

MAKING AN OUTPUT TRANSFORMER— See page 164

Practical and Amateur Wireless

3^D
EVERY
WEDNESDAY

Edited by F. J. CAMM

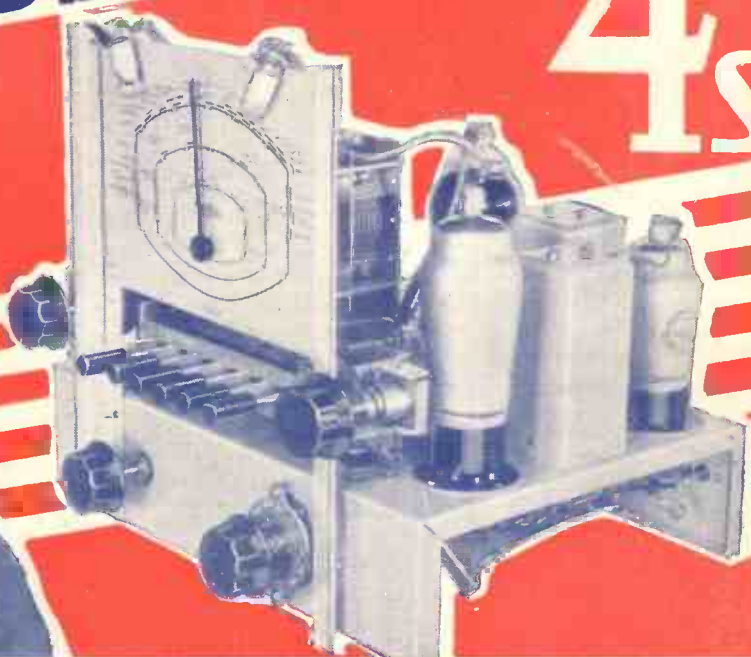
a GEORGE
NEWNES
Publication

Vol. 13. No. 319.
October 29th, 1938.

AND PRACTICAL TELEVISION

FURTHER DETAILS *of the* PUSH-BUTTON

4's



Get a Copy To-day!

EVERY PRACTICAL WIRELESS SERVICE MAN SHOULD HAVE IT.

PRACTICAL WIRELESS SERVICE MANUAL

By F. J. CAMM

A Complete Practical and Up-to-date Work on the Testing of all Types of Wireless Receivers. 288 PAGES and OVER 220 PHOTOGRAPHS, DIAGRAMS, and PLANS.

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

ADVT.

ACCURATE Instruments for ACCURATE Testing



BRITISH
MADE

In case, with high voltage leads, interchangeable test prods and crocodile clips; and instruction booklet **£3 : 10s.**

The NEW High Resistance AVOMINOR

ELECTRICAL MEASURING INSTRUMENT

An extremely sensitive 10 range D.C. moving-coil micro-ammeter also calibrated as a multi-range voltmeter and megohmmeter. Its six voltage ranges are all at 20,000 ohms per volt, the consumption at full scale deflection being 50 microamps. This extreme sensitivity permits precision readings with negligible loading and is eminently suitable for measuring grid, screen and anode voltages, and also for television. On the lower of its two current ranges, a deflection of approx. 1 mm. is produced by a current of one micro-amp, allowing accurate readings of grid current, etc.

The Universal AVOMINOR Electrical Measuring Instrument

A precision meter for measuring A.C. and D.C. volts, D.C. milliamps, and ohms. It has 22 ranges. An accurate moving-coil movement gives a 3in. full scale deflection. Total resistance is 200,000 ohms. Complete with instruction book, leads, testing prods and crocodile clips. **£5 : 10s.**

Leather case, 10/-



The word "Avo" is our registered trade mark.

DEFERRED TERMS IF DESIRED

Write for fully descriptive literature of 'AVO' Instruments

The D.C. AVOMINOR Electrical Measuring Instrument. This precision-built moving-coil D.C. instrument, with 13 ranges covering 0-120 mA, 0-600 volts, and 0-3 megohms provides adequate testing facilities for checking valve performance, batteries and power units, etc. It reduces trouble-tracking to its simplest terms. In case, with leads, interchangeable testing prods and crocodile clips, and instruction booklet. **45/-**

Sole Proprietors and Manufacturers:

THE AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT Co., Ltd. Winder House, Douglas Street, London, S.W.1.

Phone: Victoria 3404-7

GREAT NEW DOUBLE-CHANCE CARD GAME

This is the new Card Game that has taken the country by storm. And why? Because it can be played by all—it appeals to old and young alike. There's a grand football flavour about SOCCER, but remember, you need not know anything about football itself to be able to play the game and win! It's new—it's bright—it's skilful but easy!

The fascination of SOCCER is that you'll never tire of it. It has got that something extra. SOCCER is stocked by all stationers, stores, bookstalls, and fancy goods dealers, etc. Get it to-day!



SOMEONE MUST WIN EVERY HAND
THERE ARE TWO WAYS TO WIN
YOU CAN WIN BOTH WAYS!

EXCITING FROM START TO FINISH

SOCCER

THE GREAT NEW CARD GAME

2/6

A WADDINGTON GAME—IT'S GOOD!



SECRETS OF SUCCESSFUL WIRING—See Page 157.




Practical and Amateur Wireless

Edited by F. J. CAMM

Technical Staff:
W. J. Delaney, H. J. Barton Chapple, Wh.Sch.,
B.Sc., A.M.I.E.E., Frank Preston.

VOL. XIII. No. 319. October 29th, 1938.

ROUND *the* WORLD of WIRELESS

Making Your Own Components
WE are continually receiving requests from readers for instructions for making various component parts used in modern receivers, and in many cases it is found impossible to give descriptions which will be of value. For instance, making a set of all-wave coils to tune from 5 metres to 2,000 metres, with an old gang condenser. This is quite a common topic, but it is by no means a simple matter to make such a set of coils. They are usually required for use in a superhet, and the various difficulties regarding accurate matching, tracking, values of padding condensers and so on, will often prove such a worry to the constructor that the work involved is not worth while. Other items are, however, quite efficiently constructed at home, and last week we described a most useful mains transformer which will undoubtedly prove of value to every listener. This week we describe an output transformer, which is another item of great value to the experimenter, and in many cases it will be found that by using this component quality will be considerably improved. From time to time we shall describe similar items, and suggestions from readers will be welcome. It should be borne in mind, however, that instructions cannot be given for making ganged condensers or similar items.

Push-button Tuning
AN unusual aspect of push-button tuning has been brought forward in America where a committee of commercial advertisers has protested at the production of such receivers. The grounds of the protest are based upon the fact that the listener is likely to restrict his listening to a few stations, and thus the values of commercial advertising over the air are minimised.

Interference Legislation
IT is understood that the L.C.C. is to be approached by the Metropolitan Boroughs' Standing Joint Committee with a view to obtaining Parliamentary powers to suppress electrical interference from neon signs in the Metropolitan area.

Australian School Radio
THE development of listening in schools in the Commonwealth of Australia is gradually increasing. There are now more

than 1,500 schools equipped with schools radio apparatus, and weekly reports are to be submitted concerning the results obtained by this addition to the educational side.

Broadcast Hall
CO-OPERATION between B.B.C. engineers and the British Film Institute has resulted in the design of a new hall at Trinity College, Carmarthen. This will enable students to hear modern broad-

Crisis Speeches
THE Prime Minister's two speeches, made during the crisis, have been recorded by H.M.V., and the proceeds of the sale of the record are to be given to the British Legion. Both speeches are on a single record which may be obtained for 4s.

"Do You Know?"
A COMPETITION of wireless general knowledge was recently run by Messrs. J. Collier and Sons, Ltd., of London, in connection with their exhibition. The questions were: Which company was the first to make wireless—G.E.C., Marconi, or Metropolitan Vickers? When did Marconiphone first introduce the radiogram—1925, 1929, 1931? Which country first introduced the thermionic valve—U.S.A., Germany, Great Britain? Who built the first high-definition television transmitter, for regular service—Baird, Scophony, Marconi? Test your knowledge on these questions—the answers will be found on page 154.

Ghost Darts Match
A NOVEL idea is to be presented on November 3rd in the Regional programme, when Mr. F. A. Wallace, the individual darts champion of London and the Home Counties will throw for the B.B.C. in a darts match at the Alexandra Arms, Eastbourne. His score will be announced, and time will then be given for all listening competitors to throw their darts. Mr. Wallace will again throw, and so on to the end of the contest. The B.B.C. Director of Outside Broadcasts is at present thinking out a scheme for awarding a prize for the best individual performance against the champion. Entries must be authenticated by a club secretary.

Gunpowder Plot
ON November 5th an interesting broadcast will take place in the National programme. The truth about Guy Fawkes will then be heard, and it is stated that a dispassionate and critical examination of the documents relative to the "gunpowder treason and plot" reveals a story which is a horrifying farrago of loose ends. All that finally emerges is a doubt as to whether, in fact, the plot in question was ever intended at all. The programme, which has been prepared by Rayner Heppenstall from contemporary documents, will be produced by Leslie Stokes.

ON OTHER PAGES	
	Page
Amateur Transmitting ..	155
Secrets of Successful Wiring ..	157
Battery Trickle Chargers ..	158
On Your Wavelength ..	159
Short-wave Section ..	161
Simple Superhets ..	163
A Stand-by Output Transformer ..	164
Readers' Wrinkles ..	165
The Push-button 4 ..	166
Practical Television ..	169
Radio "Effects" ..	175
Readers' Letters ..	178
Queries and Enquiries ..	180

cast programmes under ideal conditions, the acoustic design of the hall incorporating the best features of the principal B.B.C. studios, enabling reverberation periods to be adjusted to suit conditions existing at the time of the broadcast. The cost of the hall and extensions necessary was £12,000.

Lord Mayor's Show
THIS spectacular event will again be broadcast on November 9th, the B.B.C. commentator this year being stationed on the front of the Mansion House to describe to listeners the commencement of the procession. At night the Prime Minister's speech will be heard by Regional listeners from the Guildhall.

ROUND the WORLD of WIRELESS (Continued)

Eire Short-wave Station

WE learn that the Radio-Eireann authorities intend to speed up the installation of the Eire short-wave station. The transmitter now in course of erection at Moydrum, near Athlone, will be in operation before the end of the present year. The power of the new station will be 3.5 kW, and as soon as a wavelength for the station has been allocated by the International Broadcasting Union Conference at Brussels this month, testing will begin.

Indian School Broadcasts

ACCORDING to a recent report, All-India Radio, Madras, is conducting special school broadcasts for half-an-hour every day. The programmes have a definite cultural bias, and are considered an invaluable addition and aid to education in the classroom.

New Transmitter at Newfoundland

A 10-kW transmitter which is being assembled at Montreal, is to be erected near St. John's, Newfoundland, and will be controlled by a body similar to the Canadian Broadcasting Corporation.

Norwegian High-power Project

IT is reported that the Norwegian broadcasting authorities intend to increase the power of the present 60-kW Oslo transmitter to 300 kW. Such a change would make the station second only to Moscow, which is at present the most powerful station in Europe.

Two Young Announcers at WLW

TWO Bills—Bill Robbins and Bill Edwards—are the latest newscasting pair to be heard on the air from WLW, the Nation's Station, Cincinnati, U.S.A. They are heard daily, except Sunday, from 6.45 to 7.0 a.m., E.S.T. Robbins, one of the station's youngest announcers, and Edwards, who tops the former by a few months in age, are injecting a new angle in newscasting. Rather than making attempts at commentating, Robbins, the newscaster, discusses the morning's events as though he were talking "shop" in a friendly manner. Edwards announces the programme.

Tunis Testing

THE new French station, Tunis P.T.T., with a power of 30 kW, has been conducting daily tests from 11 a.m. to 1 p.m., and 6 p.m. to 8 p.m., on a wavelength of 345 metres.

V.C.s' Dinner

SPEECHES at the re-union dinner for holders of the Victoria Cross will be broadcast from the Midland Regional on November 5th. The function is being held at the Regent Hotel, Leamington Spa, and the chief speaker will be the Rt. Hon. Anthony Eden, M.P. for Warwick and Leamington Division.

INTERESTING and TOPICAL NEWS and NOTES

Midland Variety

THE artists for a variety programme to be broadcast on October 31st, include Bob Arnold, from Shipston-on-Stour, in

broadcast on November 3rd (National) under the direction of the composer. In the same programme, Clarence Raybould will conduct a set of ancient airs and dances arranged by Respighi.

Light Entertainment from Carlisle and Burnley

VARIETY in the "Northern Music Hall" series will come from two Northern theatres on November 2nd and 3rd—from Her Majesty's Theatre, Carlisle, and the Palace Theatre, Burnley, respectively.

Imperial Fruit Show

THIS show opens in Bristol on October 28th and is claimed to be the largest exhibition of its kind in Europe. Mr. C. H. Middleton will visit the show and will give West of England listeners his impressions in a talk on November 1st. In addition to home-grown fruit there are to be exhibits from the Empire, and a section devoted to the canning history.

"Do You Know?"

THE answers to the General Knowledge questions on page 153 are as follows:

Marconi was the first to make wireless apparatus.

1901 was the year of the first wireless signal across the Atlantic.

1929 was the date of the introduction of the radiogram by Marconiphone.

Great Britain introduced the thermionic valve.

The first high-definition television transmitter for regular service was built by Marconi.



Mary Lamb, the 18 years old shepherdess who captured the imagination of the British Isles when broadcasting in "In Town To-night" a short while ago, is to become a B.B.C. singing star. She recently gave a recital of folk songs in Stanford Robinson's programme. She lives on a Cumberland fellside farm, and in the illustration she is seen with two of her sheep.

some of his farmer's boy sketches: Tarrant Bailey, Jr., the Birmingham banjoist; and Raymond Green, entertainer, who has broadcast since 1930. Mr. Green took part in over five hundred concert parties in France during the War.

Giant Locomotives

THE fastest trains in this country are hauled by engines of whose construction five radio snapshots have been made; and Northern listeners will hear the first, "Engine X, Episode 1," from Doncaster, on October 30th. This programme will be repeated in the Children's Hour on November 3rd. Listeners will follow Engine X from a mass of shapeless metal to the time when it can be seen at work.

Orchestral Music

A PROGRAMME of music by Edward German, including his "Norwich" Symphony, will be broadcast on October 29th (National), when the B.B.C. Orchestra will be conducted by Joseph Lewis; and on November 2nd (Regional) Eric Fogg will conduct the Empire Orchestra in a programme of French composers, including Albert Roussel's Concerto for small orchestra, Symphony No. 2 by Saint-Saëns, and Debussy's "Prélude à l'Après-midi d'un Faune." The first performance of a new work by Eric Coates, entitled "The Enchanted Garden" (a ballet suite) will be

SOLVE THIS!

PROBLEM No. 319

Martin built a three-valve set with an S.G. detector stage. When tested results were very poor. He tested the anode components in the detector stage, after finding that the H.F. stage was not faulty, and also replaced the grid condenser and leak, but still without improvement. He included a milliammeter in the detector anode circuit and obtained quite a good reading, and had every component tested and found in order. Even when 'phones were joined in the anode circuit of the detector he could obtain only very weak signals. What was the most likely cause of the trouble? Three books will be awarded for the first three correct solutions opened. Envelopes must be addressed to The Editor, PRACTICAL AND AMATEUR WIRELESS, Geo. Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. Envelopes must be marked Problem No. 319 in the top left-hand corner and must be posted to reach this office not later than the first post on Monday, October 31st, 1938.

Solution to Problem No. 318

The arrangement which Atkins adopted did not apply bias to the output valve, but merely included a high-resistance in series with the grid circuit. He should have included the resistance in the H.T. negative lead, taking the grid return direct to H.T. negative. The following three readers successfully solved Problem No. 317 and books have accordingly been forwarded to them: A. Gent, Ash Leigh Lodge, Heaton, Bolton; E. K. Clarke, 28, Chancer Road, Forest Gate, E.7; W. L. Lucock, 144, Huntingtower Road, Grantham, Lines.

The Amateur Transmitter

Initial Experiments with the Oscillator Chassis. Making and Adding an A.A. Aerial, and Suggestions for Further Experiments with Couplings, are Discussed in this Article

By L. O. SPARKS

THE experimental chassis described in last week's issue was suggested to enable those interested to carry out tests with various oscillator circuits, and observe for themselves the effects produced by different adjustments and values. Operating details were omitted purposely; practical observations are often more instructive than reading about such things. However, to enable results to be verified, details are given below of tests carried out with the apparatus specified in the previous article.

It is possible that the figures will not correspond with those obtained by everyone. This is accounted for by the fact that the readings depend on the type of valve

The loop lamp was then placed over the top of the grid coil and, while a glow was produced, it did not approach in intensity that of the anode coil.

The placing of the loop near the anode tank coil actually represents placing a load on the circuit as H.F. energy is absorbed or drawn for the tank coil, and the procedure can be likened to adding an aerial.

The addition of this load naturally upsets the balance of the two tuned circuits, so further adjustment of the anode condenser is called for. With the loop still in position, it was noticed that the brilliancy of the lamp could be increased considerably by adjusting the condenser, indicating an increase in R.F. power. Examining the

meter reading revealed that the current had now increased from 5 mA to 15 mA and from this figure, together with the value of the H.T. applied, can be calculated the power input to the oscillator. The wattage equals, in this case, 15 multiplied by 120, which gives us 1,800, but, as the current is expressed in mA, it becomes necessary to divide the result by 1,000 to reach the actual figure, namely, 1.8 watts.

Still holding the same tuning, the loop was removed and placed over the grid coil. The glow was brighter than in the first test but much less bright than when over the anode coil. Adjustment of the grid condenser improved matters, though it was noticed that the setting of the condenser

used, the high-tension voltages applied and the values of the components. Standard B.T.S. 40-metre coils were used, a Tungsram P.P.220 valve and 120 volts on the anode and 100 on the auxiliary grid, with, of course, a 2-volt cell for the filaments.

Note the method of supporting the link winding so that the coil may be changed without disturbing the link coil.

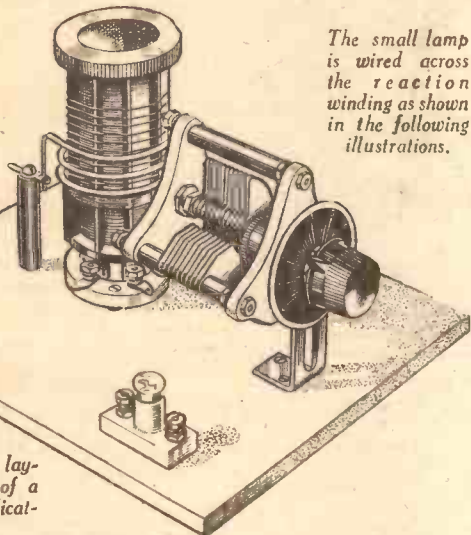


Fig. 1.—Showing the layout and construction of a simple A.A. with indicating lamp.

The small lamp is wired across the reaction winding as shown in the following illustrations.

The first figures to be taken were those indicating when the circuit was in a stable condition, i.e. not oscillating. This state can be reached by adjustment of the two tuning condensers, and the meter showed that an anode current of 28 mA was flowing.

The two condensers were then adjusted to approximately the same setting and the grid condenser slowly moved until the current started to decrease. Further adjustment produced a sudden drop in the meter reading and eventually a minimum current of 5 mA was registered.

Power Output Test

The lamp loop was then placed over the top of the anode coil and a faint glow in the lamp produced. This increased in brightness as the loop was lowered towards the anode end of the coil, the maximum being reached at a point approximately three-quarters down the winding.

Turning to the anode current meter during these operations, it was noticed that the current increased slightly.

was much more critical than that of the other circuit.

Observations

To sum the results up, therefore, we have the following. High anode current when the circuit is not oscillating. This state of affairs is not good for the valve: that is

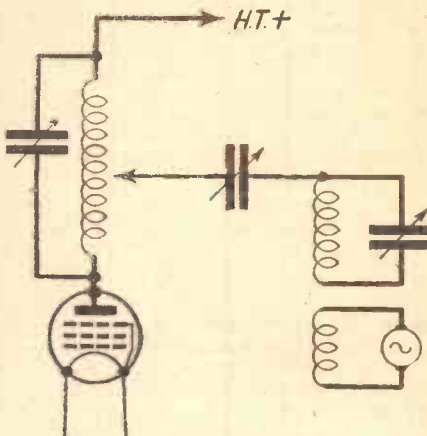


Fig. 2.—Capacity coupling. The condenser can be fixed or variable.

why it is always advisable to commence tests with reduced anode voltage. Bringing the circuit into oscillation causes a big drop in anode current, but maximum output is not obtained when the minimum output point is reached. Loading of the circuit calls for re-tuning. The most satisfactory position of the loading point on the anode tank coil has to be determined by experiment. So far so good, but these effects are only fundamental and it is necessary to proceed further with other experiments to obtain a thorough understanding. For example, the effect of using a different ratio of inductance to capacity in the anode tank circuit should be noted.

This can easily be done by (a) reducing the turns on the coil or (b) increasing the capacity of the condenser. Careful tests with the loop lamp are essential to see the resultant effect on the power output.

Artificial Aerial

The next step is to make up a simple artificial aerial. A standard arrangement is shown in Fig. 1, which makes use of a four-pin plug-in S.W. coil, a suitable tuning condenser, a pocket-lamp and holder and a holder for the coil. The complete unit can be built up on a small baseboard with a panel or bracket to hold the tuning condenser.

The grid winding is connected across the variable condenser while the lamp is wired in series with the reaction winding.

Having constructed the A.A., it now becomes necessary to provide some means of coupling it to the oscillator and it is possible to do this in one of the three ways as shown in Figs. 2, 3, and 4. The most simple is that shown in Fig. 2, which, as it makes use of a condenser for the coupling, is known as capacity coupling. The energy

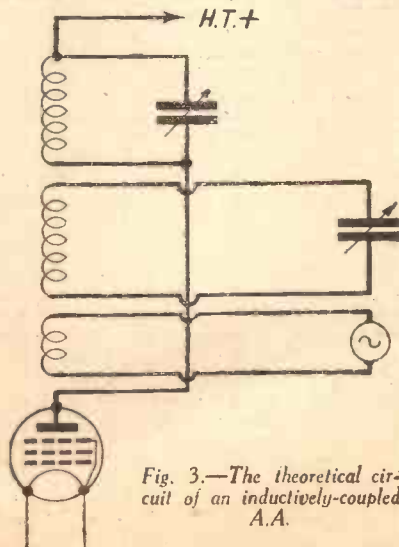


Fig. 3.—The theoretical circuit of an inductively-coupled A.A.

THE AMATEUR TRANSMITTER

(Continued from previous page)

is transferred from the anode tank coil to the A.A. by connecting a small condenser, fixed or variable, between a suitable point on the anode coil and the top end of the A.A. coil. The next, in order of simplicity, is Fig. 3, which is usually described as inductive coupling as it depends, solely, on the induction between the two coils con-

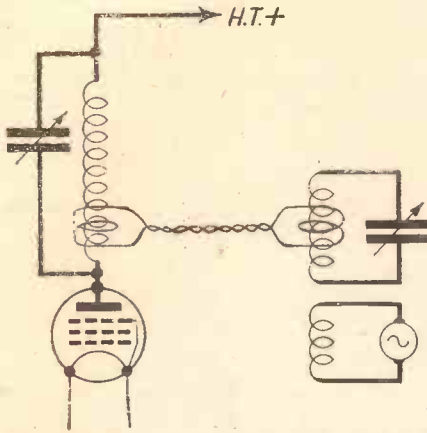


Fig. 4.—Shows how the link coupling is obtained.

cerned, for the transference of the generated R.F. energy.

With this method, the A.A. coil must be so placed that it comes within the effective field of the tank coil and this can best be achieved by winding the two coils on one former, but the degree of coupling must be determined by experiment.

Link Coupling

The last method, Fig. 4, is, perhaps, the most interesting. It is known as link

coupling and consists of small coupling coils wound round the tank and A.A. coils and coupled together by means of an ordinary piece of twisted twin flex.

Each form of coupling has advantages and disadvantages, and each one has characteristics of its own, so this one item alone can form a most interesting and instructive subject for experimental work.

It is not proposed to make comments on them in this issue, as it is hoped that every enthusiast will carry out tests for themselves and record their observations. Here are one or two pointers to guide you on the right path.

Note the effects on output, loading and tuning, if possible, on different wave-bands. Note the physical limitations, i.e., as regards ease of constructing coupling and the distance between tank coil and A.A. and the effect of this distance on the output.

Constructing the Link Coils

As some difficulty might be experienced in the making of suitable link coupling coils and their fixing, a few details are given herewith.

The coils themselves should be wound with, say, 16 or 18-gauge wire covered with insulating sleeving. If enamelled wire is used, this will not be necessary. The number of turns depends on the winding of the tank and A.A. coils, but a rough average is 10 per cent. of the turns on those coils.

The exact position of the coupling must be determined by experiment; the loop lamp will help in that direction and, once

the position has been decided on, some form of support has to be provided to hold the coils.

