radio dealer—E. W. Jones, of Wellington, Salop. The receiver in use was a Pye, D.18.T.

International Convention

DURING this month an international convention is to be held at Como, near Milan, Italy. At the same time at the Arts Palace in Milan there will be an exhibition of international television equipment. The convention and exhibition are being held under the auspices of the Italian Government.

Station Analysis

IT is reported that an analysis of the applications for licences for television transmitters in U.S.A. has revealed that the largest percentage was from newspaper proprietors—over 31 per cent. Next highest in the list were broadcasting companies, followed by cinemas and theatres.

Television Air Programme

WHAT is reported to be the largest and most varied air programmes on television is scheduled for the Battle of Britain anniversary in September The R.A.F. is co-operating, and the programme will be a combination of actual relays and film. Air Chief Marshall Sir Guy Garrod will introduce the programme, which will include a six-minutes excerpt from the R.A.F. film "Battle of Britain."

Tv Reception in S. Africa

A POINT of significance in connection with the satisfactory reception in S. Africa of the B.B.C. transmissions concerns the aerial which is used. The experimenter has been using a standard Pye B16T receiver but has found that in his particular locality a single element aerial has proved most satisfactory, hardly any noticeable difference being experienced with a three-element beam. He also found that it made little difference whether the aerial was horizontal or vertical.

TV Aerials

LITIGATION in both this country and U.S.A. has brought into question the aerial problem. In many cases landlords have been supported legally in requiring the removal of a TV aerial, but in U.S.A. a case was recently brought by a landlord to prevent the use of a window-type aerial. The magistrate ruled that the aerial could remain, provided the tenant obtained liability insurance to protect the landlord in case of any accident attributable to the aerial. At a number of sites near London local councils are prohibiting the use of TV aerials on council houses.

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PRACTICAL WIRELESS, OCT., 1949

Published on the 7th of each month by GEORGE NEWNES, LIMITED, Tower House, Southampton Street, Strand, London, W.C.2, and printed in England by W. SPEAIGHT & SONS, LTD., Exmoor Street, London, W.10. Sole Agents for Australia and New Zealand: GORDON & GOTCH (A'sia), LTD. South Africa: CENTRAL NEWS AGENCY, LTD. Subscription rate including postage, for one year: Inland and Abroad 10s. 6d. (Canada 10s.). Registered at the General Post Office for the Canadian Magazine Post.