Small insulating pillars can be purchased or made from ebonite rod, similar to those shown in Fig. 5, which indicates how they can be fitted to the experimental chassis.

It should be noted that the coupling coils are larger in diameter than the tank or A.A. coils, thus allowing them to be free to slide up and down the formers as desired and, at the same time, to provide a coupling which is not too tight.

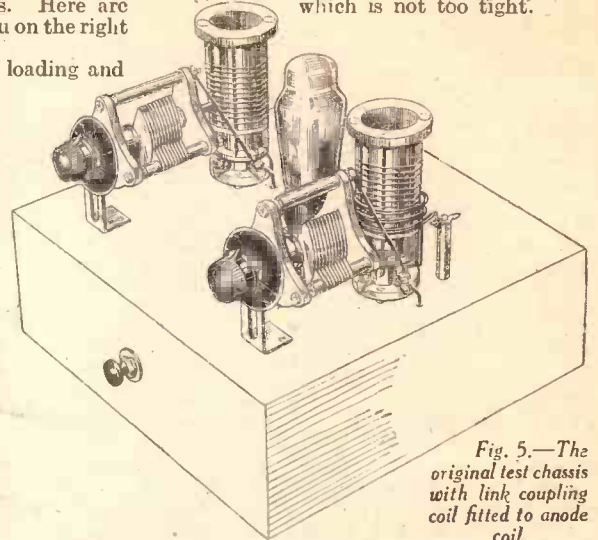


Fig. 5.—The original test chassis with link coupling coil fitted to anode coil.

The experiments outlined may seem, to some, very elementary, but they are very important and, until one has a sound knowledge of the various methods described and their characteristics, it is not safe to proceed to more advanced subjects.

IMPORTANT BROADCASTS OF THE WEEK

NATIONAL (261.1 m. and 1,500 m.)
Wednesday, October 26th.—A commentary on *The Casarewitch*.

Thursday, October 27th.—B.B.C. Ballroom.

Friday, October 28th.—*Hugh the Drover*, a romantic ballad opera, words by Harold Child and R. Vaughan Williams.

Saturday, October 29th.—*Saturday Variety Sing-Song*.

REGIONAL (342.1 m.)

Wednesday, October 26th.—England v. Rest of Europe Soccer match, from High-bury.

Thursday, October 27.—Royal Philharmonic Society Concert (1st concert of Sibelius Festival).

Friday, October 28th.—Famous Music Halls—2, *The Argyle Theatre*, Birkenhead.

Saturday, October 29th.—*The Shaft*, a Cornish legend, dramatised by A. Harris Body, from West of England.

MIDLAND (297.2 m.)

Wednesday, October 26th.—Franz Liszt—3, a musical biography: *The Rhapsodist*.

Thursday, October 27th.—Orchestral programme from the Town Hall, Birmingham.

Friday, October 28th.—Ladies' choral programme.

Saturday, October 29th.—Sport in the Midlands: eye-witness accounts.

NORTHERN (449.1 m.)

Wednesday, October 26th.—Variety at Home.

Thursday, October 27th.—*Lancashire Neet*, a programme of story and song from the County Palatine.

Friday, October 28th.—Famous Music Halls: 2, *The Argyle Theatre*, Birkenhead.

TELEVISION FEATURES

MR. J. B. PRIESTLEY, the novelist, will give the first after-dinner speech by television on November 2nd on the occasion of the Festival Dinner of the Royal Photographic Society at the Dorchester Hotel, presided over by the Duke of Kent. Immediately after the dinner, Mr. Priestley will go to Alexandra Palace and will speak for ten minutes before the television camera. Receivers installed at the Dorchester will enable the guests to see and hear the speaker.

Following the speech an all-star cabaret will be televised, with Gracie Fields, Jean Colin, Oliver Wakefield and Douglas Byng.

This will be Gracie Fields's second visit to the Alexandra Palace studios. Alexandra Palace itself, however, is familiar ground, for it was in the old Alexandra Palace theatre that Gracie Fields scored her first successes in the Archie Pitt shows, "Mr. Tower, of London," "Too Many Cooks," and "Safety First."

Saturday, October 29th.—Leeds Saturday Concert, from the Town Hall, Leeds.

WEST OF ENGLAND (285.7 m.)

Wednesday, October 26th.—*The Use of the Land—3*, *The Work of the Landowner*, a discussion.

Thursday, October 27th.—*Carmen* (Bizet), Act 3: *The Royal Carl Rosa Opera Company*, from *The Prince's Theatre*, Bristol.

Friday, October 28th.—*A La Carte*, a mixed menu of light fare.

Saturday, October 29th.—*The Shaft*, a Cornish Legend, dramatised by A. Harris Body.

WELSH (373.1 m.)

Wednesday, October 26th.—Snowdon, feature programme.

Thursday, October 27th.—*Sing-Song in Welsh* by people of Llanerfyl, Montgomeryshire.

Friday, October 28th.—*Night Express—2*, Enter Colby Stack.

Saturday, October 29th.—*The Nantyllyllon Children's Choir* and artists in "The Children's Cantata," by Joseph Parry.

SCOTTISH (391.1 m.)

Wednesday, October 26th.—North-East Variety.

Thursday, October 27th.—Scottish Dance Music.

Friday, October 28th.—Scots Songs.

Saturday, October 29th.—Orchestral concert.

SECRETS OF SUCCESSFUL WIRING

A Badly-wired Receiver may Lead to Many Troubles, and the Methods of Using Different Types of Wire and Connections are Explained Here—By W. J. DELANEY

MANY constructors go to the trouble of buying the best of components and spending hours in testing and adjusting a receiver, but carry out the most important work—namely, the wiring-up—in a shoddy manner. Apart from the fact that many constructors cannot solder satisfactorily, it seems to be assumed by many amateurs that any type of wire may be used, and that the performance will not be affected by the material used. A glance into a modern high-class receiver will show that wiring is actually one of the most important parts of the set—and at the same time it is one of the most interesting. It may be divided into two classes, namely, the material used and the method of using it. The normal material used is insulated tinned copper wire, sold under various proprietary names, and flex of varying gauge. Do not attempt to use old bell-wire or even any wire which has been used before for any purpose. On more than one occasion a set has been examined, and it has been found that apart from the fact that corrosion has set in in some part of the wire (which fact has been concealed by the covering of the wire), a kink may have occurred in it which results in a partial fracture which eventually will lead to a complete break.

Simple Rules

There are two or three simple rules which will apply to any type of wire. Firstly, if a kink occurs, do not pull it out. Untwist the wire, following the direction of the

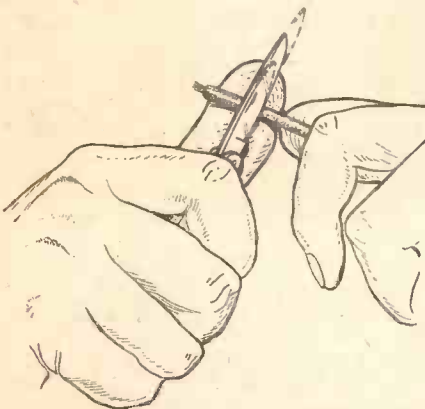


Fig. 2.—If insulated wire is scraped as shown here—there is danger of cutting through the wire.

kink, and do this before the kink has been pulled to the point where it is almost straightened out. If the wire is being reeled off a spool or unwound from some similar object, carry out the unwinding process slowly so that a loop will not run off and thereby lead to a kink.

For all normal purposes the wire may be stretched slightly so that it remains rigid from one point to another in the set, but do not do this for leads which are to be used in short- or ultra-short-wave apparatus. The surface of the wire may be fractured by undue stretching and this may result in high-frequency losses.

The gauge of connecting wire should preferably be 16 or 18 S.W.G. and finer gauges should not be employed.

If a covered type of wire is employed the greatest care should be taken in removing the insulation. A common method is to take a sharp penknife, hold the end of the wire on the ball of the thumb and rotate the knife-blade round the wire whilst

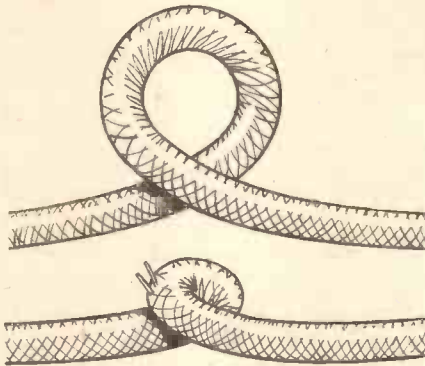


Fig. 1.—If a loop forms in the wire, as shown in the upper illustration, it should not be pulled out, or the wire may break internally, as seen in the lower illustration.

exerting a slight pressure. What generally happens when this is done is that the sharp knife not only penetrates the insulated covering of the wire and the cotton layers beneath, but also cuts into the wire itself. This is hardly noticeable owing to the reflection effects of the tinned wire and the fact that the edge of the insulation is right up to the cut. When the wire is soldered in place, however, the short length of wire which is soldered will remain rigid, and the remaining portion of the wire may be long enough to vibrate and all such movements are carried by the thin part of the wire which is left at the cut. This is seen in the exaggerated view in Fig. 3. Eventually the wire breaks at this point and the fault generally occurs without warning. If a length of insulated sleeving is slipped over the wire when wiring up it may be hours before the fault is discovered. Therefore, *scrape* the covering away, either by placing the end of the wire in a "V" slot in a piece of metal or with a fairly blunt knife held at an angle.

Cleanliness

In all cases, where the wire joint has to be made the wire should be cleaned properly. Scraping is generally not good enough as places will be missed, and if the wire is soldered the solder will only adhere at odd spots, thus giving rise to a poor joint. A small piece of old emery-cloth or fine sand-paper is ideal for cleaning, and it should be held between the finger and thumb and the end of the wire rubbed with a rotary motion. Don't overdo the cleaning and wear away half of the wire. Two or three turns are usually sufficient, and tin the point immediately before it can get dirty or corroded again.

Insulated sleeving is available in various

colours and may be slipped over the wire when one end has been fixed in position, and will provide additional insulation where this is needed, and at the same time by using different colours separate types of circuit (H.F., L.F., H.T., etc.) may easily be identified for testing and similar purposes.

Ordinary flex is the cause of many heart-burns, the usual trouble being found to be due to the fact that the wire is old and the sulphur in the rubber has corroded the wires. If the flex is thick, each strand must be separated and cleaned individually, as it will not be found possible to press the ends flat for cleaning with emery. Usually the simplest way of cleaning this type of wire is to bare a considerable length (say, 1½ in. or so), and this will enable the wire to be splayed out, flattened on the bench or work-table and then cleaned by rubbing the emery in one direction over it. The wires should then be turned over, again flattened, and the process repeated two or three times, until each individual strand is seen to shine. Carefully flux the ends, being very careful not to apply too much flux. The iron must be really hot, and then each strand will tin and join its neighbour satisfactorily. Unless this process is attended to carefully it will be found that only two or three strands take the solder, and although this may run round the complete bunch of ends, the majority will be inside a "blob" of solder which is filled with flux, and a high-resistance joint will result. As this type of flex is usually only used for heater leads in mains sets, the result is that the current being carried will be too great for the small amount of wire in actual circuit and it will heat or reduce the voltage on the valve heater.

The ends of flex should, of course, be scraped exactly in the same manner as the solid wire already referred to, and again the sharp knife is not advisable, owing to the fact that several of the fine strands may be severed. The cut ends may easily move about and cause crackling noises. Another trouble with flex which is often experienced is that soldering is not adopted and the ends of the wire are simply twisted round a terminal, which is then tightened, so much so that one or two "whiskers" of the flex will be forced out, may be missed owing to their colour and the background of the component or baseboard, and eventually a short-circuit may develop due to other "whiskers" coming into contact with them.

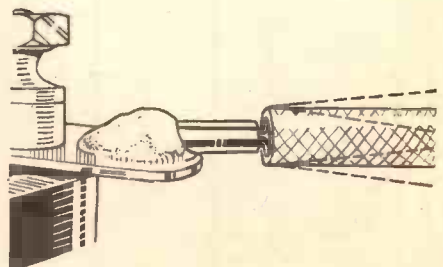
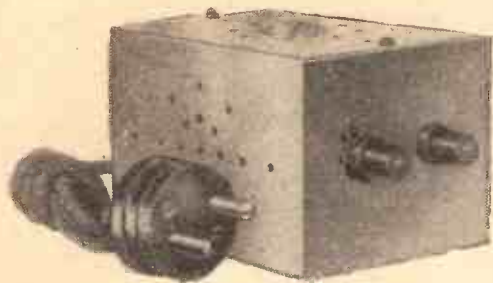


Fig. 3.—If wire is cut as shown in Fig. 2 a fracture can occur, due to the vibration of the wire.

Battery Trickle Chargers

Chargers are Now Available at Prices from 12s. 6d. Upward. They are Perfectly Safe, Have a Wide Field of Utility and Use a Negligible Amount of Current in Normal Circumstances, so that Running Costs are Rarely More than a Penny for Fifty Hours; in Many Cases they are Much Lower than this



One of the lowest-priced chargers made. It is the Heyberd "Tom Thumb," and charges 2-volt batteries at .5 amp. The price is 12s. 6d.

THE popularity of accumulator trickle charging has increased very rapidly during the past two years. So much so that a very large percentage of motorists who have a mains supply in their garage now use a charger in order to keep the battery in a fully charged state. Those who use battery-operated wireless receivers have been users of trickle chargers for a number of years,

There are various reasons for the rapid growth in the use of trickle chargers, the first of which is that prices are now extremely modest.

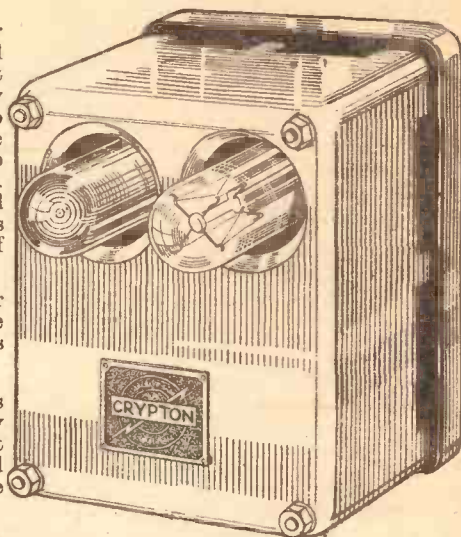
Additionally, however, the public has come to realise that a charger is perfectly safe and very easy to use correctly. What is more important, it is now understood that the cost of current for operating the charger is negligible.

The object of the trickle charger is, as the name implies, to charge at a very low rate—a "trickle" of current. Thus, the current taken out of the battery during the daytime, for example, can be replaced during the night. Suppose that an accumulator is used to feed a battery-fed wireless set or electric model taking .5 amp. for six hours a day. This means that the consumption is 3 amp. hours a day, which is the drain on the battery.

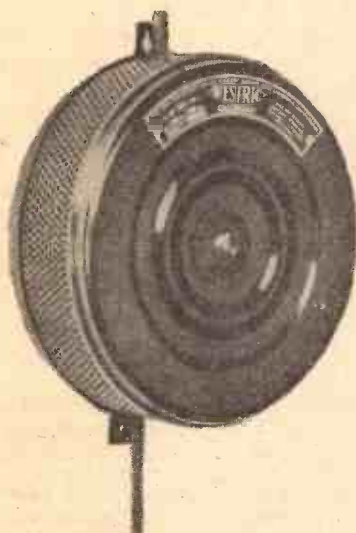
That current could be replaced by charging the battery at 1 amp. for three hours, or at .5 amp. for six hours, or at .25 amp. for 12 hours. Using the last-mentioned charging rate, the battery could be kept "full" by leaving it on trickle charge overnight.

Not only does regular charging prevent the battery from becoming "flat," but prolongs its useful life.

Besides their use for battery charging, small trickle chargers are extremely useful for operating directly small D.C. electric models and other apparatus. A number of typical chargers are illustrated on this page. As can be seen, prices range from 12s. 6d. upwards.



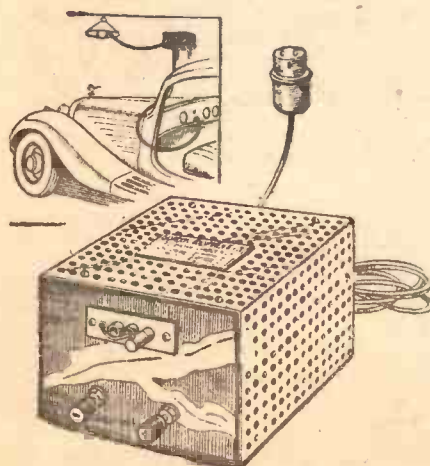
This Crypton charger employs a valve rectifier and gives a constant charging current of 1.3 amps. at 6 or 12 volts. It costs £4 complete with Philips valve.



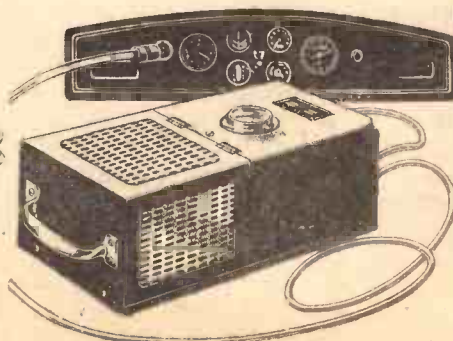
The Westinghouse "Westric" charger. It is available for 6- or 12-volt batteries and costs 75s.



Neatness is a feature of the Philips Home Charger. It uses a valve rectifier, and is obtainable with output of 6 or 12 volts at 42s 6d., or for both 4 and 6 volts, at 65s.



This is the Gordon 1-amp. charger, for 2-, 6- or 12-volt batteries. It is listed at £2 15s.



One of the many "Davenset" chargers.



The Heyberd type A.O.9. charger costs £5 5s., has an output of 1 to 3 amps. at 2, 6 or 12 volts.

ON YOUR WAVELENGTH



Beards

ALL my life I have seemed to be providing the powder and shot for other people to use—particularly those people who seem unable to think out ideas for themselves. I do not mind, of course, other people using my pages as a well of inspiration when writing their own notes, but always providing that they will acknowledge the source. My recent paragraphs about beards at Radiolympia have inspired several critics to refer to this matter.

I am not in favour of beards on boys, for it is quite obviously an endeavour on their part to endow themselves with a wisdom to which they are not entitled. A clean-shaven face would expose the vacuity of their minds. I really shall have to force radio manufacturers and others to insist upon clean-shaven faces before I can accept their kind invitations to lunch. It disturbs my digestion to be seated near some of these unsightly creatures, striking ridiculous postures, and having faces even further disfigured by this hirsute nonsense.

The Wireless and Weather

R. R., of Hull, is convinced that all the bad weather we have been experiencing is due to wireless. He says:

"It seems pretty plain to me that wireless is the arch enemy of all outdoor life, whether work or play, and one of the greatest curses of modern times.

"Some years ago, when wireless was only in its infancy, I noticed a change for the worse in weather conditions. I ventured to suggest to a neighbour that the change was due to the introduction of wireless.

"My suggestion was met by one word, namely, piffle. Although that gave me a feeling of being 'sat on,' it did not change my opinion, and the time that has elapsed since then (especially the last three or four years) has so strengthened that opinion that I now regard it as an actual fact.

"We are told that nature abhors a vacuum.

"In the same sense I think we can go further by saying that nature resents interference of any kind, and according to the degree of such interference nature exacts her toll.

"Believing what I see with my own

By *Thermion*

eyes has become a habit with me, and as I get my living by riding a bicycle early every morning and late every afternoon (Sundays excepted), I have a much better chance of knowing weather conditions first hand than those who spend most of their time in shops and offices.

"During the last five years, gloom (in the form of heavy low-hanging clouds, muddy grey mist and vapour, and fog) has been spreading over and around us like an octopus until it has become practically the order of the day.

"Instead of singing 'The radiant morn hath passed away,' it would be nearer the mark to sing 'The muddy morn hath passed away.' The same frequently being followed by

underlings.' I suppose we have well over eight millions of private wireless receivers in this country alone, and I have no doubt that each and every one is an actual weather spoiler when in use.

"If that view is correct, the sooner we realise it, and act wisely by doing away with them, the better it will be for our health and well-being."

The weather has as much relation to wireless, and vice versa, as chalk has to cheese. R. R., of Hull, is talking through his hat.

England Forever

ONE or two Scotch Nationalists object to me stating that Scotland is part of England. They insinuate that Scotland is a part of Great Britain. Shows how touchy some of these lowland Scots are. It reminds me of an incident at an outside broadcast a few months ago. A special announcer was giving details of the various contestants in a national competition, and he referred to the English competitors. An official of the B.B.C. went over to the announcer and said: "Out of consideration for a sensitive Scot, please refer to British competitors."



"Exide," the electric eel, in his tank.

pouring rain or raging wind. All the the brightest and most cheering aspects of nature have been mutilated and spoiled. The whole atmosphere has been churned up and vitiated, until it has become as restless as the sea.

"Has nature and natural law undergone a sudden and radical change? I do not think so, but rather agree with Shakespeare that: 'The fault, dear Brutus, is not in our stars, but in ourselves, that we are

I refuse to comply with any such request. England, surely, is the parent country, and Scotland, Ireland, and Wales the appendages. Even foreigners refer to this country as England. So there!

Use of the Fader

AN Irish reader indites the following:

"You are from time to time the recipient of many amusing letters. But I think the one by S. M. F.

(as printed in the issue of October 8th), referring to unnecessary programme 'cuts' by the B.B.C. is one of the queerest I have read. He starts off by a grouse about 'a few bars' or 'about a minute' of a 'cut' in some orchestral piece to which he was listening, and then rambles off into a lengthy tirade against the irreverent presentation of the following religious epilogue by a 'sanctimonious gentleman who proceeded to pray for us in a voice which, to say the least of it, failed to carry conviction,' and so on. . . . He then attacked the prayer, that 'sixty seconds of meditation' would have made it more suitable in putting the listeners of England 'one step further on the upward path,' and so on, and on again.

"Now, regarding S. M. F.'s complaint about the 'slavish use' of the 'fader,' I can, in many instances, agree with him, but definitely not as regarding 'fading out' for the religious epilogue. In this short closing broadcast S. M. F. completely forgets the very many thousands in this country, and in Ireland, Scotland, and other lands, to whom a long drawn-out concert is an utter weariness. I refer to the thousands of aged, infirm, ailing folk who rarely if ever see the outside of their bedrooms or their houses, in mean streets, in lonely little country houses, in hospitals, in 'Homes,' to whom the final 'all that follows' of five minutes' prayer-and-hymn-singing means very much indeed during the sleepless hours of a long night, and to whom that old (and perhaps out-of-date and 'sanctimonious') hymn brings memories and consolation which the 'world-famous' composition fails to do.

"Regarding the irreverent presentation of the epilogue by the sanctimonious gentleman of the unmeditated prayers, I think that S. M. F. is under a misapprehension as to the presentation of the prayers given in the epilogue. I understand (I am open to correction) that the morning service and the Sunday night epilogue are always prepared beforehand, suitable hymns and prayers being selected and then presented by (paid) wireless singers and 'pray-ers,' the latter not at all being left to casual 'sanctimonious gentlemen' who would wish to broadcast their own prayers, after sixty seconds in meditation."

The Electric Eel

THE Exide people seem to be prepared to go to any amount of trouble to further the interests of their batteries.

Notes from the Test Bench

Earth Connections

THE fact that H.F. currents are present in certain "earth" connections in a receiver is often overlooked, with the result that performance is marred due to interaction, H.F. losses and similar troubles. It is quite common in normal broadcast apparatus to take "earth" points direct to the chassis, but in some types of short-wave apparatus this is not the ideal method to adopt.

A case recently was experienced where a certain type of receiver had been reported as giving most excellent results, but when a similar receiver was built from identical components and to the same theoretical design, the performance was no more than was expected, and certainly not up to the claims which had been made. Subsequently, an examination of the actual receiver showed that a plain wooden chassis had been built and the lay-out was most interesting—components being placed in all manner of odd positions, supported on home-made brackets so that "earth" points could all be taken to a common point in each stage, but with a very minimum of wire. It would be almost impossible to reproduce an illustration of the set owing to the overlapping and mixed assembly of parts, but the idea is worthy of consideration in short-wave design.

Smoking Components

A CASE recently came to our notice where a reader had purchased a commercial receiver of the A.C./D.C. type, but had made several attempts to listen on it over a period of some weeks. It was stated that each time he switched on he smelt burning and saw smoke coming from the back and was afraid to leave it on. He switched off before signals were heard, and hesitated to take it back to his dealer in case he had connected it up wrongly or damaged it. Subsequent examination revealed that nothing was wrong with the set, the barretter being an American component in an enamelled perforated metal canister. When first switched on the heat from the barretter caused the enamel to smoke and smell, but when left on for an hour or so this disappeared. We have heard of a speaker field doing a similar thing when first put into use.

At this year's Motor Show Press Luncheon, which is considered a feature of every Motor Show opening day, they showed us an Electric Eel which has been brought all the way from South America.

Naturally, "Exide," as the eel is called, was not with the Exide people very long before they knew all about him. In the first place he *does* generate electricity. This is proved by his ability to light an electric lamp (we saw him do it), and if anyone has any further doubt about his power they have only to touch him to find out!

The batteries of the electric eel are hundreds of thousands of minute muscles separated by an electrolytic fluid. Human muscular activity is a conversion of energy in two stages; first from chemical to electrical; second, from electrical to mechanical muscular contractions. Because the eel's tissue is a modified form of muscle it is believed that the chemical processes by which human muscular energy is released are also utilised in the tissues of the eel, but that the process is reversed. The eel's electric organs produce voltages 1,000 times greater than is developed by human muscular activity.

The eel's electricity is generated only when he is angry or hungry.

The makers of Exide batteries draw a comparison between the eel and their products by submerging an Exide battery in a tank of water, and connecting a series of lamps across the battery terminals. These lamps are continually lit—although the battery remains submerged, so that everyone can see the truth in the Exide slogan "Still keeps going when the rest have stopped."

At the luncheon the Exide people helped us to while away our time before we sat down with a very ingenious contraption called "Man versus Motor"—at first sight, rather reminiscent of a fun-fair. This gadget gives a practical demonstration of just how much work our batteries save us. We were invited to turn an ordinary car starting handle, which is connected through a brake drum to a pointer which moves over a scale. This scale indicated the number of revolutions achieved.

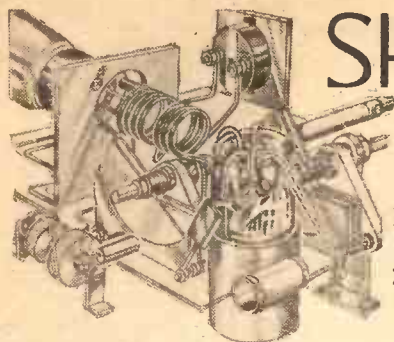
Most of those who tried it just managed to move the pointer about half-way round the scale in the time limit of ten seconds. Then an Exide standard battery was switched into circuit, and in ten seconds moved the pointer the whole of the distance. A clever demonstration of the starting ability of an Exide battery.

Evidently there are some live wires connected with Exide!

PRACTICAL WIRELESS SERVICE MANUAL

By F. J. CAMM.

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



SHORT-WAVE SECTION

MODERNISING THE FULL-RANGE BAND-SPREAD THREE

How to Bring this Popular Receiver Up to Date.
By A. W. MANN.

IN the January 12th, 1935, issue of this journal the writer described in detail the construction of a Full Range Short-wave Receiver, incorporating home-made coils of the plug-in type and bandspread tuning. The chassis method of construction was used, and this simple set met the requirements of many enthusiasts, as it enabled them to search on headphones for DX, and use the loudspeaker for the reproduction of the more powerful trans-

range. Aerial height relative to earth, etc., must, of course, be taken into consideration.

The grid-leak is in parallel with its associated condenser, and this combination consists of a 5-megohm leak and a .00001-mfd. fixed condenser. The band-setting or tank condenser is of .0001-mfd. capacity, and the band-spreading condenser is a modified 15-mmfd. type. The modification consists of increasing the distance

On the 160-metres band, however, two settings of the bandsetter will be necessary, in order to cover the whole band.

Choice of Components

The tuning condensers recommended are of the Raymart .0001 mfd. type in the case of the band-spreader, whilst the reaction condenser is the Eddystone No. 957 type, which incorporates an excellent and smooth working slow-motion mechanism.

It will be noticed that throttle-controlled reaction is used. This method provides a comparatively high degree of sensitivity and has much to recommend it, especially in the case of low-power DX reception.

The first low-frequency stage is transformer coupled, the second being R.C.C. coupled. The usual arrangement is to use the R.C.C. coupling in the first L.F. stage, but the idea in this instance is to enable the operator to obtain a useful degree of amplification on two valves for searching, and allows the use of two valves when noise level is high on three valves. Decoupling, by-passing and isolation chokes are also included.

The Layout

Whilst the circuit is the foundation of a receiver, the components must be laid out to the best advantage, in order to reduce the possibilities of interaction. In addition wiring must be reduced to the minimum in the interests of general efficiency. The layout, shown at Fig. 2, enables us to lay out the various components with the above points of view.

The wiring between the band setter and coil base in particular must be kept as short and direct as possible. The tag type of grid condenser recommended is the T.C.C. of .0001 mfd. capacity. This will assure a sound and rigid connection.

The series aerial condensers should be mounted on 1/4 in. high ebonite spacers, above the chassis face, and in line with their respective aerial terminals.

With reference to the H.F. choke (HFC1), there are various makes which will function efficiently between 5 metres and 170 metres, and the choice is left to the constructor. It should, however, be mounted above the chassis, whilst chokes 2, 3 and 4 (which are standard short-wave components), together with decoupling components and G.B. battery, should be underneath the chassis.

A metal panel should be used in all instances. This may be aluminium or, alternatively, crackle-finished steel. The chassis can be of metal or of foiled-lined plywood.

Chassis and panel dimensions will be governed by the physical dimensions of individual components. When components of suitable types and values are to hand the constructor should get out the drawing board and, following the suggestions outlined, as in Fig. 2, measure up carefully, and then lay out the components, in order to determine the chassis and panel dimensions.

A 16in. panel, with a chassis 10in. wide and 2in. deep, (Continued overleaf)

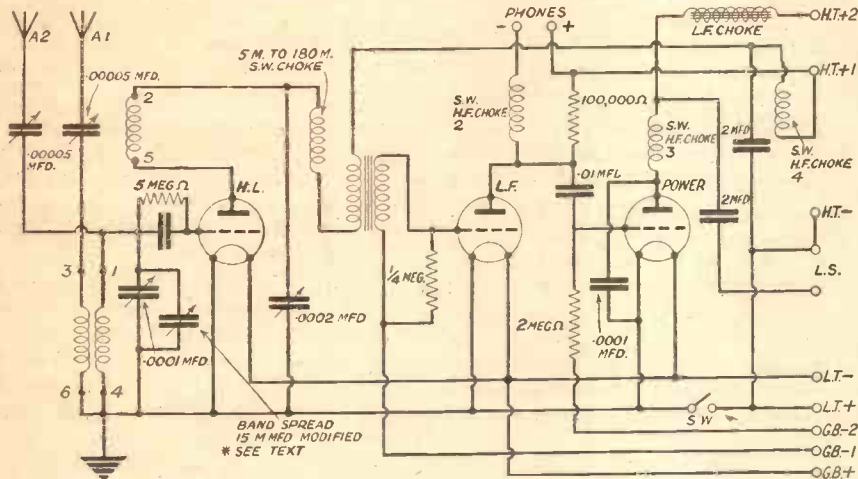


Fig. 1.—Theoretical circuit diagram of the Full-range Band-spread Three, as described in the text.

missions. A well-tryed circuit capable of providing a comparatively high degree of sensitivity and reasonably good selectivity was used.

In the meantime rapid developments have taken place in the design and construction of short-wave components, with a consequent increase in the standards of electrical and mechanical efficiency. In addition, increasing interest is being taken in 10-metre reception, and as this receiver proved to function efficiently on this band, it may be assumed that built on modern lines and incorporating up-to-date components, including six-pin coils, an even better standard of performance will be obtained.

The Circuit

First, let us examine the theoretical circuit diagram shown at Fig. 1. We have a regenerative detector of the triode type. Six-pin plug-in coils, which enable us to couple the aerial aperiodically to the grid circuit. A slight modification has been carried out here and provision made for capacitatively coupling the aerial to the grid circuit via A2, whilst A1 provides for aperiodic aerial coupling. It will also be noted that in addition to the aperiodic coil in A1 aerial input, a .00005-mfd. pre-set condenser has been included.

The reason for this is that modern plug-in coils appear to require a very short aerial in order to overcome the possibilities of dead spots in tuning throughout the

between the fixed and moving plates to seven thirty-seconds of an inch.

We must, of course, take into account circuit differences, and that the receiver will be built from components to hand. The experimenter should aim at obtaining a spread or coverage of 80 degrees on the 40-metre band, which will be sufficient, and allow a reasonable spread on 10 metres, 20 metres and 80 metres, respectively.

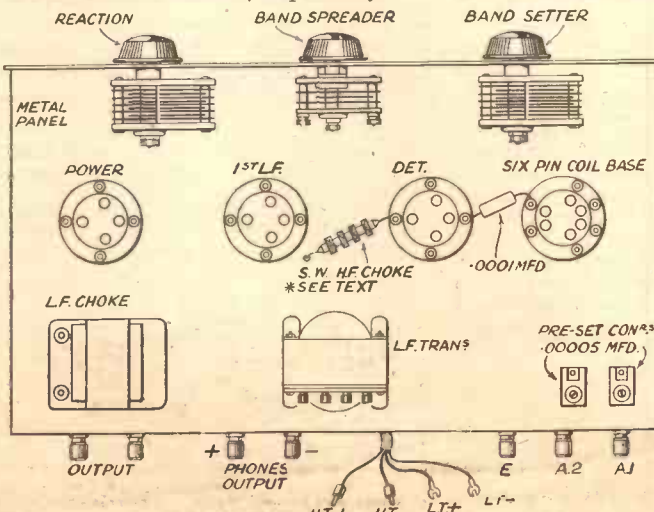


Fig. 2.—Suggesting layout of components.

Leaves from a Short-wave Log

More Programmes from Brazil

LA VOZ DO BRAZIL (Rio de Janeiro), covering propaganda broadcasts in various languages, has extended its activities. Three transmitters are now brought into operation: PSH, 29.35 m. (10.22 mc/s); PSE, 20.09 m. (14.935 mc/s), and PSA, 14.23 m. (21.08 mc/s). PSE works between G.M.T. 21.00-21.30 on Wednesdays in German; on Thursdays in Italian, and on Saturdays in French. Other days are devoted to broadcasts in the Portuguese, Spanish and English languages. PSH is on the air daily (excepting Mondays and Saturdays) from G.M.T. 00.00-01.00; also on Tuesdays from G.M.T. 01.30-02.30, and on Saturdays from 00.00-01.30. PSA may be heard on Fridays between G.M.T. 18.50-19.00, and also on the first Thursday in each month between G.M.T. 17.15-18.00, with an Italian programme.

Radio Universidad

GIVING its full call: *Emisora Radio Universidad de Antioquia*, HJ4ABU, a new one-kilowatt station at Medellin (Republic of Colombia), is now working regularly on 31.68 m. (8.65 mc/s). Reception reports should be addressed to Apartado Postal (Post Box), 217, Medellin, Republic of Colombia, South America.

Peru on 31-metre Band

RAUDIO UNIVERSAL, OAX5A, of Ica (Peru), which was stated to be operating on 25.42 m. (11.8 mc/s) is now reported by listeners to have been definitely identified on 31.67 m. (9.473 mc/s). The station closes down towards G.M.T. 06.30 with an electrical recording of an organ solo. Address: Radio Universal Emisores OAX5A y OAX5C, Apartado Postal, 112, Ica (Republic of Peru).

San Salvador on the Air

YSM, San Salvador, 25.62 m. (11.71 mc/s); YSH, 31.51 m. (9.52 mc/s) and YSD, 38.02 m. (8.89 mc/s) are the stations used by the San Salvador State Broadcasting System. On the last channel

regular broadcasts are made from midnight to G.M.T. 03.30. Experimental transmissions are also carried out on 25.62 m. (11.71 mc/s), but so far, the transmitter (YSM) is not in daily use for the broadcast of radio programmes.

Listen to Radio Martinique

FZZF6, Fort-de-France, Martinique, on 30.93 m. (9.7 mc/s) has now established a regular daily service of broadcasts. The programme is as follows: G.M.T. 16.15, music; 17.00, news and weather forecast (in the French language); 23.00, news bulletin; 23.30, gramophone records; and 00.30, late news and weather bulletin. The studio opens with the striking of seven chimes, and usually closes towards 01.00 with the playing of the *Marseillaise*. Announcements are made in French, Spanish, English and German.

Oslo's Time Table

THE relay of the Oslo (Norway) programmes on short waves is carried out on two channels, namely: LKC, on 31.48 m. (9.53 mc/s) and LKJ1, on 48.94 m. (6.13 mc/s), the former works from G.M.T. 10.00-13.00, and the latter from 16.00-22.00.

Japan's Autumn Schedule

FOR the months of October, November and December, the programmes of the Nippon Hoso Kyokai (Broadcasting Corporation of Japan) have been fixed as under:

JZJ and JZK, Tokio-Nazaki, on 25.42 m. (11.8 mc/s), and 19.79 m. (15.16 mc/s) respectively, simultaneously broadcast from G.M.T. 19.30-21.00. The transmission opens with a talk in English followed by news bulletins, etc., in German, French and Japanese. The same stations also transmit from G.M.T. 21.30-22.30 for South America. JZK is on the air again between G.M.T. 01.00-01.30 for the Western Provinces of North America. JZJ, between G.M.T. 12.00-12.30, broadcasts a programme for the Eastern coast of the United States and

Canada, and both JZJ and JZK are used between G.M.T. 13.00-14.30 for a transmission destined to China, the Pacific Coast and Oceania.

Panama Doubles Its Power

HP5G, Panama City (Republic of Panama), on 25.47 m. (11.78 mc/s) has increased the power of the transmitter to 1,500 watts. Reception reports will be gladly acknowledged if addressed to Radio-emisora HP5G, Apartado Postal, 1121, Panama City, Republic of Panama, Central America.

Guatemala's October-November Programmes

TGW, Guatemala City, Republic of Guatemala, Central America, has been allotted the following channels: 31.75 m. (9.45 mc/s); 30.98 m. (9.685 mc/s); 25.21 m. (11.76 mc/s); 19.78 m. (15.17 mc/s), and 16.85 m. (17.8 mc/s), but at present is only using 19.78 m. and 30.98 m.

On the former wavelength concerts are given on week-days from G.M.T. 18.45-19.45, and on Sundays these are extended to G.M.T. 23.15, with the second half of the broadcast of special interest to European listeners. On 30.98 m. (9.685 mc/s), TGWA is on the ether from G.M.T. 04.00-06.00, and on Mondays, Tuesdays and Saturdays a concert is broadcast which is mainly destined to the United States of America.

Alteration of Cuban Wavelengths

COBC, Havana, *el Progreso Cubano*, is now working on 30.12 m. (9.963 mc/s); COCD, *La Voz del Aire*, formerly on 48.94 m. (6.13 mc/s), has reduced its wavelength to 32.08 m. (9.35 mc/s); COCQ has moved from 30.8 m. (9.74 mc/s), to 30.93 m. (9.7 mc/s), but has also been heard around 31.1 m. (9.645 mc/s). Finally COCX, formerly on 25.75 m. (11.65 mc/s), is now logged regularly on 25.55 m. (11.74 mc/s).

Malaya Testing

IT is reported that the new 500-watt transmitters installed by the British Malaya Broadcasting Corporation at Singapore are testing on 30.96 m. (9.69 mc/s), and 48.58 m. (6.175 mc/s). According to official lists the frequencies and call-signs allotted and registered were: ZHO, 6.012 mc/s (49.9 m.) and ZHP, 9.53 mc/s (31.48 m.).

S.W. SECTION

(Continued from previous page)

and a panel width of 8 in., will be suitable, provided that the components are of modern design and small physical dimensions.

The inclusion of electrical band-spreading in this receiver makes tuning as easy as that of a standard broadcast receiver.

Testing Out

The first trial should be carried out with a view to getting used to the operation, and the locating of the different bands throughout the range.

A set of six-pin coils, covering from 9.8 metres to 170 metres, will enable the enthusiast to listen to every type of short-wave transmission of interest, including amateurs, broadcast and trawler phones, etc.

Data for the winding of 10-metre coils has been given in previous articles. If, however, there are local amateurs active on 5 metres, the experimenter can at least attempt to receive their transmissions, using a 1½ turns grid coil, 1½ turns reaction coil, and 1 turn aperiodic coil, with grid winding double spaced—aperiodic winding an eight of an inch from the grid winding; the same applies to aperiodic winding. The reaction turns to standard spacing, a standard-threaded coil former being used.

A PROMISED "DRIVE"

THE B.B.C. are making active efforts to co-operate in the "drive" to increase the number of television viewers by several thousand before the spring of next year. Much better programmes, coupled with longer hours of transmission, are expected as soon as the new studio accommodation is increased by bringing studio B into operation, together with a new control room built in the old Baird light-spot studio. There is no doubt that very soon the plans will be complete for the conversion of the old Alexandra Palace theatre which is at present used as a property store. Added to this is the recently acquired mobile film unit, the new fleet of outside broadcast vans; all of which will play their part in providing programme material of a very varying character. For the past few months the Post Office engineers have been laying the balanced twin form of television cable which links the B.B.C. television headquarters with the main West End thoroughfares. This cable runs direct to Broad-

casting House, thence by way of Oxford Circus down Oxford Street to Marble Arch, along Park Lane, and up Piccadilly to the Circus. From there it travels along Shaftesbury Avenue, so that the theatreland is available for first night televising down Charing Cross Road to Trafalgar Square, along Whitehall to Westminster Bridge, taking in the Houses of Parliament and the Abbey, then to Victoria Station and back past Buckingham Palace, along Pall Mall to Broadcasting House. As will be seen by referring to a map of London the route, which has been carefully selected, takes in all the most important points where events of national importance occur, and it is learned that there are over five dozen plug points where the television apparatus (vision and sound) can be tapped into the cable, so that signals can be relayed to Alexandra Palace for re-radiation. The effect of this work will certainly make itself felt in the very near future, and the results will no doubt provide sufficient justification for proceeding with provincial development; a scheme which has held fire for so long, much to the extreme disappointment and chagrin of all those potential viewers situated outside the established service area of signals.

SIMPLE SUPERHETS

The "Experimenters" Give a Circuit and Full Details of an Experimental Superhet Receiver that can be Made by Using Spare Components Originally Intended for Use in a "Straight" Receiver

YOU will remember that a short time ago we said that we found it difficult to understand why many of our readers "fought shy" of the superhet. In a couple of articles we tried to indicate the simplicity of the superhet, especially from the point of view of ensuring stable operation. We are glad to have found that our appeal for more readers to give the superhet arrangement a fair trial has met with a fairly good response. Several have written to point out that, as a result of our explanatory articles, they have built superhets to one or other of the PRACTICAL AND AMATEUR WIRELESS designs. Up to now we have not heard from any reader who was other than thoroughly pleased with the result.

At the same time we have had not a few letters from other of our readers who think it all very well for us to "boost" the superhet, but consider that we are expecting too much if we ask them to buy a complete set of new parts to give a set of this type a trial. Why cannot we give a circuit of a type that can incorporate many of the components that are on hand, they ask; that would at least give them a chance of testing our claims before going to the expense of a kit of parts for one of the several excellent superhet circuits that have been described in these pages.

A Compromise

This time we are going to make an attempt to satisfy the requirements of people such as this. But let us be perfectly fair and appreciate to the full that a set made up in this way will not give the superhet an honest chance to prove all of its advantages. In giving a circuit and brief details, therefore, our object is simply to prove that a good superhet need not be difficult to make. At the same time, we do not suggest that the circuit is ideal or that it will do other than encourage those who care to give it a trial to go "the whole hog" a little later in building a complete set to one of the designs which have appeared in these pages.

As many are fully aware, the simplicity of operation of a modern superhet is due in large measure to the use of sets of matched tuning and oscillator coils in conjunction with a gang-type superhet condenser. It is possible to use an ordinary gang condenser with an ordinary aerial-tuning coil and an oscillator coil, by inserting in the oscillator-tuning circuit various padding and tracking condensers. In the majority of instances, however, it is the use of those components that drove many constructors from the superhet a few years ago when it was generally essential that they be used. They are certainly not necessary when using matched components that can be bought at moderate prices from most accessory manufacturers.

It is not the inclusion in the circuit of those balancing components that introduces difficulty, but the final accurate setting of them when making preliminary adjustments. The tracking-up can be a very awkward job for the constructor who is not in possession of the desirable test gear,

which includes a modulated oscillator. And those who have such gear would not be likely to build a form of superhet which is admittedly old-fashioned.

Two-valve Frequency Changer

However, we are not going to make any more excuses for giving the circuit shown on this page. It employs four valves, and any form of L.F. amplifier could be added. The frequency-changer comprises two valves—an H.F. pentode first detector and a triode oscillator. This combination is followed by an H.F. pentode intermediate-frequency stage and a triode second detector or, more correctly, demodulator. The set could be used with 110 kc/s I.F. transformers, but it would be better in every respect to work on 465 kc/s. If the lower intermediate frequency is adopted there is almost sure to be a certain amount of interference unless the single-circuit input tuner is replaced by a band-pass filter. The same applies to a slightly smaller degree if I.F. transformers tuning to 126 or 150 kc/s are used. When working on 465 kc/s interference should be practically non-existent and there is no reason why the set should not operate satisfactorily on both wavebands, provided that certain precautions to be mentioned are taken.

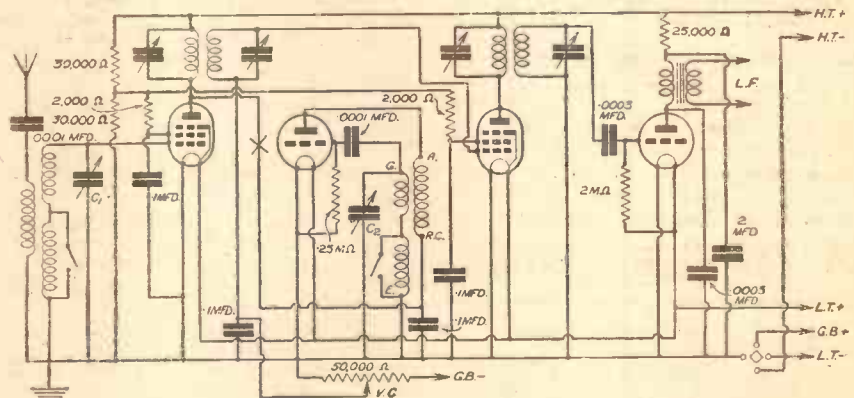
It will be seen that the "mixing" of the oscillator and signal frequencies takes place

tetrode can be used if this is more convenient. The second detector—fourth—valve should be a general-purpose or detector triode; 'phones may be connected in place of the primary of the L.F. transformer, or an L.F. amplifier can be added in the usual manner.

Notice that a four-point on-off switch is used to ensure that H.T., L.T. and G.B. circuits are all broken when the set is switched off. If a switch of the two- or three-point type were used either the V.M. volume-control potentiometer or the fixed screening-grid potentiometer would place a constant drain on the G.B. or H.T. supply.

Tuning for 110 kc/s

In spite of what has been written above concerning the undesirability of using an I.F. lower than 465 kc/s, we will consider first the position when using transformers tuned to that frequency. The aerial coil may be of any normal type that happens to be available, whilst any type of tuning coil with reaction winding may be used for the oscillator circuit. Condensers C.1 and C.2 may both be standard .0005-mfd. components, but they must not be ganged, because the tuning of both will be different. Actually, it would be better to remove about five turns from the medium-wave winding, and about 20 turns from the long



Theoretical circuit diagram of the H.F. side of a modern superhet, incorporating an H.F. pentode first detector, and a triode oscillator as described in the text.

in the anode circuit of the H.F. pen. first detector, the anode winding or reaction winding of the oscillator valve being connected back to the anode of the first detector. This is not always an ideal arrangement, and it is sometimes desirable to include a 20,000-ohm resistor shunted by a .001-mfd. condenser at the point marked X. This tends to improve uniformity of "mixing" over the two wavebands.

Suitable Valves

Any standard H.F. pen. can be used in the first stage, whilst an L.F. or small power valve is suitable for use as oscillator. A variable- μ H.F. pen. is most suitable for the third or I.F. valve, but a variable- μ

wave winding of this coil, but that is not essential. The trouble is that if this is not done the tuning range of the set will be restricted, due to the fact that when the setting of C.2 is a minimum correct tuning will be obtained with C.1 set to a position several degrees from minimum.

Oscillator for 465 kc/s

Still that is not a great disadvantage from the experimental point of view, and at 110 kc/s the tuning range is not curtailed to a very serious extent. When using a higher intermediate frequency, which is to be preferred on most counts, it is better to use a .0002-mfd. or .0003-mfd. tuning

(Continued on page 174)

A Stand-by Output Transformer

Full Constructional Details of This Useful Component are Given in this Article

TO the enthusiast with a first-class amplifier comes at times a call to impress his friends with the need for quality reproduction. No longer does he "turn the wick" right up and dance the mantelpiece vases to destruction in the fireplace.

Rather does he sit back in his chair, tune in, and offer suggestions for improvement to his friend's apparatus, secure in the knowledge that he won't have to pay for it. But when the convert brings his loud-speaker round for trial the expert sits up and takes notice. "What is the impedance of this new loudspeaker?" "Can he hope to match it to his present equipment?"

In the transformer to be described is the answer. Those who are familiar with the vexed question of impedance matching will recognise the formula

$$N = \frac{\sqrt{RL}}{Z}$$

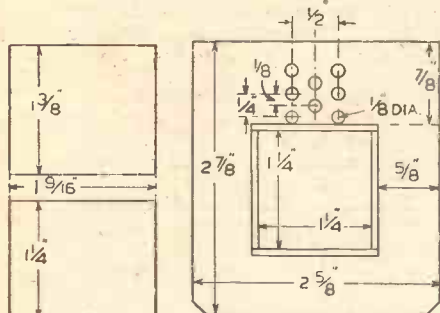


Fig. 2.—Details of the former and web-piece.

where N is the transformer turns ratio, RL the load resistance, and Z the loud-speaker impedance. From this fundamental relationship the unit has been designed.

Working from a basis of a 3,500 Ω load, which corresponds to the optimum load of the popular choice of output valves, the transformer will accommodate loudspeakers with impedances varying from 2 to 10 Ω. A centre tap on the primary winding also enables the unit to be used with a push-pull output stage. A further advantage is that the secondary may be used as an auto-transformer, matching an existing supply to an extension speaker of high or low impedance.

Constructional Details

Construction and winding present few complications. Care must be exercised when winding the 20-gauge secondary, and also in applying the insulation between it and the primary. Since a high peak-voltage is developed across this winding, the insulation is an important safety measure, and must not be skimped. Apart from these precautions the home constructor should have no difficulty in making up this useful accessory.

The former is constructed to the dimensions given in Fig. 2, from 1/8 in. bakelite or hard fibre sheet. It is subdivided into three

sections in the interests of the over-all response of the complete transformer. When making up, cut out the centre of the cheek before drilling the lead holes, otherwise the bakelite will probably split. The best method will be to use a fretsaw or to drill a series of pilot holes inside the square and file the cheeks to fit.

The "tunnel," which is made up of four separate pieces, should be a tight fit in the end cheeks. The two separators should be held in position with additional spacing pieces between them. The completed former must be mounted on a wooden mandrel or similar support or it may collapse with the strain of winding. The turns data, gauge of wire, etc., are given in the table on this page.

Windings

Commence with the primary winding by layering 550 turns of wire in each slot, finishing the first slot before starting the second. Terminate the winding when the third slot is completed, and 1,650 turns are wound. This constitutes the first half of the primary.

Cover each section with a strip of insulating material, as with the first half of the primary. The second half is then wound over the secondary, and covered with a final layer of tape.

In the interests of response it is better not to dope the bobbin with varnish, as this will increase the self-capacity of the winding, and, consequently, the high-note loss.

The iron circuit consists of approximately 90 pairs of stampings, type 109, supplied by Magnetic and Electrical Alloys, Ltd., of Wembley. The laminations are "butt jointed," and not interleaved. The experiment can be tried of inserting various gapping pieces, and noting the effect on performance. Actually, since the core is a generous size, little improvement will be noticed unless quantitative measurements are taken.

Cover this section with a layer of thin paper, and repeat the winding for the second section of 24 turns. Cover this second layer also, then wind on 33 turns, spreading the wire evenly in each slot. Complete the secondary by covering this third section with paper, and winding on the remaining 79 turns.

Cover the sectionalised secondary with strips of insulating material, as with the first half of the primary. The second half is then wound over the secondary, and covered with a final layer of tape.

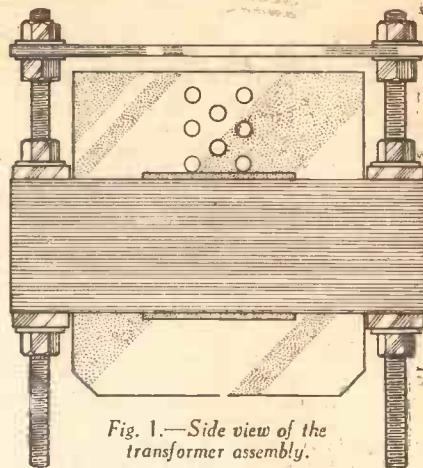


Fig. 1.—Side view of the transformer assembly.

The iron circuit consists of approximately 90 pairs of stampings, type 109, supplied by Magnetic and Electrical Alloys, Ltd., of Wembley. The laminations are "butt jointed," and not interleaved. The experiment can be tried of inserting various gapping pieces, and noting the effect on performance. Actually, since the core is a generous size, little improvement will be noticed unless quantitative measurements are taken.

In the interests of response it is better not to dope the bobbin with varnish, as this will increase the self-capacity of the winding, and, consequently, the high-note loss.

Iron Circuit

The iron circuit consists of approximately 90 pairs of stampings, type 109, supplied by Magnetic and Electrical Alloys, Ltd., of Wembley. The laminations are "butt jointed," and not interleaved. The experiment can be tried of inserting various gapping pieces, and noting the effect on performance. Actually, since the core is a generous size, little improvement will be noticed unless quantitative measurements are taken.

Winding.	Turns.	Gauge of wire.	Covering.
Primary	2 sections of 1,650 turns each.	.0076" (36 S.W.G.)	Enamelled single silk.
Secondary	4 sections.	.036"	Enamelled.
	1st: 39 turns each.	(20 S.W.G.)	
	2nd: 24 " "		
	3rd: 33 " "		
	4th: 79 " "		

Although a skeleton framework is shown, the final arrangement of the unit is a matter for the skill of the constructor. Some little care must be observed in the final connecting up, and the wiring may best be followed by referring to the diagram. If access is

(Continued on page 174)

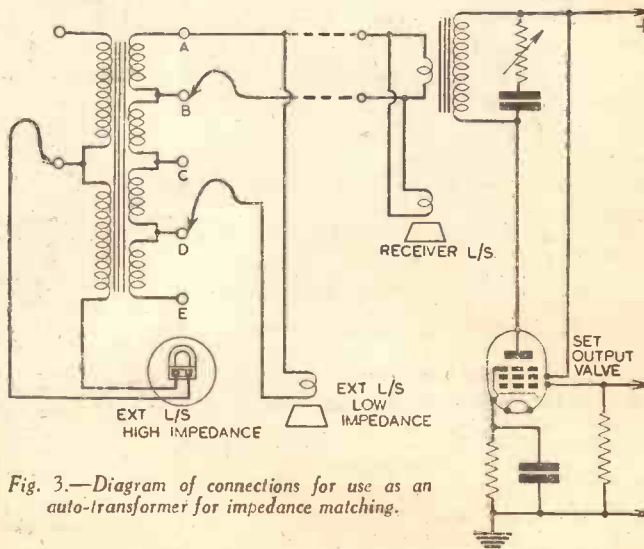


Fig. 3.—Diagram of connections for use as an auto-transformer for impedance matching.

A PAGE OF PRACTICAL HINTS

SUBMIT
YOUR
IDEA

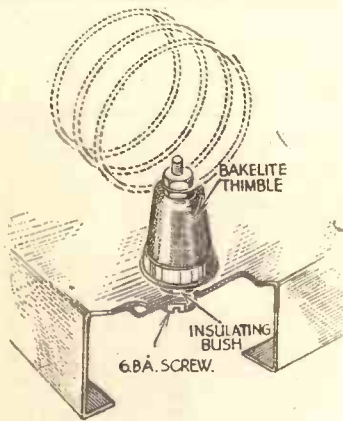
READERS
WRINKLES

THE
HALF-
GUINEA
PAGE

A Simple Stand-off Insulator

AN insulated bush inserted into the chassis of my receiver with a 6BA nut and bolt turned a small bakelite thimble into a useful makeshift stand-off insulator, as shown in the sketch.

The thimble is drilled through the top and a solder tag placed between the two



A small bakelite thimble is used for making this handy stand-off insulator.

lock nuts. These are placed on the 6BA screw, and the insulator is ready for use.—G. DUCKWORTH (Chester).

Shock Absorbers

MODERN receivers are generally susceptible to effects of vibration, especially where tuning is very sharp. This may be avoided by mounting the tuning condenser on a resilient platform. One way of doing this is to bolt the condenser to a flat plate and to support this on the chassis by long bolts, over which are placed standard rubber grommets, and another way is to use thick sponge rubber. Kneeling pads are obtainable quite cheaply and may be cut up for the purpose. This material is also useful to place beneath an existing chassis to minimise the effects of vibration, and this helps to reduce microphony in old model receivers. The material may also be used in the large sheets for supporting speakers, car radio apparatus and similar equipment. If the kneeling pads are not large enough, or a thicker material is required, it may be purchased in the flat sheet in all thicknesses up to 2in., the price of the latter being about 4s. per square foot.—D. FRANCIS (N.W.).

An Electrode Inspection Stand

THE accompanying illustration shows a rather novel valve electrode inspection stand that I have recently constructed. At times one may wish to examine the electrode assembly of a new or unusual valve, or again, one might have occasion to check for possible filament sag or elec-

THAT DODGE OF YOURS!

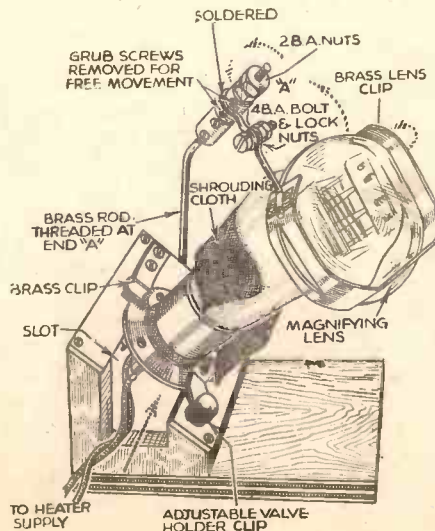
Every Reader of "PRACTICAL AND AMATEUR WIRELESS" must have originated some little dodge which would interest other readers. Why not pass it on to us? We pay £1-10-0 for the best wrinkle submitted, and for every other item published on this page we will pay half-a-guinea. Turn that idea of yours to account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

SPECIAL NOTICE

All wrinkles in future must be accompanied by the coupon cut from page 174.

trode distortion, due, say, to the valve having been jarred or dropped, and whilst it is, of course, a far better proposition to use a valve tester, this is not always to hand, and is an expensive consideration if the majority of standard valves are to be contended with.

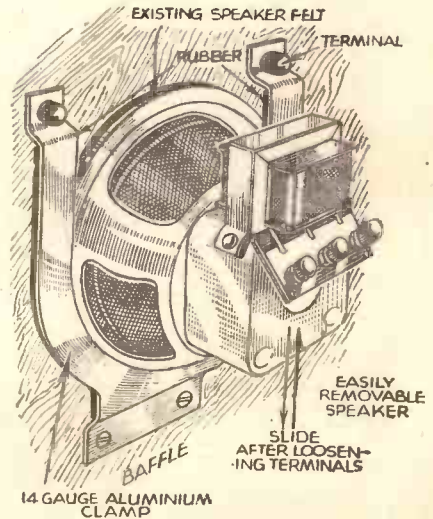
A large magnifying lens supported in an easily constructed brass clip constitutes the viewer, whilst the flexible coupling to a length of brass rod (optional diameter according to the requirements of the user) is an assembly which can be made up either with the aid of the proverbial junk box, or by resorting to a well-known constructional toy. The slot in the side of the wooden stand is for the insertion and extraction of different types of valve holders, within reason, and the heater leads should be taken into consideration as illustrated.—R. W. BLACKWOOD (Melksham).



This novel fitment is useful for examining electrode assemblies.

A Removable Speaker Clamp

AT the moment I have only one moving-coil speaker, which I wish to use under various conditions, such as testing for cabinet resonance, etc. Up to the time of the construction of this speaker clamp, I have had continually to remove, and replace the speaker, an operation which proved a nuisance. The clamp is shaped from a sheet of 14 gauge aluminium, this happening to be surplus from another job of construction, and by facing the under-side with strips of rubber, and providing two ordinary terminals, a rattle-free fitment resulted. Around the front



By the use of this clamp a speaker can be removed quickly from its baffle, when required.

of the speaker, that is the periphery of the speaker, it is essential to have a felt washer, and the type of speaker I am using has this already fitted; however, readers interested could soon provide a washer, if necessary.—G. K. JACKSON (Dorchester).

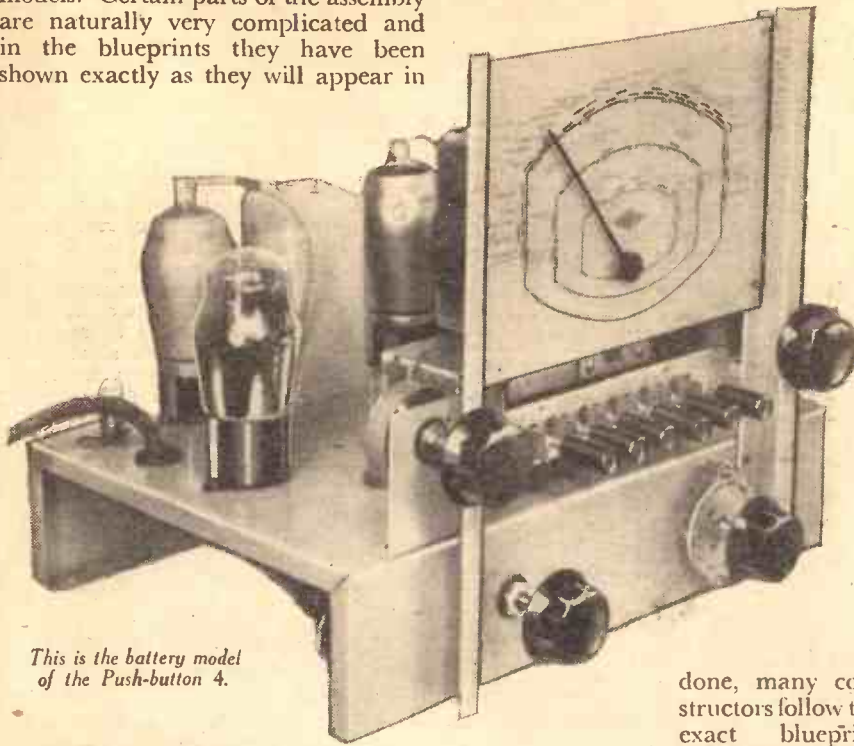
A FINE TECHNICAL LIBRARY OF STANDARD WORKS

	Price.	By Post.
Practical Wireless Service Manual	5/-	5/6
Wireless Transmission for Amateurs	2/6	2/10
Sixty Tested Wireless Circuits	2/6	2/10
Wireless Coils, Chokes and Transformers and How to Make Them	2/6	2/10
Wireless Constructor's Encyclopædia	5/-	5/6
Everyman's Wireless Book	3/6	3/10
Television and Short-Wave Handbook	3/6	3/10

ALL of the main constructional details were given in last week's issue, and there are very few difficulties which should be met with in building either of these models. Certain parts of the assembly are naturally very complicated and in the blueprints they have been shown exactly as they will appear in

THE PUSH-BUTTON

Completing Construction and T
with Notes on the Correct Adj



This is the battery model of the Push-button 4.

the receiver, and have not been spaced out to make the connections clear. It has been found that where this is

sequently leads are lengthened and the performance is often upset due to this. Therefore in the two or three

DETAILED LIST OF COMPONENTS FOR BATTERY MODEL.

- One enamelled steel chassis, 11 1/2 in. by 8 1/2 in. by 2 1/2 in., with aerial-earth strip fitted, 4s. 6d. (Peto-Scott).
- One special all-wave tuning unit with switches, filter unit, etc., type P.B.4, 18s. 6d. (Peto-Scott).
- One 6-pt push-button mechanism with station plate, knob, buttons and escutcheon, 20s. (Peto-Scott).
- One two-gang bar-type condenser, .00043 mfd. each section, with special mounting bracket, 4s. 6d. (Peto-Scott).
- One station-named scale and drive, brackets, driving drum, pointer and cord, 4s. (Peto-Scott).
- One special potentiometer mounting bracket, 4d. (Peto-Scott).
- Two I.F. transformers, types B.P.122 and B.P.123, 7s. 9d each (Varley).
- One volume control, 500,000 ohms, with on-off switch (Lab. Type), 3s. 6d. (Erie).
- One volume control, 100,000 ohms (Lab. type), 3s. (Erie).
- One fuse-holder, type S.E.S.38, 4 1/2 d. (Bulgin).
- One fuse bulb, 9d. (Bulgin).
- Four valveholders, type V1 and V2, two 5-pin and two 7-pin, 3s. 6d. (Clix).
- Fixed condensers:
 - Four at .0001 mfd., type 690 W, 8d. each (Dubilier).
 - One at .002 mfd., type 4601/S, 1s. (Dubilier).
 - One at .01, type 4601/S, 1s. (Dubilier).
 - Two at .05 mfd., type 4602/S, 1s. 3d. each (Dubilier).
 - Five at .1 mfd., type 4603/S, 1s. 4d. each (Dubilier).
 - One at 2 mfd., type 3016 (Electrolytic), 1s. 6d. each (Dubilier).
- Fixed resistors:
 - Three at 5,000 ohms, 1/2-watt type, 1s. each (Erie).
 - One at 10,000 ohms, 1/2-watt type, 1s. (Erie).
 - Two at 30,000 ohms, 1/2-watt type, 1s. each (Erie).
 - Two at 50,000 ohms, 1/2-watt type, 1s. each (Erie).
 - One at 100,000 ohms, 1/2-watt type, 1s. (Erie).
 - One at 250,000 ohms, 1/2-watt type, 1s. (Erie).
 - Five at 500,000 ohms, 1/2-watt type, 1s. each (Erie).
 - One at 1 megohm, 1/2-watt type, 1s. (Erie).
- Three top-cap connectors, type P.41, 2d. (Bulgin).
- Length of flex, wire for connection, length of screened braid, screws, etc., 3s. 6d. (Peto-Scott).
- Four valves:
 - One TP23 (Mazda).
 - One 210 VPT (Cossor).
 - One 210 DDT (Cossor).
 - One 220 HPT (Cossor).
- One W/B Stentorian Junior Loudspeaker.

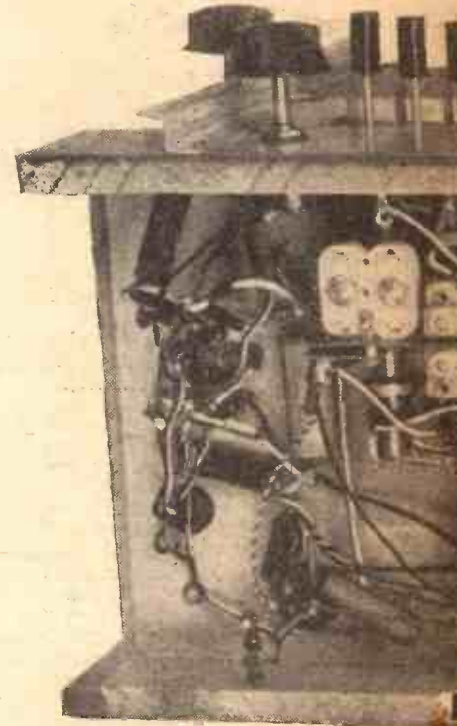
done, many constructors follow the exact blueprint drawing and consequently leads are lengthened and the performance is often upset due to this. Therefore in the two or three cases where a very complicated layout appears it will be found that the components are packed together to reduce and actually to simplify the wiring. A little care and careful examination in conjunction with the theoretical circuit will soon elucidate any apparent mysteries, and the wiring will not be found so difficult as at first it might appear.

Trimming

After the set has been built it will have to be adjusted or trimmed in order to get the maximum performance from it, although it is quite

possible that signals will be received directly the set is connected up. The I.F. transformers are sent out by the makers adjusted exactly to 465 kc/s, but naturally the additional wiring connection to these will slightly modify the setting. The same remarks apply to the coil unit—this being adjusted by the makers to the correct values which will be modified by the additional connections or wiring.

The first process, therefore, when the receiver is completed is to fix the pointer as mentioned last week. The condenser should be turned so



Underside view of the battery model.

that the vanes are "all out" and the pointer then placed in a horizontal position pointing to the lowest wavelength. The best plan is then to mark with a sharp tool the exact positions of the trimming screw slots on top of the I.F. cans so that when any adjustment is made the screws may be put back to their original position without difficulty. This will serve as a check for those who have no instruments such as a signal generator with which the I.F. components may

UTTON FOUR

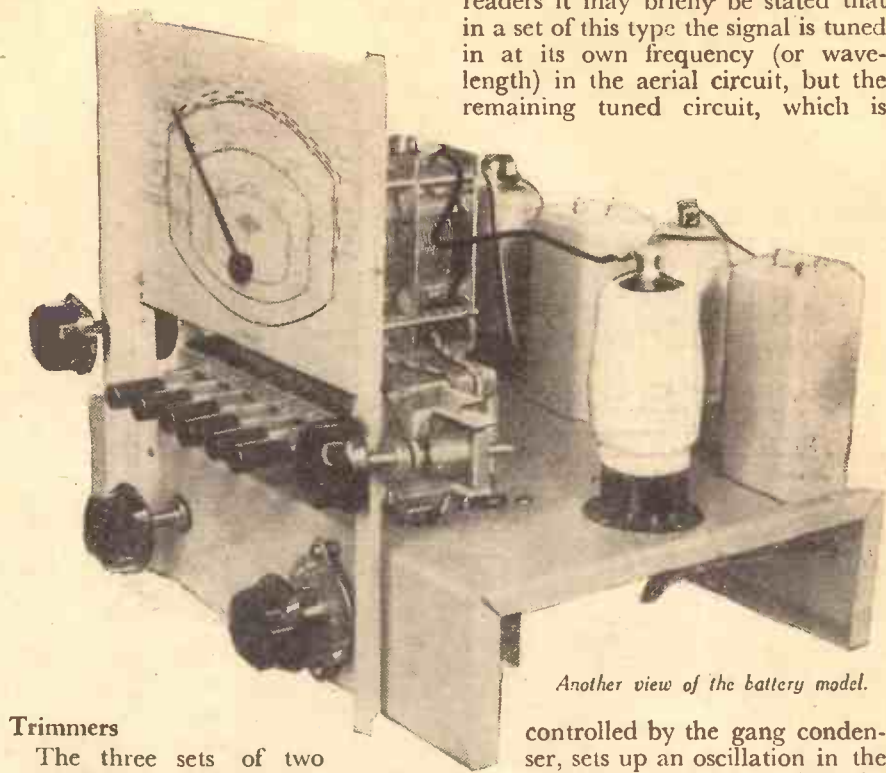
Trimming the New Receivers, Adjustment of the Various Circuits

be adjusted. The set should then be turned on its side and the trimming carefully checked. Connect the battery leads to the appropriate batteries in the case of the simple receiver, and plug in the mains lead in the other set. See that the right-hand top control is pushed over to the right (which cuts out the push-button mechanism) and slowly turn that control until the pointer is adjusted to your local station. The lower right-hand control should be turned clockwise to the first "click" and the lower left-hand control should then be slowly turned until signals



Model of the Push-button 4.

are heard. The top left-hand control may be left alone for the time being as this is only a tone control. When signals are heard, adjust tuning to see whether the pointer is correctly set for the station being received. If not, the set screw may be loosened and the point placed in the correct position, after which another station should be tuned in. If this does not register correctly, the trimmers and padders on the coil unit will have to be adjusted.



Another view of the battery model.

Trimmers

The three sets of two trimmers arranged close together trim the aerial and oscillator coils, whilst the two condensers which stand alone near the front runner of the chassis are the medium and long-wave padders. The padder on the long-wave exerts quite a lot of control, and therefore it should be adjusted very slowly, whilst checking the effects by examining the pointer indications. The trimmers, looking at the coil unit from the underside and reading from the switch unit, are for short waves, medium waves and long waves. The aerial trimmers are not very critical, although they control the setting of the pointer, but the oscillator trimmers must be

accurately set so that they provide the correct frequency difference to enable all stations to be passed through the I.F. stages. For the benefit of new readers it may briefly be stated that in a set of this type the signal is tuned in at its own frequency (or wavelength) in the aerial circuit, but the remaining tuned circuit, which is

controlled by the gang condenser, sets up an oscillation in the first valve as a result of which the incoming signal frequency beats with the local oscillation and the signal

(Continued overleaf)

DETAILED LIST OF COMPONENTS FOR THE MAINS MODEL

- One enamelled steel chassis 11 1/2 in. by 8 1/2 in. by 2 1/2 in., with aerial-earth strip fitted, 5s. 6d. (Peto-Scott.)
- One special all-wave tuning unit with switches, filter unit, etc., type P.B.4. 18s. 6d. (Peto-Scott.)
- One 6-pt. push-button mechanism with station plate, knob, buttons and escutcheon, 20s. (Peto-Scott.)
- One two-gang bar-type condenser, .00043 mfd. each section, with special mounting bracket, 4s. 6d. (Peto-Scott.)
- One station-named scale and drive, brackets, driving drum, pointer and cord, 4s. (Peto-Scott.)
- One special potentiometer mounting bracket, 4d. (Peto-Scott.)
- Two I.F. transformers, types BP.122 and BP.123, 7s. 9d. each. (Varley.)
- One mains transformer, type P.B.4, 20s. (Heyberd.)
- Fixed condensers:
 - One at .0001 mfd., type 451, 1s. (T.C.C.)
 - One at .0002 mfd., type 451, 1s. (T.C.C.)
 - Four at .006, type M, 1s. 6d. each. (T.C.C.)
 - One at .01 mfd., type 451, 1s. (T.C.C.)
 - One at .02 mfd., type 451, 1s. (T.C.C.)
 - Three at .1 mfd., type 341, 1s. 4d. each. (T.C.C.)
 - One 8-8 mfd. electrolytic, type 712/3, 6s. (T.C.C.)
 - One 25 mfd. electrolytic, type FT, 1s. 6d. (T.C.C.)
- Fixed resistors:
 - One at 100 ohms, 1-watt type, 1s. (Erie.)
 - Two at 150 ohms, 1-watt type, 1s. each (Erie.)
 - One at 200 ohms, 1-watt type, 1s. (Erie.)
 - One at 20,000 ohms, 1-watt type, 1s. (Erie.)
 - Three at 25,000 ohms, 1-watt type, 1s. each. (Erie.)
 - One at 50,000 ohms, 1-watt type, 1s. (Erie.)
 - Four at 500,000 ohms, 1-watt type, 1s. each. (Erie.)
- Four valveholders, three 7-pin and one 5-pin, types V1 and V2, 3s. (Clix.)
- One volume control 100,000 ohms, Lab. type, 3s. (Erie.)
- One volume control, 500,000 ohms, with on/off switch, 3s. 6d. (Erie.)
- Two dial lamps 6.3 volts .3 amp., 9d. each. (Bulgin.)
- Three top-cap connectors, type P.41, 2d. (Bulgin.)
- Connecting wire, length of screened braid, mains flex and plug, 5s. (Peto-Scott.)
- Four valves:
 - One type TX4. (Tungsram.)
 - One type VP4-B. (Tungsram.)
 - One type DDPP4B. (Tungsram.)
 - One type APV4. (Tungsram.)
 - One energised loudspeaker, Type EM/PB. (W.B.)

THE PUSH-BUTTON 4

(Continued from previous page)

is thus passed out, not at its own frequency, but at the frequency of the beat note set up in the valve.

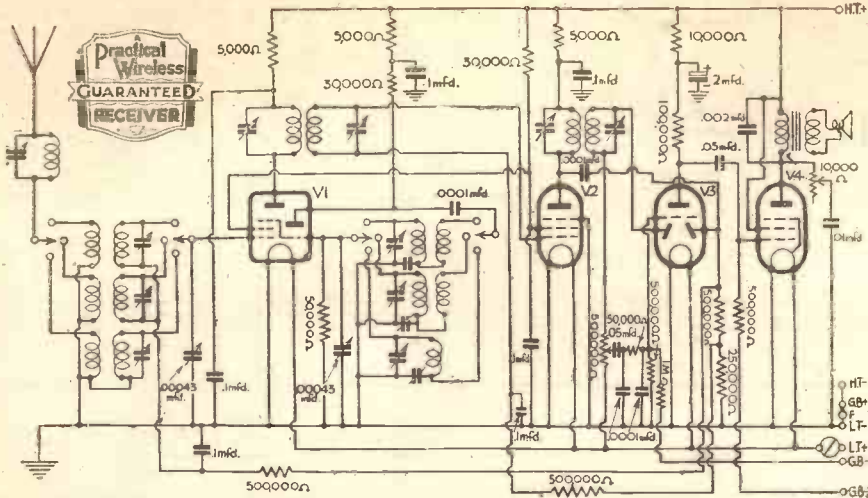
remarks that trimming is a very difficult task, but when it is actually tackled it is not so very hard. You will probably be able to make all the necessary adjustments in a shorter

for the benefit of those who have previously not attempted to build or adjust a superhet.

Mains Model

In the case of the mains receiver, all of the above instructions also apply, but in addition there are a few precautions to be taken regarding the mains transformer. The leads on this are provided with small reference tabs, and it will be seen that the primary is tapped for varying mains voltages. The lead marked 50 should be taken as one lead and the remaining one should be that carrying an identification agreeing with your mains voltage. If this is not given exactly, the next nearest above your mains should be taken. These two leads are those which are taken to the on-off switch, which is combined with the volume control. With regard to the block condenser, this should be mounted by means of a small metal bracket, made up from any old strip of metal, bolted to the side runner of the chassis. Great care must be exercised, however, when connecting this condenser, as there are three leads only, two of

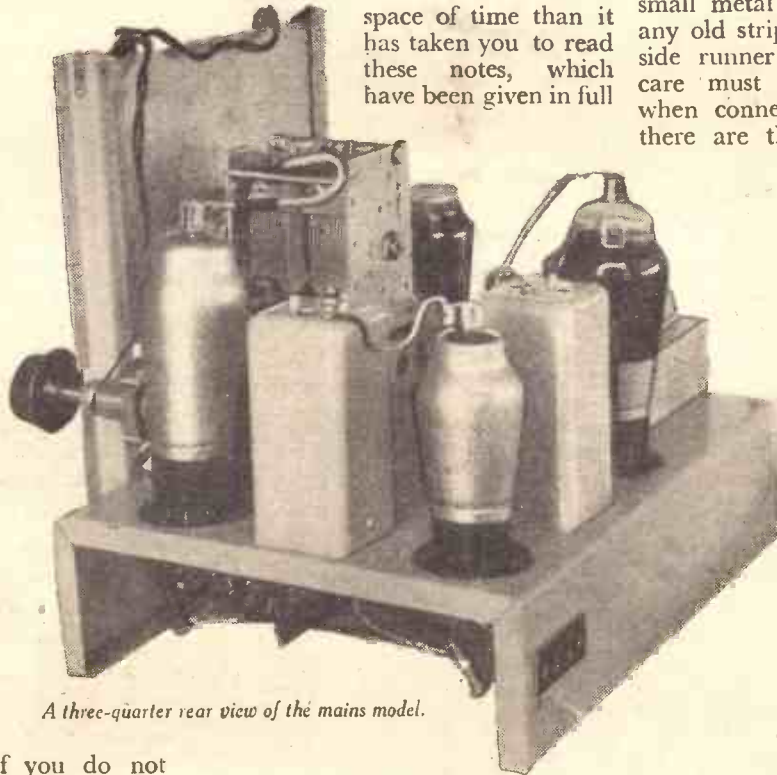
which are positive and one negative. If the condenser is wrongly connected it will be damaged, as it is not of the reversible type. The black lead is negative and is, accordingly, joined to the chassis to the nearest fixing bolt. The two red leads are interchangeable and either may be joined to the rectifying valve. As the speaker is of the energised type, and has to be included in the H.T. positive supply line, care is also necessary in connection with the leads on the speaker.



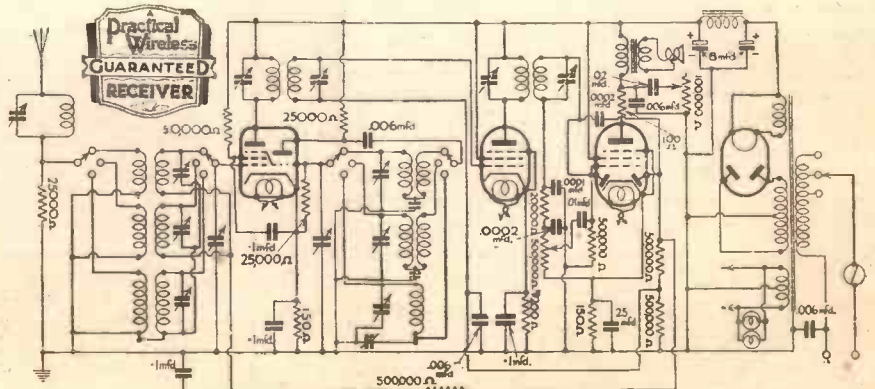
The battery theoretical circuit.

remaining two tuned circuits (the I.F. transformers) are not controlled when tuning from one station to another, but are fixed-tuned at 465 kc/s (approximately 645 metres). Therefore, it is essential, if all stations are to be heard, that the beat note set up on every station in the first stage shall be 465 kc/s. As the aerial tuning is dependent upon the frequency of the station being received it is obvious that the oscillator stage is the most critical, and the trimmers and padders in this stage are usually the source of trouble when a superhet fails to do what is expected of it. Therefore, spend a little time, if you do not possess a signal generator, in getting these peaked to the correct frequency. It is not difficult if you take stations at each end of the waveband, and do one band at a time. It will be found that when each end of the band tracks accurately, the centre of the scale will be correctly covered, but usually, if you trim at one end of the scale and at a point in the centre of the scale, it is possible to obtain a setting which will give the desired results there, but will fail to hold through the entire range.


It may seem from the above



A three-quarter rear view of the mains model.



This is the mains circuit.



Practical Television

October 29th, 1938. Vol. 3. No. 123.

Receiver Compactness

ONE of the objections levelled at television receivers twelve or eighteen months ago was the bulky cabinet which seemed necessary to house all the equipment required to give the sound and vision reproduction in a single set. The new range of models shown this year, both in this country and Germany, has changed the situation completely. Receiver designers have succeeded in juxtapositioning the various chassis and cathode-ray tube in a way hitherto thought impossible. There is no doubt that better screening

The tube itself was shorter than any hitherto demonstrated, and was considered a marked step forward towards the introduction of home television into Germany.

Televising Films

AFTER a very long period of experiment the Germans have finally abandoned the iconoscope for use when televising talking films. The inherent defects of this form of camera which appear to be corrected so ingeniously when used for direct pick up are thrown into greater relief with film working, and at present

One of the main difficulties here arises from the decay of fluorescence in the C.R. tube screen which, if excessive, gives a blurring effect to the picture detail. The idea has the merits of relative simplicity, and when used in conjunction with the film projector, which eliminates the chopper disc for frame changes and substitutes a continuous film motion with a mirror-drum compensator to allow for the steady frame movement, the results are quite satisfactory. The third telecine scanner employs the image dissector tube in conjunction with an efficient secondary emission multiplier. The complete scanner built up in this way is very neat and compact, and Fig. 2 shows the form taken by a unit purchased by the German Post Office. The original arc is replaced by an incandescent filament lamp and the earlier troubles arising from the high "noise level" of the dissector tube have now been entirely overcome. The resultant pictures are free from flare effects, and since the device operates by virtue of a mechanical aperture it has many of the attributes of plain mechanical scanning without the difficulties associated with an efficient driving motor. Bearing in mind that the televising of films is the least efficient of the present B.B.C. service, it is conceivable that they may in due course completely re-examine the position and follow the lead of Continental practice for this work.

Front or Back Projection

A GOOD many experiments are still being undertaken to ascertain whether front or back projection is to be preferred in sets designed for home use. At Radiolympia, back projection was employed in every case demonstrated, but it is realised that a considerable proportion of the available light is lost by this method.



Fig. 1.—Modern television receiver design has allowed the table model sets to be built up in a very compact form.

and chassis layout has contributed in no small measure to this, but it seems certain that the most important item is the use in nearly every set of an all-magnetically-operated C.R. tube. With the electrostatically focused and deflected tube any stray static or magnetic fields had a marked influence on the cathode-ray beam, and were capable of upsetting the picture completely unless very elaborate screening was resorted to or alternatively bigger spacing between components and tube arranged for. With the all-magnetic tube the magnitude of the deflecting and focusing fields produced by the coils external to the tube neck exceed so greatly any stray leakage fields that the picture scanning and line sharpness is uninfluenced. It is generally conceded that the most outstanding example of compactness in so far as Continental practice is concerned was the Fernseh D.E.7 model illustrated in Fig. 1. Although the picture size was approximately 9ins. by 8ins., the cabinet was less than 2ft. wide and little more than a foot high and a foot deep. Made in the form shown it was a table model in every sense of the word, and gave radio reception on a medium and long-wave station, in addition to ultra-short-wave working.

three alternative methods have been used quite successfully in Germany. In the case of one company a 441 disc scanner was used in conjunction with multiplier photo-electric cells, which acted as the agent for converting the varying light pulses into their equivalent signal voltages for modulation purposes. This gave a clear, sharp picture, and although mechanical scanning is considered in many quarters as a retrograde step there is no doubt that this apparatus proved conclusively that for special purposes and with the present picture definition, the disc scanner is capable of giving results which are an improvement on electronic methods of working. The second scheme was that of employing a projection type cathode-ray tube scanner which acted on the individual film frames in much the same way as a spot-light scanner.

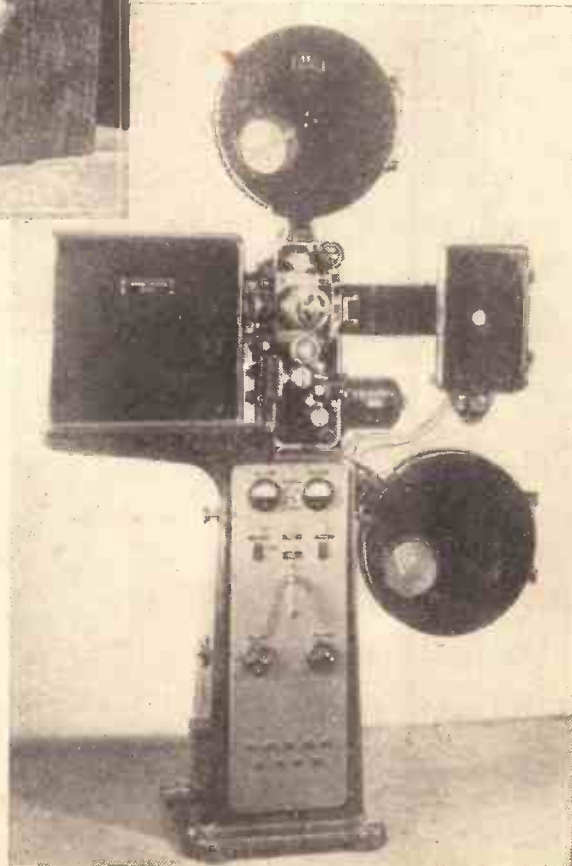


Fig. 2.—When using a dissector tube scanner for television talking films the complete equipment is very compact and efficient.

TELEVIEWS

Valuable Criticisms

EITHER individually or through their own particular organisations the dealers and television set users within the limits of signal reception are making many very useful suggestions in an effort to show how the present B.B.C. television service could be improved. After all, these are the very people who have the many and intricate problems associated with their own locality to contend with, and it therefore follows that any collated data of this character is all the more important and valuable because it bears a more authoritative stamp. One particular item which has emerged from the reports of these individuals and associations is that very frequently a great deal more receptive trouble is experienced on the 41.5 megacycle sound channel than on the accompanying 45 megacycle vision carrier. Whereas local electrical interference has produced the usual form of white splashes on the vision screen, but not sufficient to upset picture viewing completely, the sound has been ruined altogether with the high extraneous noise level. The B.B.C. have therefore been asked on several occasions to examine the possibility of increasing quite substantially the power radiated on the sound channel. As an alternative to this it has been suggested that sound could be radiated on a wavelength above 100 metres, this of course being additional to the propagation of the ultra-short-wave signals. Again, although

people situated in the North and Midlands are quite rightly continuing to pursue rigorously their just claims for television stations in their own areas, those in the South have not been slow to point out that they are by no means entirely satisfied with their service. In this connection it has been asked whether a transmitter situated south of the present one could not be built so as to give a really satisfactory signal to all the south coast towns. Another important item which has been the subject of comment is that too frequently the high spots in the television programmes coincide with the times of star sound broadcasts. There is no doubt that closer co-operation between the Alexandra Palace and Broadcasting House staffs could quite readily rectify this matter, and with this spirit now manifesting itself in several directions it seems certain that there will be little cause for complaint in this connection in the near future.

Electron Multiplication

THE principles of electron multiplication having now been well established, it is only natural that different forms of tubes making use of this fact should be designed. As a general rule the devices follow the lines of reciprocal impact, and progressive impact with solid surfaces, or use the grid formation of the Weiss type. The principal differences are in the electrode shaping and the methods of shepherding the electrons from the original emissive cathode to the final collecting anode. The general direction of the stream should be obstructed as little as possible, and in one model the target electrodes have a central disc aperture. Mounted across this is a propeller-shaped device which offers a fairly large secondary emissive surface, but which

at the same time does not impede to any marked extent the passage of the electrons down the tube.

Brighter Pictures

THERE has been no relaxing in the efforts to provide consistently bright pictures in the television receivers built for home use. Better screens, improved electrode systems and so on have played their part, but inventors have in many cases diverted their attention from the more orthodox cathode-ray tube to the production of other forms in which the principles of secondary emission play their part. In one interesting example an evacuated glass tube, comprised in the main of three limbs, is provided. At the end of one of these is a photo-electric screen upon which the picture is first of all focused optically. This produces an electron image, and the stream of electrons is then focused electronically on to a target situated at the end of a second limb. The surface of this target electrode is chemically coated and also heated so that the impact of electrons brings about a very copious emission of secondary electrons. This amplified electronic image is then focused magnetically so that it is directed on to a fluorescent screen positioned in the third and final limb of the tube. The result is a very brilliant picture due to the material amplification brought about by the secondary emission, and is a marked improvement on that produced by ordinary cathode-ray tube working.

WIRELESS CONSTRUCTOR'S ENCYCLOPEDIA

5/- or 5/6 by post from

George Neveins, Ltd., Tower House, Southampton St., Strand, London, W.C.2.



Mr. F. J. Camm, editor of "Practical Wireless."

Says Mr. Camm: "listeners are fortunate in having

at their command a speaker so sensitively responsive. Good and bad sets will be improved by it."

Are you sure you realise exactly what that means to you?

Are you satisfied with the "cleanness" of your bass reproduction? Is your set giving the high smooth top and vivid transient response that make so much difference?

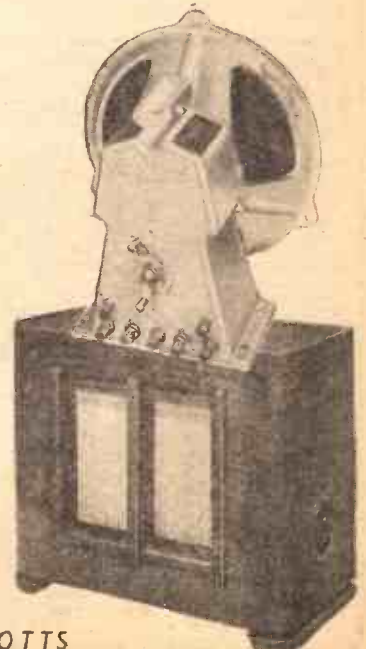
If you are not absolutely sure, wouldn't it be a good idea to hear a modern **Stentorian** on your set?

Ten to one it would surprise you. Ask your dealer now!

WHITELEY ELECTRICAL RADIO CO., LTD., MANSFIELD, NOTTS

	Chassis	Cabinet models
Midget	17/6	—
Baby	23/6	29/6
Cadet	—	*39/6
Junior	32/6	*49/6
Senior	42/0	*63/0
Regent	—	*105/0
Emperor	—	*147/0

* These models have constant impedance (3 winding) volume control, with push button for Long Arm Remote Control.



PETO-SCOTT

BRITAIN'S GREAT
MAIL ORDER HOUSE

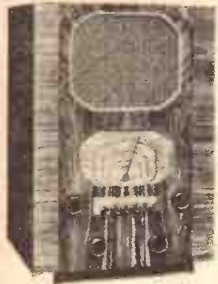
ESTABLISHED

The Peto-Scott 1939 range of radio receivers, chassis and kits comprises in its entirety, only highest quality apparatus which "Practical Wireless" readers must not confuse with lines offered elsewhere at seemingly attractive prices. Every Peto-Scott chassis and Receiver is guaranteed for 12 months, valves included.

1919

BUY a 1939 RADIO NOW

Are you getting the best out of radio... Is your set out of date? Decide NOW and see that from henceforth you "listen in" on a really modern all-wave set—a Peto-Scott guaranteed direct-from-factory receiver. Press-Button and non Press-Button models are available from Peto-Scott at amazingly low cash prices and on easiest of terms. A wonderful complete range of battery and mains models—at prices from £5/15/- is fully described in the new beautiful Peto-Scott Radio Catalogue... send for it NOW.



PETO-SCOTT 1939 ALL-WAVE PRESS-BUTTON RECEIVERS BATTERY S/HET MODEL 9033

Here is a 7-stage 4-valve battery superhet which will bring in 40 or more stations from all parts of the world on the short, medium and long waves, with the addition of no-trouble press-button tuning for 6 principal stations. Unsurpassed selectivity and sensitivity. Station-name dial. Pentode output provides all finish cabinet as illustrated. Fully guaranteed. Price less batteries. C.O.D. 8 Gns. for 5/- Down Balance in 18 monthly payments of 10/8.

A.C. MODEL 9053 6-stage 4-valve A.C. version of the above set. Dual electrolytic tuning. Illuminated station-name dial. A.V.C. Moving-coil speaker. Over 3-watts output. Volume and tone controls. CASH 9 GNS. YOURS FOR 7/6 Down Balance in 18 monthly payments of 11/9.

PETO-SCOTT ALL-WAVE "STRAD" CONSOLE 4v.S/HET

A popular console type all wave receiver incorporating all the modern features employed in models 9033 and 9053 described above. The cabinet (size 34 1/2 in. h, 14 in. w, 10 1/2 in. deep) is extremely attractive and ultra modern in design, and the pleasing walnut veneer finish enhances the beauty of any home furnishing scheme.



BATTERY VERSION Model 7037 CASH 10 GNS. YOURS FOR 11/6 Down Balance in 18 monthly payments of 13/-.

A.C. VERSION Model 9051 CASH 11 GNS. YOURS FOR 12/- Down Balance in 18 monthly payments of 14/4.

SEND FOR BEAUTIFUL ART BROCHURE COVERING THE COMPLETE RANGE OF PETO-SCOTT 1939 ALL-WAVE RECEIVERS & RADIOGRAMS

PETO-SCOTT 1939 ALL-WAVE PRESS-BUTTON

5 VALVE A.C. S/HET TABLE MODEL 9084

Modern 7-stage superhet, as illustrated on right. Wave range 18-2,000 metres. Press-button tuning for 6 principal programmes. Manual tuning for world-wide reception on short, medium and long waves. Station-name dial. Moving-coil speaker. Output 3 watts. Outstanding cabinet designs, contrastingly walnut veneered. For A.C. mains only: 200-250 volts, 40/100 cycles.



Size 20 1/2" high, 15" wide, 11" deep.

CASH £10:19:6 YOURS FOR 11/6 DOWN C.O.D. Balance in 18 monthly payments of 13/7.

STRAD MODEL 9087 Console version of model 9034 employing the striking cabinet illustrated above. A powerful all-wave "no trouble or fuss" A.C. receiver for the connoisseur who also appreciates beautiful cabinet lines.

CASH 12 GNS. YOURS FOR 15/- DOWN C.O.D. Balance in 18 monthly payments of 15/8.

F. J. CAMM'S P. B. 4 KIT "A" BATTERY MODEL CASH - C.O.D. 5 GNS

or yours for 9/- down, balance in 12 monthly payments of 9/-. Comprising all first specified parts for Mr. Camm's receiver, including Peto-Scott ready-drilled chassis, push-button unit condenser and dial, etc., Varley L.P. transformers, wire, flex, and screws, but less valves, speaker and cabinet.

KIT "B" As for "A" but including set of 4 specified valves, Less cabinet and speaker. Cash or C.O.D. £7:1:0 or yours for 12/- down and 12 monthly payments of 12/-.
KIT "C" As for "A" but including valves and specified Peto-Scott walnut finish console cabinet, less speaker. Cash or C.O.D. carriage paid £8:5:0, or yours for 14/3 down and 12 monthly payments of 14/3

KIT "CS" As for Kit "A" but including valves, cabinet and specified W.B. Stentorian junior speaker. Cash or C.O.D. carriage paid, £9:18:5, or yours for 17/- down and 12 monthly payments of 17/-.

THERE'S REAL ENJOYMENT IN SHORT-WAVE LISTENING

Short-wave "listening in" provides unlimited thrills and entertainment, and despite what the all-wave type of set is intended for, real short-wave reception can only be enjoyed on a specially designed receiver. A TROPHY gives you short-wave entertainment at local station loud-speaker strength.

TROPHY SETS ARE IDEAL

TROPHY 3 as illustrated. Battery and A.C. mains models to choose from. Straight 3-valve circuit provides amazing sensitivity over the whole wave-range of 6.2 (television) to 550 metres. Employs famous B.T.H. self-locating inductors. Metre-calibrated dial. Moving coil speaker incorporated with provision for using 'phones. Pleasing metal cabinet, fully guaranteed and supplied complete with inductors for 12-35 metres.

Battery Model CASH £5:15:0 YOURS FOR 7/- DOWN C.O.D. Balance in 18 monthly payments of 7/-.
A.C. Model CASH £6:6:0 YOURS FOR 7/6 DOWN C.O.D. Balance in 18 monthly payments of 7/9.

TROPHY 5 TROPHY 5. A.C. 5-valve junior communication receiver for efficient short-wave reception. Wave-range 10-650 metres, continuous. No trouble switching. Built-in speaker. Jack for using 'phones. Bandspread tuning. Scale calibrated in metres or kilocycles. Incorporates all those refinements normally only associated with much higher-priced instruments. Housed in pleasing steel cabinet. For A.C. mains, 200/250 volts, 40/100 cycles.

CASH £9 YOURS FOR 10/9 DOWN C.O.D. Balance in 18 monthly payments of 10/9.

PETO-SCOTT SHORT-WAVE KITS

For the constructor, Peto-Scott offers a wonderful range of low-priced kits for the assembly into highly efficient short-wave receivers. The complete range is fully described in the Peto-Scott booklet "The Short-Wave Experimenter" available post free. Post coupon for your copy.

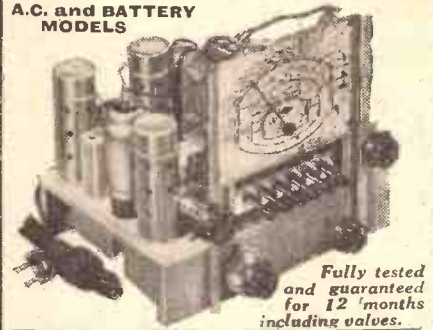
HOME BROADCASTER

Transverse Current Carbon Microphone For Dance Bands, Crooners, Home Broadcasting and Public Address Work. May be used with A.C. or Battery amplifier, or attached to your radio receiver. High-fidelity reproduction at all speech and musical frequencies. Carbon electrodes and granules. Diaphragm protected by metal grille. Supported on 4 sensitive springs attached to a chromium plated ring, on black moulded base. On-off switch. 30-1 microphone Transformer with bias battery in separate bakelite moulding for greater efficiency. Table Model.

CASH 25/- YOURS FOR 2/6 DOWN C.O.D. Balance in 10 monthly payments of 2/6.

TELESCOPIC FLOORSTAND MODEL CASH C.O.D. 42/- YOURS FOR 2/6 DOWN Balance in 11 monthly payments of 4/-.

REPLACE THAT OLD SET WITH A 1939 PETO-SCOTT ALL WAVE PRESS-BUTTON CHASSIS



A.C. and BATTERY MODELS

Fully tested and guaranteed for 12 months including valves.

BATTERY 4-VALVE ALL-WAVE S/HET

Sensitive 4-valve 7-stage circuit with filter to triode pentode frequency changer, Litz-wound transformer coupled to H.F. pentode as I.F. amplifier similarly coupled to double diode triode followed by output pentode. Wave range and chassis size as A.C. model. 6-station press-button and manual tuning. Station-name dial. Low H.T. consumption. Supplied complete with British valves, knobs and escutcheon.
CASH £5:12:6 YOURS FOR 5/- DOWN C.O.D. Balance in 18 monthly payments of 7/-. Matched P.M. moving-coil speaker, 21/- extra, or add 1/5 to monthly payments; same deposit.

A.C. 4-VALVE ALL-WAVE SUPERHET

3 Wave ranges 19-2,000 metres. Station-named dial. 4-valve, 6-stage circuit, with variable-mu triode hexode frequency changer, bandpass coupled to H.F. pentode as I.F. amplifier, also bandpass coupled to double diode output pentode, providing rectification delayed A.V.C. and 3 watts output. 6-station press-button and manual tuning. Volume and tone controls. Chassis size 11 1/2 in. wide, 9 1/2 in. high, 8 1/2 in. deep. Similar in appearance to illustration. Supplied complete with British valves, knobs and escutcheon.
CASH £6:19:6 YOURS FOR 5/- DOWN C.O.D. Balance in 18 monthly payments of 8/10. Matched moving-coil speaker, 19/6 extra, or add 1/4 only to monthly payments; same deposit.

ALL-WAVE S.C.3 NON PRESS-BUTTON MODEL
Powerful 3-valve 3-stage circuit with variable-mu H.F. pentode, high efficiency Detector and Harries distortionless output pentode. Clear, colour-coded, station-named dial. Wave-ranges, 18-52, 200-650 and 900-2,100 metres. Duplex Frequency tuning with slow-motion ratios of 9:1 and 80:1. Balanced and screened air-cored wave-wound broadcast coils; screened short-wave coils. Alternative aerial tapings. Rotary wave-change switch, with silver-plated contacts. Volume control. Complete with 3 British valves and all knobs.
CASH £3:12:6 YOURS FOR 5/- DOWN C.O.D. Balance in 12 monthly payments of 6/8. If required with matched moving-coil speaker, add 21/- to cash price or 2/- to monthly payments; same deposit.

THIS IS NEWS

A NEW DEPARTMENT.—News on the desire of an overwhelming number of Peto-Scott's clients we have fully stocked a new department with a new range of Electric Shavers, Fires, Vacuum Cleaners, Clocks, etc., everything electrical for the modern home, quality apparatus at better cash prices and terms you can possibly obtain elsewhere. Post Coupon for Lists.

POST THIS COUPON NOW

PETO-SCOTT 77 (Pr. W. 10), City Road, London, E.C.1. Tel. Oldisall 9878, for Showroom, Clerkenwell 6911.

PLEASE SEND ME fully illustrated Catalogues and lists on the following, which will place me under no obligation.
 1939 All-wave Receivers and Radiograms.
 1939 CHASSIS ONLY.
 TROPHY SHORT-WAVE SETS AND KITS.
 ELECTRIC SHAVERS, CLOCKS, CLEANERS, ETC.
Please tick item in which you are interested.

NAME

ADDRESS

MR. F. W. OGILVIE,

Director-General of the B.B.C., introduces himself

IN his broadcast talk in the third News Bulletin on October 17th, Mr. Ogilvie said: "The B.B.C. is a body which has certain work to do. What I am doing to-night is probably well outside my proper business as Director-General. And, worse than that, it would clearly be unbearable—for listeners, I mean—if a Director or anyone else were to regard himself as free to come to the microphone in this personal kind of way at any time.

"My reason for speaking to-night is simply this, that many listeners have asked that I should; and—well, you know, of course, that any suggestion from listeners, any suggestion whatever, is always looked into carefully.

"In my appointment here I succeed a single-hearted and gallant architect of the air, Sir John Reith, who carries with him the warm good wishes, of the Corporation and of listeners, in the task to which he has now set his hand. And I have joined a body which, in all its different fields of work, has before it the single aim of public service—in home programmes of sound and television, in Empire programmes, in broadcasts in foreign languages. It is no doubt inevitable that the opinions of listeners should often differ about day-to-day programmes. But in a wider sense should we be agreed, I wonder, that these unparalleled inventions of broadcasting and television are gifts of science which our age holds in trust; that freedom of the air is something infinitely precious; and would you not agree that the B.B.C. would fail in its purpose if it did not continue to aim at doing all it properly could to meet the very varied tastes and needs of people at home, and to contribute internationally to mutual understanding, and so to the peace of the world?



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

First Impressions

"First impressions in a new post are dangerous, but they are not invariably wrong. And if you were to ask me for mine, as a newcomer, I think I should say this, that the broadcasting service is not a machine: it is people, working for people—actors, debaters, musicians, intent upon the flick of the studio light which is to put them across to you; commentators perched uncomfortably somewhere so that you can follow the football match or the procession; news editors working at a bulletin—shaping it at the tail, perhaps, while its head is already through your receiving-set; engineers and craftsmen up and down the country attending, at any of the twenty-four hours, to the instruments upon which you depend. And in speaking of the staff, in the Regions as in London, I just want to say how much I appreciate the friendliness of the welcome given me by those I have met so far; from Mr. Graves, the Deputy Director-General, who was in charge from July to October, a period as critical and difficult, obviously, as any in the whole history of British broadcasting; from Mr. Graves to a messenger-boy who had to bring me round an urgent letter at a very late hour the other night—and seemed quite cheerful about it.

"One personal word more. Since my appointment a few weeks ago I have received expressions of greeting and good wishes from listeners in many parts of this country and the Empire, and in America and other countries overseas. These messages from friends, known and unknown, mean to me more than I care to say."

NOW READY!

WORKSHOP CALCULATIONS, TABLES AND FORMULÆ

By F. J. CAMM

3/6, by post 3/10, from George Newnes, Ltd., Tower House, Southampton Street, Strand, W.C.2.

WATER EFFECTS

THE transmission of ultra-short-wave signals is still the subject of very careful investigation, particularly in relation to the results achieved through the signals passing over ground with peculiar contours, and also with reference to any peculiarities that can be traced to the effect of water. From time to time it has been stated with a reasonable degree of authority that ultra-short waves are capable of being received over much greater distances when stretches of water intervene. To a certain extent this was borne out by the experiment which took place almost a year ago. Readers may remember that on this occasion the Cunard White Star liner *Britannia* was passing through the English Channel, and television pictures from the Alexandra Palace station were picked up and shown quite clearly on a set installed in one of the state rooms. This was regarded as a very praiseworthy achievement for the first reports of successful reception were given when the vessel was 30 miles south of Hastings. When the B.B.C. were informed of the results they sent a message of greeting to the captain, and all on board, by visual means. At the time, this was said

to open up enormous possibilities in the maritime world which were quite apart from the pleasure afforded to passengers while travelling at sea. The success of this and other experiments is sufficient to warrant further work being undertaken, and once more revives the oft proposed scheme of giving visual directions to a ship obscured by fog. If a satisfactory solution could be found, much of the terrors associated with the fog menace round the coast of Britain would be removed. Apart from this, however, it seems certain that there is some form of change in the propagation characteristics of ultra-short waves when fairly long stretches of water intervene, and no doubt much of the research work now being undertaken will help to clarify the situation.

THIS CABLE QUESTION

THIS vexed question of the Post Office coaxial cable does not seem to have been brought any closer in its relation to television by the evidence published recently in a Government Blue Book, and the discussion which took place concerning it in the House of Commons. It is known that

the cable is laid to Birmingham and is being extended to Manchester, but the trunk working from the telephonic point of view does not become an economical proposition until the number of channels in use is of the order of 200. While the Post Office were hopeful that the B.B.C. would use it at those times of the day when it was not required for telephonic communication, there was apparently no definite arrangement in this connection, and it was felt that this was primarily because of the financial obligations that would be involved. When asked directly by an M.P. whether the cable would handle television frequencies, the Director-General of the Post Office had to admit that it was not yet finally established that it was possible. This very unfortunate delay has no doubt accounted for the experiments which are being conducted to find a satisfactory but cheaper alternative for the rediffusion of programmes generated in London. Which ever scheme is to be adopted it is essential that the work should be expedited, for the absence of any concrete plans for television signal distribution throughout the country has had a marked effect on the production plans of television receiver manufacturers. Given a reliable guide on this matter it is certain that set makers would show their confidence by a wide-scale plan for real mass production of sets and this would give the public every confidence to buy.

POST ORDERS
All orders sent by return, carriage and C.O.D. charges paid over 10/-. Overseas orders please send full cash or 50% deposit, balance plus forwarding charges collected on delivery.

N.T.S. CASH AND EASY-WAY BARGAINS

CALLERS
All advertised lines available from our London address. Call in for lists and choose your requirements at your leisure.

MORE AMAZING SCOOPS

BRAND NEW 1939 BATTERY RECEIVER

READY TO PLAY with SPEAKER and BATTERIES

Amazing purchase from LIST VALUE well-known British set-makers. Wave range 200-2,000 metres. No-trouble switching for on/off and wave-change.

BARGAIN 27/6

Brand new and absolutely complete with standard 2-volt tetrode and pentode valves. Built-in speaker, Oldham H.T. and L.T. batteries. Wonderful performance anywhere. British and continental stations. Speaker gives pure reproduction without crackles or hum. Beautiful veneered walnut cabinet. Written guarantee. All you pay is 27/6 plus 2/6 for carriage and packing, or sent C.O.D. ORDER EARLY.



SPECIAL PURCHASE MAINS UNITS FEW ONLY



PETO-SCOTT MODEL AC12
List Value 39/6
BARGAIN 19/6

Suitable for all sets requiring output up to 12 m.a. Gives output of 120 volts, 12 m.a., 4 H.T. tappings. For A.C. supplies 200/250 volts. Incorporates metal rectifier. Yours for 2/6 down and 8 monthly payments of 2/6.

BUILD FIVE SHORT-WAVE OR ALL-WAVE SETS FOR THE PRICE OF ONE with this N.T.S. "PENTA-KIT"

9-2000 METRES



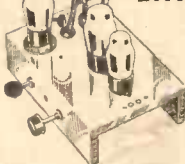
- Builds alternatively:—**
- Short-Wave Adaptor
 - Short-Wave Converter
 - 1-Valve All-Waver
 - 2-Valve All-Waver
 - 3-Valve All-Waver

2/6 Down

Designed specially for efficient short-wave or all-wave work. 3 Short-wave ranges. Employs famous B.T.S. self-locating 6-pin inductors with wave range of 9-2,000 metres. Kit comprises slow-motion tuning and reaction condenser, L.F. transformers, all-wave and short-wave chokes, fixed condensers, ready drilled steel chassis with all holders fitted, engraved slow-motion dial, coils and all instructions. 3 matched British battery valves comprising highly efficient Detector and L.F. and Pentode output given FREE. List value £4/10/0. Bargain 42/- or 2/6 down and 12 monthly payments of 3/6. ONE OF OUR MOST OUTSTANDING OFFERS.

USEFUL and HIGHLY EFFICIENT

Ready-built NEW 4 WATT BATTERY AMPLIFIER



Here is a new 4-valve battery amplifier with Class "B" output meeting every requirement and available at a fraction of actual list value. Special circuit arrangement provides full output using 150 v. H.T. Lower voltage can be used when full output is not needed. Ideal for boosting up all types of battery sets and recommended for amplifying speech and gramophone records. Yours for 4/6

down and 12 monthly payments of 4/-. List Value, £3:5:0. **BARGAIN 45/-**

TURN 6/6 INTO GOOD ACCOUNT

Buy a Cosmocond highly efficient 15/- gramophone pick-up for 6/6 post free. Only a few left. Electrically reproduced records sound best (off your radio or amplifier) and this special offer should not be missed.

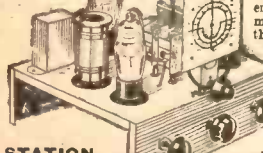
3 MATCHED VALVES (VALUE 35/-) FOR 5/6!

Complete with 3 valveholders, and post free. AN investment for every set owner and constructor. 3 matched, brand-new world-famous Philco 2-volt battery-type valves, comprising 2 S.G. H.F.'s and 1 Output Pentode, packed in original cartons. Three different valve types indispensable for modern constructor's circuits (available on request) using any number of valves, invaluable also for replacement purposes. Offered to you at a fraction of manufacturing cost... a real scoop in N.T.S. bargains. Order now while supplies hold out!

FREE! SHORT-WAVE BOOKLET describing in detail, with actual photographing, 3 entirely new N.T.S. Bargain Battery and A.C. Short-Wave Kits, together with complete General Bargain Lists—Receivers, Accessories, Components. N.T.S. supply everything Radio (all makes) on the famous N.T.S. Easyway System—Receivers and Accessories... send us a list of your needs for quotation by return.

NEW "WORLD" S.G.3 LIST VALUE £4:15:0 CASH BARGAIN C.O.D. 29/6

9 to 2,000 metres



A triumph in receiver design. Two S.G. and Pentode Output stages. For the enthusiast who requires maximum efficiency and those extra stations on the Short, Medium and Long Waves. 3 Short-wave ranges. Employs 1 a m o u s B.T.S. One-2-104 inductors or N.T.S. 6-pin coils. Slow-motion Tuning. Complete Kit for Battery use with Steel Chassis Twin-range Condenser. Slow-motion Tuning, Station-name dial, Transformer, Resistances, etc., and assembling instructions, less coils, 29/6 only Cash or C.O.D., or 2/6 down and 12 monthly payments of 2/6.

2/6 Down

STATION-NAME DIAL
motion Tuning, Station-name dial, Transformer, Resistances, etc., and assembling instructions, less coils, 29/6 only Cash or C.O.D., or 2/6 down and 12 monthly payments of 2/6.

COMPLETE KIT. Comprising above kit with set of 6 Coils, Cash or C.O.D. 41/6 or 3/- down and 12 monthly payments of 4/-. VALVES GIVEN FREE.

WORLD S.G.4. A more ambitious model with Pre H.F.S.G., Det. S.G. and Pentode output. All components supplied extra Co 3-Valve version including station-name dial. 4 valves given FREE. Cash or C.O.D. 42/- or 2/6 down and 12 monthly payments of 3/6. Required coils special offer, 10 B.T.S. coils list value 27/- Bargain 17/6. Or add 1/6 to deposit and payments.

REPLACE YOUR SET NOW! AMAZING ALL-WAVE BARGAINS

FAMOUS NAME S.G.3 ALL-WAVE BATTERY RECEIVER List £8:15:0

BARGAIN CASH £4:19:6 or C.O.D. 29/6

Yours for 5/- down and 18 monthly payments of 6/4.



This superb receiver as illustrated above will give you programmes from all over the world. Circuit comprises V.M.H.F. Pentode, High Efficiency Detector and Harries distortionless output Pentode. 4 Wave-ranges. 14-2,100 metres. Station-name dial. An exquisite walnut cabinet houses the chassis measuring 19 1/2 ins. high, 16 ins. wide, 11 ins. deep. Tone-compensated moving-coil speaker fitted. You must hurry to secure this bargain.

CHASSIS ONLY. Limited number of chassis only available as used in above set, ready for fitting in your own cabinet. Supplied fully tested and complete with matched British valves as fitted by the makers, station-name dial, all knobs and escutcheon. Brand-new. List value 5 1/2 gns. **BARGAIN 75/-** cash or C.O.D. Yours for 5/- down and 16 monthly payments of 5/3.

4-VALVE ALL-WAVE A.C. MAINS CHASSIS COMPLETE WITH VALVES BARGAIN 79/6

List value £6:6:0
Yours for 5/- down and 18 monthly payments of 5/-. A magnificent chassis for fitting into your own cabinet. Employs latest 4-valve S.G. Bandpass circuit with Pentode in the last stage, giving over 3 watts output. Wave-range: 18-2,100 metres. Pleasing circular illuminated dial engraved station names and metres. Pick-up sockets. Brand new, complete with 4 British matched valves, all knobs and escutcheon. Fully tested. ORDER EARLY.

BATTERY S.G.3 Chassis less Valves, List Value £3:0:0 BARGAIN 19/6



Calibrated 200-2,000 metres. Chassis size 10" x 7 1/2" x 8" high.

Complete Receiver, above, efficient S.G., Det., Pentode Output Chassis (only 9 m.a. H.T. consumption) in beautiful Walnut Cabinet illustrated. Concert-grand Moving Coil Speaker, 3 valves fitted but less batteries, 39/6 cash or C.O.D., of 4/- down & 11 monthly payments of 4/-.

ALL-WAVE CHASSIS MODEL. Popular all-wave version of above chassis. Wave-range 18-2,000 metres. World-wide reception. Engraved dial. Amazing sensitivity and volume ensured by S.G., Det. and Pentode output circuit. Chassis only, less valves, fully tested. List value, £3 15s. Od. **BARGAIN 39/6**, or 2/6 down and 10 monthly payments of 4/-.

1938 Peto-Scott STRAIGHT 3 List Value £4:7:6 BARGAIN 42/-



Wonderful genuine offer of highly-efficient, brand new battery 3-valve receivers. Limited stocks. Amazing range, tone and volume. Engraved dial 200-2,000 metres. Concert-grand moving-coil speaker and 3 British valves fitted. Beautiful modern walnut-veneered cabinet size

19 1/2" h. 14" w. 10" deep. Yours for 4/- down and 12 monthly payments of 4/-. Prompt ordering is essential. **CHASSIS ONLY.** Limited supply of chassis only of above set. Absolutely brand new and ready for fixing in your own cabinet. Less valves. List value 45/-, N.T.S. price cash or C.O.D. 12/6. Please cross P.O.'s and register currency.

REPLACEMENT VALVES

Send now for N.T.S. Bargains List "V" of replacement valves, Amazing offers covering all types of valves. Saves you pounds.

NEW TIMES SALES CO.
56 (Pr.W.10), LUDGATE HILL, LONDON, E.C.4.
Phonet City 5516 Est. 1924

DON'T MISS THIS OFFER Entirely new PARCELS List Value 35/- BARGAIN 6/11

Post 9d. extra
MAJOR item KIT comprising 2 brand new screened Iron-cored Dual-range coils, each size 3in. by 2 1/2in., with solid contacts and leads; 1 brand new 2-gang bar type .00043 mfd. condenser for broadcast or all-wave sets; 1 brand new shrouded L.F. transformer with terminals, 3 valveholders; 1 drilled steel chassis together with tested circuit diagram showing all coil connections. Amazing value for 6/11 and you must hurry as stocks are limited.

ELECTRADIX

DIX-MIPANTA VEST POCKET TESTER. A wonderfully versatile moving-iron multirange meter for service on A.C. or D.C. jobs. No projecting terminals. THREE ranges of volts, 0-7.5, 0-150, 0-500. Used for MILLIAMPS, reads 121 m.a. and 75 m.a. in black bakelite case. Measures only 2 1/2 in. by 2 1/2 in., with pair of test leads and plugs. Leaflet **19/6** "N" gives full information.



Your voice amplified from your radio set to loudspeaker. **5-BUTTON MICROPHONES** for all purposes.

Usually sold at 3/6. Our price has always been 1/-. We have supplied thousands. **TABLE MIKE No. 11 "N.W."** This is a splendid Microphone for speech and music. The bakelite case, containing a 2in. mike and transformer, is on a bronze pedestal, detachable for sliding. Switch and plug fitted. Unrivalled for quality and price, 15/-. Other types: Lesdix No.



10B Pedestal, 10in. high, 12/6; Lesdix Superior No. 12BB Ring, 1 1/4in. Pedestal, 18/6. Hand Mikes in 2in. case, No. 11 at 5/8; Superior type No. 11A, 7/6. Ask for Illustrated Mike List of 20 models.

TELEPHONES.—For all purposes. Table or wall, house or office phones, from 10/-; Portable Emergency Telephones and Cable Headphones, Pocket type W.D., leather Headbands, 2/6 pr. Sultivan Radio, 120 v., 2/9 pr. 4,000 ohm 8/W lightweight Headphones, 4/6 pr. Aldis and Lucas Signal Lamps. Helios and Range Finders for Field work.

Type V. Enclosed Dynamo, 12/20 v., 12 amps. Ball Bearings, Vee Pulley, 35/-. **Marine Type Switchboard** with Ammeter, maximum and minimum Auto Cutout Mains Switch and Fuses, Field Regulator, 25/- (as illustrated).

SCHOOL CINE PROJECTOR 35 m/m sheet enclosed for L.C.C. Cost £70; as new, bargain, 12-ft. picture, £12. Soundheads £4. LABELS of experimental odd coils, micas, wire, chokes, condensers, switches, terminals, etc., post free, 10lb., 7/6; 7lb., 5/-.



LOW COST SOUND RECORDING. Blanks now 2/8 per dozen. Electric FEIGH set has ball-bearing centre gear box and geared traverse rod. Set with Tracking Gear, Pick-up and Tone-arm fitted diamond, 37/6. Tracker gear only, less Pick-up and Tone-arm, is 21/6. Diamond Cutter Needles fit all pick-ups, 7/6. 6in. Blank Discs, 3/3 dozen. Complete Acoustic Sets de Luxe, 18/-; No. 2, 10/6; Junior Type, 5/6 each, complete.

Write for our Free Illustrated Bargain List "N." It will save you a lot of money.

ELECTRADIX RADIOS
218, UPPER THAMES ST., LONDON, E.C.4
Telephone: Central 4611

Engineers' Guide To Success

Write TO-DAY for this great Guide, containing world's widest choice of home-study courses in engineering covering all branches, including Radio, Television, Sound Reproduction, etc., and which alone gives the Regulations for Qualifications such as A. M. I. E. R., A. M. I. R. E., A. M. I. W. T., C. & G., etc. Training until Successful Guaranteed.

Free!

THE TECHNOLOGICAL INSTITUTE OF GREAT BRITAIN,
42, Temple Bar House, London, E.C.4.
(Founded 1917.)
20,000 Successes.

200 Courses

FREE ADVICE BUREAU COUPON

This coupon is available until November 5th, 1938, and must accompany all Queries and Wrinkles.

PRACTICAL AND AMATEUR WIRELESS,
29/10/38.

SIMPLE SUPERHETS

(Continued from page 163)

condenser for C.2 and to remove a larger number of turns from the oscillator coil, the optimum number being dependent upon the frequency chosen. For example, when working on 465 kc/s it might be necessary to remove as many as 50 per cent. of the turns from the long-wave winding and 30 per cent. from the medium-wave section, and it is certainly desirable to use a tuning condenser (C.2) of not more than about .0002-mfd. capacity. When these alterations have been made the full tuning range can be employed; turns should be removed from the oscillator-coil tuning winding until both tuning condensers are at their minimum settings when receiving a station at the bottom of the waveband.

Should it be desired to wind an oscillator coil, this can be done by using about 70 turns for M.W. and 150 turns for L.W. on a lin. diameter former. For reaction, use about 100 turns in all, 40 placed about 1/2 in. from the M.W. section and 60 a similar distance from the L.W. portion. Ready-made I.F. transformers will generally be used, but constructional details have previously been given in these pages for those who wish to wind their own.

Standard Construction

Constructional details need not prove troublesome, since the general layout of the set can be similar to that normally followed when building one using an H.F.-Det.-Pen. circuit. The coils should be screened and placed so that connections to them are short and direct, whilst it is also

desirable that the tuning condensers should be separated by a screen if the condensers themselves are not enclosed in metal containers. I.F. transformers should also be screened and should be placed near to the anode connections of the two H.F. pen. valves.

Tuning

In operating the set it will be found that the tuning of the oscillator circuit will be more critical than that of the aerial circuit. Because of this the more powerful stations can be found by turning the aerial condenser to the approximate position at which those stations are normally found on a "straight" set, and then the oscillator tuner can be slowly turned until signals are heard. Turn that condenser to bring them up to maximum strength and then re-set the aerial condenser. After a little practice it will be found possible to operate both condensers together in the manner that we used to adopt before the days of ganging when tuning an H.F. receiver.

The pre-set condensers on the I.F. transformers will require to be adjusted after the receiver has been given a preliminary test. A simple method is to turn the trimmer on the primary of the first transformer to its midway position, and then to try the effect of altering the other pre-sets in "circuit" order; that is: secondary of first I.F.; primary of second I.F.; secondary of second I.F. Each is carefully adjusted until the signal strength from one of the local transmitters (previously made just audible with the variable-mu control) is brought up to maximum. Once set, they will not require further adjustment.

A STAND-BY OUTPUT TRANSFORMER

(Continued from page 164)

possible to A.C. mains, the problem is considerably simplified.

Testing

Connect a 240v. 40w. lamp in series with one half of the primary across the mains. Then try connecting the second half in series with the first, the lamp remaining in circuit. If the windings are connected in the wrong sense, the lamp will be bright. When they are connected correctly, the lamp will be dimmed to extinction point.

The secondaries should then be connected in series so that the voltages from A to E are additive. An A.C. voltage of approximately 13v. will be developed across the total winding.

Connection in the receiver presents little difficulty. The whole primary is used in the case of a single valve, and the centre tap for a pair in push-pull. The correct impedance matching is tabulated as follows:

Speaker Impedance.	Connect across
2	A-B
4	A-C
6	A-D
10	A-E

For auto-transformer coupling, the low-impedance output should be connected across the appropriate secondary taps, and the speaker connected across the terminals corresponding to its impedance.

A moving-iron type unit will give surprisingly good results if connected across half or full primary, while some measure of "tone control"—better described as "top cut"—can be obtained by connecting suitable capacity-resistance networks across the primary winding.

It cannot be claimed that this transformer will give perfect matching, since it is

a compromise between simplicity and performance, with two variables, RL and Z, thrown in to confuse the issue. It will,

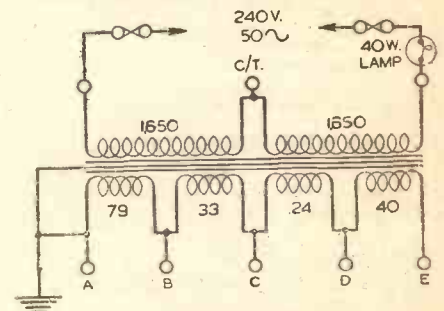


Fig. 4.—Diagram of connections for a universal output transformer.

however, meet the needs of most amateurs installing an extension unit in the kitchen, or testing out a new speaker.

PRACTICAL MECHANICS HANDBOOK

By F. J. CAMM

400 pages, 6/-, or 6/6 by post from

GEORGE NEWNES, LTD.,
Tower House, Southampton Street, Strand, W.C.2.

Radio "Effects"

An Interesting Account of B.B.C. Backstage Activities

ONCE upon a time, in the days that followed cat's-whisker-and-crystal reception, shrewd radio listeners often had a family competition to guess how the B.B.C. made a noise like a tempest, or the gallop of horses, or the crowing of some dawn Chanticleer. They knew, then, that they were almost certainly hearing only an imitation, admittedly realistic, of the "noises off."

Maybe their guesses were sometimes right, too, though it is a bit doubtful whether they knew that lead pellets, swirling around in a sieve, gave them the noise of breakers crashing on to a shingle beach; that stiff paper, crumpled into a ball near the microphone, simulated the noise of frying eggs and bacon, and that many other of the more subtle but realistic effects were obtained by similar simple devices.

But those were days of experiment in almost every sphere of broadcasting technique. Microphones did not faithfully reproduce the sounds that reached them, and one result was that sound experts had to retaliate by trying to discover how to produce noises which the microphone translated as the exact effect that they wanted to convey to listeners.

Progress in microphone and studio design, in recording and in many other ways has abolished all but little need to-day for synthetic sound.

It is true that it is still preferable to create artificially a comparatively small number of noises that are in fairly regular use—rain, thunder-claps and a few more that have so far eluded the recording van. Moreover, nothing sounds more like a closing door than a closing door.

The Use of Records

So these and similar props. are among the effects equipment. But, generally speaking, Charles Willis and his ten lieutenants in the Sound Effects Section of the

Drama Department are coming to rely more on records for background effects and less on imitations.

During the last four or five years, the B.B.C. has accumulated a large library of recorded noises. Between 3,000 and 4,000 discs are on file, each recording three or four different types of sound. The laugh of the jackass, the mighty roar of one of the country's crack express trains, the crashing drone of high-speed 'planes, the muted murmurs of a dove-cote, pealing bells, tolling bells, the whine of underground lifts, cacklings of the farmyard, the pulsating rumble of newspaper presses, the rhythmic clicking of tap dancing—they are a few of the potted sounds indexed in the effects catalogue.

And, believe it or not, there are individual programmes—plays and features—in which more than seventy records are used in, say, forty-five minutes; "Summer over the British Isles" and "Gale Warning" were broadcasts which demonstrated excellently the value of having so many authentic sounds "on tap." Indeed, in practice, a record is seldom used alone; more often three or four, revolving synchronously on adjoining gramophone turntables in one of the studios, will have their noises judiciously mixed and combined for a production. To give a simple illustration: a horse is pulling a creaking cart, a car travelling at speed, and a skidding car. Each is placed on a different turntable and "faded up" according to the need. One rehearsal may suffice to produce the exact effect. It is easy, then, to put the composite sound picture on one of the 'phone lines from Broadcasting House to the B.B.C.'s recording rooms at Maida Vale, where, in its sub-edited form, it may easily be transferred to a single record for use during the transmission. Saves time—and last-minute "hitches."

These recorded sound pictures are never destroyed after use; there will inevitably

come a time when such scenes in sound will again be useful.

Until quite recently, the usual method of mixing records was to mark with soft red or yellow pencil the groove on each disc at which the needle must be dropped, and then dropping the pick-up by hand. Tricky.

"Gramo. Banks"

Now, however, a clever electrical device, operated from a central mixing panel, will automatically drop the pick-ups on pre-determined grooves, as one record after another is faded in to the programme. In the main effects studio, with its masses of paraphernalia, there are two "gram banks," by means of which as many as eleven records can be played consecutively or mixed in any order that may be necessary.

More and more "atmosphere" and effects records are constantly being added to the library at the rate of a hundred a year. Whenever the recording van is not on more urgent duty, it spends an hour or two collecting all sorts of traffic sounds and typical noises, ranging from the furious fulminations of Hyde Park orators to the excited chatter in a big store at sale time, from the music, mirth and screams of a fairground to the drone of incoming 'planes at some big aerodrome. And whenever an outside broadcast includes interesting atmosphere noises—Cup Finals and Test Matches (not forgetting the nightingale) are good examples—a recording is retained for future use.

"You can't have too many effects records," says E. J. Inglis, Drama Productions Manager. "True, we have a pretty adequate collection now, but one or two sounds are very elusive. Take rain. If you record rain, it only sounds like the usual surface hiss of a record, so we still use the studio water tank for the job. Thunder has never been satisfactorily recorded, so we use the thunder-sheet—with good effect, we think.

"We've tried umpteen ways to get a recording of a motor car as it travels along, with its little body noises, squeaks, rise and fall of revolutions—so far unsuccessfully. If the recording van is running alongside, it picks up its own noises.

"Oddly enough, our best records are of acroplanes, with gunfire a good second."

CURRENT AMERICAN PRACTICE

IT is often claimed that America is ahead of us in receiver design, and it is interesting to note from time to time the trend of design in that country. The most prominent fact which emerged from an analysis of the new season's models is that push-button and other automatic tuning systems are dying out. In the table model receivers the percentage is still greater than for those with all-manual tuning, but is, nevertheless, smaller than last year. In the console receivers, however, tuning by inductance variation as distinct from standard auto-tuning systems is favoured. The number of valves now being used in each receiver is also being reduced, and a happy average now is five or six valves for table models and eight for console models. It is interesting to note, however, that console cabinet design is being very seriously considered, and some interesting models have very wide claims made for the range of frequencies and the realism of reproduction which are afforded. It would appear that the small fretted or clear opening for the speaker is being dispensed with, and cabinets which appear to be open all round

are being employed. Baffles at the rear restrict the sound waves, and combinations of speakers of different characteristics and various other ideas are being employed to improve reproduction.

As an instance of the research being undertaken in this connection, one of the largest speaker manufacturers in America has had a new laboratory built in which a large windowless room, with a 40ft. ceiling is to be used for acoustic research. A complex system of rigging designed to locate various measuring instruments will be inserted, and the roof of the 40ft. tower will be equipped with similar rigging to enable outdoor measurements to be made.

Long-distance Signals

In the majority of cases, a long-distance signal will be weak. It is therefore up to the listener to take every step he can to make such a signal audible, not only from a point of view of volume, but from the point of view of bringing the signal above the level of noise which generally accompanies it. This may usually be done by increasing the efficiency of the receiver, and in most cases the addition of further H.F. stages is generally the most effective. It should be remembered that if a simple detector, followed by one or more L.F.

stages, is in use, reaction probably has to be used to bring up the signal and this generally makes background noises more audible. Subsequent L.F. amplification, therefore, only amplifies the noises with the signal, and the ratio of signal to noise remains the same. On the other hand, by using more effective H.F. amplification it is often possible to strengthen a signal and cut out mush, because the additional tuned circuits act as a limiting factor on the untuned noises and thus give higher volume signal and lower volume noise. Then, subsequent L.F. amplification, although it will still magnify noise, will also magnify the signal and better readability will be obtained.

In the same way, improvement in the aerial-earth system will give an improved H.F. input to the receiver, and it is often surprising what a lot of noise can be cut out when a really well-insulated aerial is employed. A coating of soot and dirt on a single insulator will often cause a signal leakage to the supporting wire or rope, but does not seem to affect the volume of noise which is picked up. Directional aerials, reflectors, and special lead-in cables are other factors which are worth trying when it is desired to pick up signals from the farthest part of the earth.



The Man with a Future

The man who soon will be in a much better position than he occupies to-day is the man who is devoting some of his spare time to vocational study NOW. He knows that training is the best means of strengthening his salary-earning ability.

Through spare-time study ambitious men everywhere have risen to positions of responsibility. They developed their natural faculties, and so progressed in an era of constantly increasing competition. Tens of thousands are doing so to-day. They are the men with a future.

If you are dissatisfied with your present prospects, if you desire bigger pay, promotion, let the I.C.S. advise you, free and without obligation. Write, or fill in and post the coupon. But don't delay.

COUPON FOR FREE BOOKLET

INTERNATIONAL CORRESPONDENCE SCHOOLS LTD.

Dept. 94, International Buildings, Kingsway, London, W.C.2.

Please send me free booklet describing I.C.S. Courses in the subject I have marked X. I assume no obligation.

RADIO ENGINEERING RADIO
RADIO SERVICING TELEVISION

Also

- | | |
|--------------------|---------------------|
| ACCOUNTANCY | HORTICULTURE |
| ADVERTISING | INSURANCE |
| AERONAUTICAL ENG. | JOURNALISM |
| AGRICULTURE | MECHANICAL ENG. |
| AIR CONDITIONING | MOTOR ENGINEERING |
| ARCHITECTURE | PLUMBING |
| BOOK-KEEPING | SALESMANSHIP |
| BUILDING | SANITARY ENG. |
| BUSINESS TRAINING | SECRETARIAL WORK |
| CHEMICAL ENG. | SHORT-STORY WRITING |
| COMMERCIAL ART | SURVEYING |
| CIVIL ENGINEERING | TEXTILE MANUF'G |
| DIESEL ENGINEERING | WINDOW DRESSING |
| DRAUGHTSMANSHIP | WOODWORKING |
| ELECTRICAL ENG. | WORKS MANAGEMENT |
| GENERAL EDUCATION | |

EXAMINATIONS:

Technical, Professional, Civil Service, Matriculation (including Inst. Wireless Tech., P.M.G. Certif. for Wireless Operators, City and Guilds Radio Comm., and Prov. Certif. in Radio Telephony and Telegraphy for Aircraft).

State your Exam. here.....

Name..... Age.....

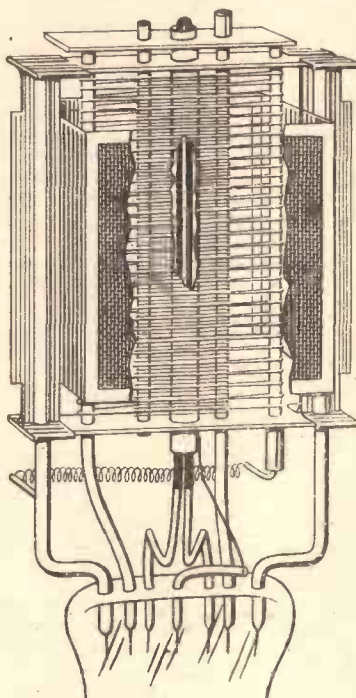
Address.....

Greatest, largest and most famous of all institutions devoted to spare-time training by the postal method. Branches in 30 countries, students in 50.



Modern Valves

CONSIDERABLE changes in the design of valves have been apparent over the past few years, and many members are puzzled to know the reason for the peculiar domed top which is now provided on most types of valve. If the inside of a modern valve is examined it will be found that the electrodes are supported at each end by a disc of mica or similar material. When one considers the



This illustration shows the complicated electrode assembly of a modern valve. The insulated supports are now generally circular as explained in the accompanying paragraph.

many supports which have to be used in some types of valve, such as a pentagrid, it is obvious that the utmost rigidity is necessary to avoid short-circuits between the various component parts. In the early days a simple strip of mica served quite well, but the modern valve has to be much more reliable and accordingly a much more rigid assembly must be provided. The domed top is so designed that the positioning disc of mica is wedged tightly where the glass bulb changes its shape and accordingly no risk arises of the electrode assembly moving. In spite of this, however, the valves should not be thrown about carelessly, as sudden shocks or jars may easily disarrange some of the internal wires or leads and upset the characteristics.

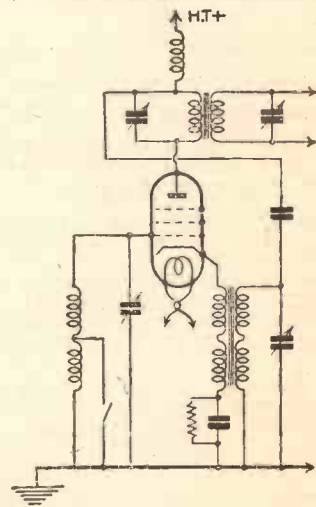
Acid Fumes

Most constructors are aware of the damaging effects of sulphuric acid and the fumes from it, but it would appear that there are still many who are under the impression that a jelly type cell is free from such troubles. Unless a cell is hermetically sealed, fumes must escape, and, in fact, all batteries are provided with a vent or vent-

plug. If the battery is placed near to copper wires it will be found that in quite a short period of time a green deposit accumulates on the wire, and before long the wire is eaten right through. We remember a case of a well-known commercial portable in which the frame aerial was wound round the back of the cabinet in the form of a movable door for directional effects. Considerable trouble was experienced by the manufacturers due to the fact that the fine-wire long-wave winding became damaged by the fumes from the accumulator, which was badly positioned in this particular set. Always try, if possible, to get the battery as far away as possible from all radio components, and if long leads are used, have them in as heavy a gauge as possible.

Iron-core Coils

When iron-core coils and transformers were first introduced, some doubt was raised as to the best method of showing them in theoretical form. A standard L.F. choke or transformer is indicated by a few parallel lines between primary and secondary windings, and to avoid ambiguity, it was first suggested that these lines be replaced by broken lines to indicate the powder-iron core such as was employed in the H.F. coils and transformers. In some cases dotted lines were placed over the coil windings, but in recent years the practice of indicating iron-core H.F. components has been dropped. It is taken for granted that unless specially mentioned, medium and long-wave broadcast coils and I.F. transformers of modern design are provided with powder-iron cores. Short-wave coils, of course, are of the standard air-core type.



The two components shown in this illustration are not L.F., but H.F., and the core is now generally omitted from diagrams to avoid confusion.

THE WIRELESS CONSTRUCTOR'S ENCYCLOPEDIA

By F. J. CAMM 8th Edition 5/- net
(Editor of "Practical and Amateur Wireless")

Wireless Construction, Terms, and Definitions explained and illustrated in concise, clear language.

From all Booksellers, or by post 5/6 from George Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2.



Replies in Brief

The following replies to queries are given in abbreviated form either because of non-compliance

with our rules, or because the point raised is not of general interest.

L. O'G. (Ballyconnell). We have not published a design for an amplifier of the type mentioned.

A. R. (Crowborough). There is no set exactly of the type mentioned, but you could build the first two stages of the Perfect S.W. Three and this would answer your requirements.

E. S. (Dudley). The valve or metal rectifier type is definitely to be preferred. The Argon charger should fulfil your requirements, and this was published in our issue dated May 28th, 1938.

E. L. (Shepherd's Bush). It is difficult to advise from the details given, and we suggest that you have the set examined by the makers or their nearest local service agent.

W. H. (Claremont, S. Africa). We have published many details of apparatus of the type mentioned. A good example will be found in this week's issue.

E. W. (Aldford). Probably the only way to stop the noise will be found to be by connecting a short length of flexible wire from the moving vanes to the moving spindle or a spacing washer on it.

L. E. D. (W. Croydon). We have not described an amplifier of the type mentioned, and think you would have difficulty in carrying out your desires without the use of mains supplies.

E. S. (Elgin). We can only suggest you refer to the firms who advertise in our pages.

A. J. K. (E. 3). You do not state what circuit or components you are using. The coil may be in order, but your circuit may be incorrectly designed or wired.

R. J. W. (Sherborne). The first-named would cost about 30s. for the parts and the second about 50s. to £3.

J. L. P. (Holywell). Our 12-watt amplifier should be ideal for your purpose. This was described in our issue dated October 30th, 1937. An ordinary M.C. speaker may be used as a moving-coil mike.

L. P. (Chelmsford). Your idea is quite sound. The two-valve may be used as the basis for all types of experiment, and should give quite good results under all normal conditions.

S. B. A. (W. Bromwich). A good baseboard three-valve should be suitable, such as the Centaur Three.

F. L. (Selangor, Malaya). We are unable to trace that any manufacturer has placed a set of the type mentioned on the market—either in this or in any other country. The short waveband would be the difficulty in the case mentioned.

L. A. F. S. (S.W. 16). We have no details of the components mentioned and cannot trace that the manufacturers are now in business.

G. R. W. (Wakefield). Tags 1 and 2 are probably joined to the same point—namely, the fixed vanes. They may, therefore, be considered as one point and you can join the leads to either or both of them. Point 3 is no doubt the moving-vane connection, and this should be joined to earth.

F. W. U. (Reigate). We cannot trace any details of the type of meter you mention. A good local electric serviceman may be able to identify it or trace how it should be joined to the lighting plant.

C. H. (Taunton). The output is that from the transformer secondary. It should be fed to a valve of the type requiring an input of 250.0-250, and the total voltage output may be in excess of this—dependent upon the current load on the valve. The valve curves will show the output according to the current load.

J. K. (Westmeath).—We are sorry that we cannot identify the coil from your description. The letters probably stand for Aerial, Grid, Reaction, Earth, and Switch, but the purpose of the sockets, etc., is not clear.

C. H. M. (Ipswich).—Full details of the coils were included in the article in question. We are unable to supply any further details in this connection.

S. J. (Merthyr Tydfil).—There is no special code adopted by manufacturers and therefore the makers of your speaker must be consulted. Alternatively, it may be possible to trace out the connections or a good local dealer could do so for you.

J. C. M. (Eltham).—We are considering publication of a set of the type mentioned.

J. B. W. (Rhondda).—One transformer is obviously a push-pull component, for Class B working and this has the two G terminals on each side of the G.B. terminal. The lettering on the other component is not standard and we are thus unable to assist you.

Dr. Stephan had much to say also on some latest developments, such as the new ceramic materials, and the use of silvered mica. Then there was a new condenser trimmer, in which one spiral turned inside another. Actually one rotation made a difference of only one micro-microfarad. On Tuesday, November 1st, the society visits the Surrey Radio Contact Club for a lecture by the secretary of the Radio Society of Great Britain. It takes place at the Alhambra, Wellesley Road, West Croydon.—Hon. Pub. Secretary, E. L. Cumbers, Maycourt, Campden Road, S. Croydon.

WORTHING AND DISTRICT SHORT-WAVE CLUB
A VERY attractive programme has been arranged for the meetings of this club, and the main items are given hereunder.

October 27th—Talk: Operation and Equipment of a Commercial Radio Station, by Mr. Jenkins.
November 10th—Talk on Automatic Telephones.
November 24th—Workshop Tips, by Mr. Ellmore.
December 8th—Power Supplies, by Mr. Boxall.
December 22nd—Fault Finding, by Mr. Bedward (2FMK) and Adapting Old Components, by Mr. Lambourne (2DQ1).

Arrangements are being made for the club to visit a local cinema to look over the talkie apparatus, and it is also hoped to visit the local telephone exchange. The club is holding a listening competition during the fortnight beginning November 5th, and this is open only to club members.
All short-wave enthusiasts are welcome to our meetings, which are held at the Literary Institute Committee Rooms, Montague Street, Worthing, at 7.30 p.m. on the dates given above.—G. Lambourne (2DQ1), Hon. Publicity Secretary, 16, Angola Road, Worthing.

WIRELESS TRANSMISSION FOR AMATEURS

Edited by F. J. GAMM

Explaining how to Learn the Morse Code: Applying for a Licence: Building and Operating the Set. Illustrated by Many Practical Diagrams.

Price 2/6 or 2/9 by post

From George Newnes, Ltd. (Book Dept.), Tower House, Southampton Street, Strand, W.C.2.

WE OFFER YOU A WIDE CHOICE

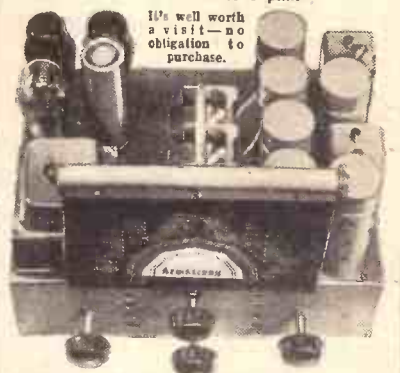


of all that is best in Radio—Chassis, Complete Sets and Radiograms, Components, Speakers, Valves, etc., on the Best and Lowest Easy Terms available. Prompt Delivery and Satisfaction guaranteed. No matter what you need, let us quote and send you Full Specifications, Price Lists and Terms.

LRS
EVERY offer carrying this symbol is:
(1) Fully Guaranteed
(2) Sent Carriage Paid
(3) Available for Immediate Delivery
(4) On the Best and Lowest Terms

HEAR FOR YOURSELF WHAT MODERN RADIO CAN DO.

WE ARE GIVING DAILY DEMONSTRATIONS OF THE NEW **ARMSTRONG CHASSIS** from 10 a.m. to 5 p.m.



LRS New **ARMSTRONG 9-valve ALL-WAVE CHASSIS**
Model AW93PP. Pre-Amplifier and 8 Watts Resistance Capacity Triode Push-pull Output.
CASH PRICE £10.10.0 or 21/- with order and 12 monthly payments of 17/-.
It's well worth a visit—no obligation to purchase.

ARMSTRONG PRESS-BUTTON CHASSIS
LRS Model AW3PB, 7-stage ALL-WAVE Chassis. Manual and Instantaneous Press-Button Tuning. Short waves from 15.9 to 50 m. Complete with 8in. Matched M.C. Speaker.
CASH PRICE £7.18.6 or 12/6 with order and 12 monthly payments of 13/4.

LRS The NEW **COLUMBIA Model 228 ELECTRIC RECORD PLAYER** converts any radio set into a radiogram, and enables you to hear records with a quality that only modern electric reproduction can give. Electric motor—no winding. Hand and auto brake, pick-up, rest, needle container—all self-contained in walnut-finished cabinet.
Cash Price 39/6, or with order, and 10 monthly payments of 5/- by payments of 3/10.

LRS **AVO-MINOR TEST METER**
—the equivalent of 13 testing instruments in one. Measures Current, Voltage and Resistance with ease and accuracy.
CASH PRICE 45/- or 5/- with order and 10 monthly payments of 4/6.

★WE CAN SUPPLY

on the most favourable terms available — all well-known sets, Speakers, Valves, Components, etc., also the famous Scott Taggart S.T.300 Kit (still the best Battery All-wave Kit), and all domestic Electrical Equipment.

MINUTES FROM ST. PAULS

LONDON RADIO SUPPLY COMPANY ESTD 1925
11, OAT LANE, NOBLE ST. LONDON, E.C.2.
Phone: NATIONAL 6828-9

CASH OR C.O.D. ORDERS DELIVERED BY RETURN OF POST

You'll get it QUICKER and on BETTER TERMS from LRS

RADIO CLUBS & SOCIETIES

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

EXETER AND DISTRICT WIRELESS SOCIETY

At the meeting of this society, held on Monday, 10th instant, the society's amplifier was put through its paces. Sets of test records were available, and the amplifier has now only to be subjected to very minor alterations before the members will have a piece of apparatus of which to be very proud.

The programme of fixtures for the next few weeks is as follows: Nov. 14: "Radio and the Moon," an illustrated lecture by D. R. Barber, B.Sc., F.R.A.S., Norman Lockyer Observatory, Sidmouth. Nov. 21: "Questions and Answers," radio problems and solutions arranged by H. A. Bartlett (G5QA). Nov. 28: Details for this meeting will be announced later. Dec. 5: "Electricity in Harness," by W. S. Pyrah. Dec. 12: "From Power Station to Power Point," by F. S. Rumball.

Annual subscription, 5s. (entrance fee, 1s. 6d.). Juniors (under seventeen), 2s. 6d. (entrance fee, 1s.). Meetings are held each Monday, at 8 p.m., at No. 3, Dix's Field, Exeter, and those interested should get in touch with the secretary, W. J. Ching, 9, Sivell Place, Heavitree, Exeter.

THE CROYDON RADIO SOCIETY

THE CROYDON RADIO SOCIETY'S new session made a good start on Tuesday, October 11th, when the president, Mr. H. R. Rivers-Moore, was in the chair. The lecturer was Dr. F. C. Stephan, of the Telegraph Condenser Co., Ltd., and the event took place in St. Peter's Hall, Ledbury Road, S. Croydon. He discussed, firstly, the limits as to how close the plates of a condenser could be together, and after dealing with the uses of impregnated paper came to the modern electrolytic condenser. Dr. Stephan's account of how the oxide film was formed on the aluminium plate was particularly fascinating. It ensured that the current should be uni-directional, and the solution in which electrolysis took place was mostly boric acid. Such a condenser had great uses as a surge limiter, as if a voltage above, say, 500 was subjected, it was made to remain at that value. When the surge had passed the oxide film re-formed and the condenser functioned normally again.



LETTERS FROM READERS

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

Prizewinners' Thanks

SIR,—Many thanks for the "W.B." speaker, which arrived in perfect condition.

May I also take this opportunity of thanking you for your fine journal, which, together with your book, "50 Tested Wireless Circuits," was the direct cause of my winning the speaker?

The fact that I am not yet seventeen years old certainly proves that your articles, etc., are easily understood by even the youngest of your readers.—**WM. A. L. SMITH** (Lee, S.E.12).

SIR,—I received the Stentorian speaker, awarded me in the recent competition, in perfect condition, from the Whiteley Electrical Radio Co., Ltd., and would like to take this opportunity of thanking you for it. This is a very fine instrument, and its performance certainly deserves the claims made for it by the makers.

With best wishes for the continued success of PRACTICAL AND AMATEUR WIRELESS.—**L. J. ROFFEY** (Dalston).

Logged at Wisbech

SIR,—I enclose a list of the best DX stations logged here between October 2nd and 16th, inclusive. All were using 'phone on the 14 mc/s band, and I give the time of reception in G.M.T.

VK3BM (20.35), VK5BW (20.45), VK5SW (07.45), CE3CH (07.45); VU2DR, FS, FU (17.00-18.30); XZ2DY (18.30), VS7GJ (18.10), VQ2HC (17.20), VQ4KTB (17.30), ZE1JA (17.40), ZS1AX (17.50), ZS6AJ (17.15), FB8AB (18.20), F18AC (17.45); KA1BH, FT, 3KK (17.30-18.30); PK2WL (17.45), K6OQE (08.00), U3DS (17.35), TF3C (17.15). Receiver: auto-dyne converter coupled to 3-valve T.R.F. broadcast set (H.F. pen., triode det., O.P. pen.), all reception being on headphones.—**L. SINGLETARY** (Wisbech, Cambs.).

A Universal Superhet!

SIR,—I would like to associate myself with Mr. J. W. Haughton in his request for a receiver with A.C.-D.C. 12-volt valves, to be run from a car battery, and as mentioned by Mr. Haughton, not necessarily for permanent installation in a car. As a matter of fact so far as I am personally concerned the set would have nothing to do with a car as I do not possess one. My idea is to get a good quality set without dry batteries, where no mains supply is available, and I would very much welcome such a set, straight or superhet, to be run from a car battery with real quality output, for I know from experience that 2-volt valves cannot give the quality and efficiency that mains-type can, and I wonder whether there would be enough interest amongst readers for you to publish a design for a set on the lines mentioned. I've been trying to get some real quality without mains for a good while.

Just a year ago "The Experimenters" wrote an article, "Making a 'Quality' Battery Receiver." With their help I constructed a variable- μ H.F. Pentode, as in the "Hall-Mark Four," and it is the best that I have heard with battery valves. The H.T. is supplied by "The Mains-less Unit," as described by "The Experimenters" in P.W. for July 17th, 1937, and modified by Bulgins in P.W. for August 7th, 1937, and run from 6-volt car batteries. I was quite a good age before I became interested in "Wireless," but I now like nothing better, and am prepared to make sacrifices to get good quality. I am very grateful indeed to PRACTICAL AND AMATEUR WIRELESS for many good sets, and many happy hours spent in constructional work.—**T. W. BRETT** (Plymouth).

Correspondent Wanted

SIR,—I am desirous of getting in touch with a reader of PRACTICAL AND AMATEUR WIRELESS who can give me elementary instruction in Arabic, as well as exchange views on radio. In exchange, I will gladly give instructions in French, German, Latin or Esperanto. I really want to learn to be able to read and write Arabic, but not necessarily speak it. I do not mind what nationality the correspondent is, but I should prefer someone who can write English fairly well.—**DONALD ROCK** (G8PR), 4, Linton Road, Old Hill, Staffs.

Station HP5J—Panama

SIR,—In your issue of October 8th there is a paragraph in "Leaves from a Short-wave Log" dealing with stations in the Republic of Panama. I have just received a letter from HP5J giving some interesting information for short-wave listeners.

I quote from a magazine cutting which he enclosed: "A special broadcast to be heard over HP5J early in December at 00.00 G.M.T., will inaugurate a world-wide contest for short-wave listeners in connection with the famous English news broadcast heard nightly at this hour. George Williams, globe trotter, soldier of fortune, and current news commentator for HP5J, will give complete details concerning the contest, which it is reported will include among other prizes a two weeks' vacation in Panama, all expenses paid."

HP5J is to increase its power before December, and Mr. G. Williams expects good reception to be available in this country. The prizes will be awarded by

EVERYMAN'S WIRELESS BOOK

By F. J. CAMM

3/6, or 4/- by post from Geo. Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2

the sponsors of the programme.—**L. COLLIS** (Tadworth, Surrey).

A 10-metres Log

SIR,—I wonder if any other readers took advantage of the fine conditions prevailing on the ten-metre band during the week-end October 15th-16th. My own log shows an addition of 110 stations received for the Saturday evening, and on the Sunday, several at QSA5, R8.

For the interest of fellow readers I append the following details showing how the W districts were getting over:

W1's: twenty-two; W2's: twenty-eight; W3's: fifteen; W4's: ten; W5's: JY, 5ZA, 5QYM, 5GMR; W6's; IMI, 6LIC, 6GHZ; W7FU; W8's; fifteen; W9's: twelve. Also CN8MU, CN8AV, French Morocco, and SP2HH, Poland.

The receiver used was an 0-v-1 resistance-coupled, using 'phones; detector, an Ever-Ready K30. A twenty-foot indoor aerial was used.—**F. L. ROBINSON** (Swindon).

The "One-Valver for America"

SIR,—I suddenly developed an interest in wireless, and started by building a crystal set; this worked, but was definitely not interesting enough.

I therefore built the "one-valver for America." All the parts, except the pre-set condenser and the valve, were second-hand, and the tuning condenser and coil were home-constructed. The aerial was a home-made frame aerial, and the earth was a bath tap.

I have obtained 110 "G" stations and a few Irish, French and Belgian amateurs. Also, EAQ (Madrid, 30.43 m.), DJA (Berlin), HBJ (Geneva, verified), TPA3 (Paris), 2RO (Rome, Italy), RKL and RAN (Radio Centre, Moscow, verified), and HBQ (Geneva). HBJ's veri is a photo of the station with particulars as to schedule, etc. RKI and RAN's veri is a photo of some Russian children, and on the back a short letter. Also enclosed were particulars as to schedule, etc.—**MICHAEL PARKY** (Apperley Bridge, nr. Bradford).

CUT THIS OUT EACH WEEK.

Do you know

—THAT the top cap of a valve is not always the anode, but in many cases is the grid.

—THAT when two or more transformers are employed they should be oriented so that the fields do not interact.

—THAT the same remarks apply when an iron-core choke is mounted near an L.F. or mains transformer.

—THAT a totally enclosed chassis will prevent selectivity troubles in close proximity to a powerful station, due to pick-up on the set wiring.

—THAT special calibrated volume controls are available for use in test apparatus.

—THAT one type of instrument of this kind has a dial marked in decibels.

The Editor will be pleased to consider articles of a practical nature suitable for publication in PRACTICAL AND AMATEUR WIRELESS. Such articles should be written on one side of the paper only, and should contain the name and address of the sender. Whilst the Editor does not hold himself responsible for manuscripts, every effort will be made to return them if a stamped and addressed envelope is enclosed. All correspondence intended for the Editor should be addressed: The Editor, PRACTICAL AND AMATEUR WIRELESS, George Newnes, Ltd., Tower House, Southampton Street, Strand, W.C.2.

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

Copyright in all drawings, photographs and articles published in PRACTICAL AND AMATEUR WIRELESS is specifically reserved throughout the countries signatory to the Bern Convention and the U.S.A. Reproductions or imitations of any of these are therefore expressly forbidden.

Practical and Amateur Wireless BLUEPRINT SERVICE

PRACTICAL WIRELESS
Date of Issue No. of Blueprint

CRYSTAL SETS.
Blueprints, 6d. each.
1937 Crystal Receiver .. 9.1.37 PW71
The "Junior" Crystal Set .. 27.8.38 PW94

STRAIGHT SETS. Battery Operated.
One-valve : Blueprints, 1s. each.
All-wave Unipen (Pentode) .. PW31A
Beginner's One-valver .. 19.2.38 PW85
The "Pyramid" One-valver (HF Pen) .. 27.8.38 PW93

Two-valve : Blueprints, 1s. each.
Four-range Super Mag Two (D, Pen) The Siguet Two (D & LF) .. 24.9.38 PW76

Three-valve : Blueprints, 1s. each.
The Long-range Express Three (SG, D, Pen) .. 24.1.37 PW2
Selectone Battery Three (D, 2 LF (Trans)) .. PW10

Sixty Shilling Three (D, 2 LF (RC & Trans)) .. PW34A
Leader Three (SG, D, Pow) .. 22.5.37 PW35
Summit Three (HF Pen, D, Pen) .. PW37

All Pentode Three (HF Pen, D (Pen) Pen) .. 20.5.37 PW30
Hall-Mark Three (SG, D, Pow) .. 12.6.37 PW41
Hall-Mark Cadet (D, LF, Pen (RC)) .. 10.3.35 PW48

F. J. Camm's Silver Souvenir (HF Pen, D (Pen), Pen) (All-wave Three) .. 13.4.35 PW49
Genet Midget (D, 2LF (Trans)) .. June '35 PM1
Cameo Midget Three (D, 2 LF (Trans)) .. 8.6.35 PW51

1936 Sonotone Three-Four (HF Pen, HF Pen, Westector, Pen) Battery All-Wave Three (D, 2 LF (RC)) .. PW53
The Monitor (HF Pen, D, Pen) .. PW55
The Tutor Three (HF Pen, D, Pen) .. 21.3.36 PW62
The Centaur Three (SG, D, P) .. 14.8.37 PW64

F. J. Camm's Record All-Wave Three (HF Pen, D, Pen) .. 31.10.30 PW69
The "Colt" All-Wave Three (D, 2 LF (RC & Trans)) .. 5.12.36 PW72
The "Rapido" Straight 3 (D, 2 LF (RC & Trans)) .. 4.12.37 PW82

F. J. Camm's Oracle All-Wave Three (HF, Det, Pen) .. 28.8.37 PW78
1938 "Triband" All-wave Three (HF Pen, D, Pen) .. 22.1.38 PW84
F. J. Camm's "Sprite" Three (HF Pen, D, Tet) .. 26.3.38 PW87

The "Hurricane" All-Wave Three (SG, D (Pen), Pen) .. 30.4.38 PW89
F. J. Camm's "Push-Button" Three (HF Pen, D, Pen, Tot) .. 3.9.38 PW92

Four-valve : Blueprints, 1s. each.
Sonotone Four (SG, D, LF, P) .. 1.5.37 PW4
Fury Four (2 SG, D, Pen) .. 8.5.37 PW11
Beta Universal Four (SG, D, LF, Cl. B) .. PW17

Nucleon Class B Four (SG, D, (SG), LF, Cl. B) .. 0.1.34 PW34B
Fury Four Super (SG, SG, D, Pen) Battery Hall-Mark 4 (HF Pen, D, Push-Pull) .. PW40
F. J. Camm's "Limit" All-Wave Four (HF Pen, D, LF, P) .. 20.0.36 PW67

All-Wave "Corona" 4 (HF Pen, D, LF, Pow) .. 9.10.37 PW79
"Aene" All-Wave 4 (HF Pen, D (Pen), LF, Cl. B) .. 12.2.39 PW83
The "Admiral" Four (HF Pen, HF Pen, D, Pen (RC)) .. 3.9.38 PW90

Mains Operated
Two-valve : Blueprints, 1s. each.
A.C. Twin (D (Pen), Pen) .. PW18
A.C. D.C. Two (SG, Pow) .. PW31
Selectone A.C. Radiogram Two (D, Pow) .. PW19

Three-valve : Blueprints, 1s. each.
Double-Diode-Triode Three (HF Pen, DDT, Pen) .. PW23
D.C. Ace (SG, D, Pen) .. PW25
A.C. Three (SG, D, Pen) .. PW29
A.C. Leader (HF Pen, D, Pow) .. PW35C
D.C. Premier (HF Pen, D, Pen) .. 31.3.34 PW35B
Ubique (HF Pen, D (Pen), Pen) .. 28.7.34 PW36A
Armada Mains Three (HF Pen, D, Pen) .. PW38

F. J. Camm's A.C. All-Wave Silver Souvenir Three (HF Pen, D, Pen) "All-Wave" A.C. Three (D, 2 LF (RC)) .. PW54
A.C. 1936 Sonotone (HF Pen, HF Pen, Westector, Pen) .. PW56
Mains Record All-Wave 3 (HF Pen, D, Pen) .. 5.12.30 PW70
All-World Ace (HF Pen, D, Pen) .. 29.8.37 PW80

Four-valve : Blueprints, 1s. each.
A.C. Fury Four (SG, SG, D, Pen) A.C. Fury Four Super (SG, SG, D, Pen) .. PW34D
A.C. Hall-Mark (HF Pen, D, Push-Pull) .. 24.7.37 PW45
Universal Hall-Mark (HF Pen, D, Push-Pull) .. 9.2.35 PW47
A.C. All-Wave Corona Four .. 6.11.37 PW81

AMATEUR WIRELESS AND WIRELESS MAGAZINE
CRYSTAL SETS.
Blueprints, 6d. each.
Four-station Crystal Set .. 23.7.38 AW427
1934 Crystal Set .. AW444
150-mile Crystal Set .. AW450

STRAIGHT SETS. Battery Operated.
One-valve : Blueprints, 1s. each.
B.B.C. Special One-valver .. AW387
Twenty-station Loudspeaker One-valver (Class B) .. AW449
Two-valve : Blueprints, 1s. each.
Melody Ranger Two (D, Trans) .. AW388
Full-volume Two (SG, Det, Pen) .. AW392
Lucerne Minor (D, Pen) .. AW426
A Modern Two-valver .. WM409

Three-valve : Blueprints, 1s. each.
Class B Three (D, Trans, Class B) .. AW386
New Britain's Favourite Three (D, Trans, Class B) .. 15.7.33 AW394
Home-built Coil Three (SG, D, Trans) .. AW404
Fan and Family Three (D, Trans, Class B) .. 25.11.33 AW410
£5 5s. S.G.3 (SG, D, Trans) .. 2.12.33 AW412
Lucerne Ranger (SG, D, Trans) .. AW422
£5 5s. Three : De Luxe Version (SG, D, Trans) .. 19.5.34 AW435
Lucerne Straight Three (D, RC, Trans) .. AW437
"Wireless League" Three (HF Pen, D, Pen) .. 3.11.34 AW451
Transportable Three (SG, D, Pen) .. WM271
Simple-tune Three (SG, D, Pen) .. June '33 WM327
Economy-Pentode Three (SG, D, Pen) .. Oct. '33 WM337
"W.M." 1934 Standard Three (SG, D, Pen) .. WM351
£3 3s. Three (SG, D, Trans) .. Mar. '34 WM354
1935 £0 6s. Battery Three (SG, D, Pen) .. WM371
PTP Three (Pen, D, Pen) .. WM389
Certainty Three (SG, D, Pen) .. WM393
Minutube Three (SG, D, Trans) .. Oct. '35 WM396
All-Wave Winning Three (SG, D, Pen) .. WM400

Four-valve : Blueprints, 1s. 6d. each.
65s. Four (SG, D, RC, Trans) .. AW370
"A.W." Ideal Four (2 SG, D, Pen) .. 16.9.33 AW402
2HF Four (2 SG, D, Pen) .. AW421
Crusader's A.V.C.4 (2 HF, D, QP21) (Pentode and Class B Outputs for above : Blueprints 6d. each) .. 18.8.34 AW445
Self-contained Four (SG, D, LF, Class B) .. Aug. '33 WM331
Lucerne Straight Four (SG, D, LF, Trans) .. WM350
£5 5s. Battery Four (HF, D, 2LF) The H.K. Four (SG, SG, D, Pen) .. Feb. '35 WM381
The Auto Straight Four (HF Pen, HF Pen, DDT, Pen) .. Apr. '36 WM404

Five-valve : Blueprints, 1s. 6d. each.
Super-quality Five (2 HF, D, RC, Trans) .. WM320
Class B Quadradyne (2 SG, D, LF, Class B) .. WM344
New Class B Five (2 SG, D, LF, Class B) .. WM340

PORTABLES.
Three-valve : Blueprints, 1s. each.
F. J. Camm's E.L.E. Three-valve Portable (HF Pen, D, Pen) .. PW65
Parvo Flyweight Midget Portable (SG, D, Pen) .. 10.6.37 PW77
Four-valve : Blueprint, 1s.
"Imp" Portable 4 (D, LF, LF, Pen) .. 19.3.38 PW86

MISCELLANEOUS.
S.W. Converter-Adapter (1 valve) .. PW48A

AMATEUR WIRELESS AND WIRELESS MAGAZINE
CRYSTAL SETS.
Blueprints, 6d. each.
Four-station Crystal Set .. 23.7.38 AW427
1934 Crystal Set .. AW444
150-mile Crystal Set .. AW450

STRAIGHT SETS. Battery Operated.
One-valve : Blueprints, 1s. each.
B.B.C. Special One-valver .. AW387
Twenty-station Loudspeaker One-valver (Class B) .. AW449
Two-valve : Blueprints, 1s. each.
Melody Ranger Two (D, Trans) .. AW388
Full-volume Two (SG, Det, Pen) .. AW392
Lucerne Minor (D, Pen) .. AW426
A Modern Two-valver .. WM409

Three-valve : Blueprints, 1s. each.
Class B Three (D, Trans, Class B) .. AW386
New Britain's Favourite Three (D, Trans, Class B) .. 15.7.33 AW394
Home-built Coil Three (SG, D, Trans) .. AW404
Fan and Family Three (D, Trans, Class B) .. 25.11.33 AW410
£5 5s. S.G.3 (SG, D, Trans) .. 2.12.33 AW412
Lucerne Ranger (SG, D, Trans) .. AW422
£5 5s. Three : De Luxe Version (SG, D, Trans) .. 19.5.34 AW435
Lucerne Straight Three (D, RC, Trans) .. AW437
"Wireless League" Three (HF Pen, D, Pen) .. 3.11.34 AW451
Transportable Three (SG, D, Pen) .. WM271
Simple-tune Three (SG, D, Pen) .. June '33 WM327
Economy-Pentode Three (SG, D, Pen) .. Oct. '33 WM337
"W.M." 1934 Standard Three (SG, D, Pen) .. WM351
£3 3s. Three (SG, D, Trans) .. Mar. '34 WM354
1935 £0 6s. Battery Three (SG, D, Pen) .. WM371
PTP Three (Pen, D, Pen) .. WM389
Certainty Three (SG, D, Pen) .. WM393
Minutube Three (SG, D, Trans) .. Oct. '35 WM396
All-Wave Winning Three (SG, D, Pen) .. WM400

Four-valve : Blueprints, 1s. 6d. each.
65s. Four (SG, D, RC, Trans) .. AW370
"A.W." Ideal Four (2 SG, D, Pen) .. 16.9.33 AW402
2HF Four (2 SG, D, Pen) .. AW421
Crusader's A.V.C.4 (2 HF, D, QP21) (Pentode and Class B Outputs for above : Blueprints 6d. each) .. 18.8.34 AW445
Self-contained Four (SG, D, LF, Class B) .. Aug. '33 WM331
Lucerne Straight Four (SG, D, LF, Trans) .. WM350
£5 5s. Battery Four (HF, D, 2LF) The H.K. Four (SG, SG, D, Pen) .. Feb. '35 WM381
The Auto Straight Four (HF Pen, HF Pen, DDT, Pen) .. Apr. '36 WM404

Five-valve : Blueprints, 1s. 6d. each.
Super-quality Five (2 HF, D, RC, Trans) .. WM320
Class B Quadradyne (2 SG, D, LF, Class B) .. WM344
New Class B Five (2 SG, D, LF, Class B) .. WM340

PORTABLES.
Three-valve : Blueprints, 1s. each.
F. J. Camm's E.L.E. Three-valve Portable (HF Pen, D, Pen) .. PW65
Parvo Flyweight Midget Portable (SG, D, Pen) .. 10.6.37 PW77
Four-valve : Blueprint, 1s.
"Imp" Portable 4 (D, LF, LF, Pen) .. 19.3.38 PW86

MISCELLANEOUS.
S.W. Converter-Adapter (1 valve) .. PW48A

AMATEUR WIRELESS AND WIRELESS MAGAZINE
CRYSTAL SETS.
Blueprints, 6d. each.
Four-station Crystal Set .. 23.7.38 AW427
1934 Crystal Set .. AW444
150-mile Crystal Set .. AW450

STRAIGHT SETS. Battery Operated.
One-valve : Blueprints, 1s. each.
B.B.C. Special One-valver .. AW387
Twenty-station Loudspeaker One-valver (Class B) .. AW449
Two-valve : Blueprints, 1s. each.
Melody Ranger Two (D, Trans) .. AW388
Full-volume Two (SG, Det, Pen) .. AW392
Lucerne Minor (D, Pen) .. AW426
A Modern Two-valver .. WM409

Three-valve : Blueprints, 1s. each.
Class B Three (D, Trans, Class B) .. AW386
New Britain's Favourite Three (D, Trans, Class B) .. 15.7.33 AW394
Home-built Coil Three (SG, D, Trans) .. AW404
Fan and Family Three (D, Trans, Class B) .. 25.11.33 AW410
£5 5s. S.G.3 (SG, D, Trans) .. 2.12.33 AW412
Lucerne Ranger (SG, D, Trans) .. AW422
£5 5s. Three : De Luxe Version (SG, D, Trans) .. 19.5.34 AW435
Lucerne Straight Three (D, RC, Trans) .. AW437
"Wireless League" Three (HF Pen, D, Pen) .. 3.11.34 AW451
Transportable Three (SG, D, Pen) .. WM271
Simple-tune Three (SG, D, Pen) .. June '33 WM327
Economy-Pentode Three (SG, D, Pen) .. Oct. '33 WM337
"W.M." 1934 Standard Three (SG, D, Pen) .. WM351
£3 3s. Three (SG, D, Trans) .. Mar. '34 WM354
1935 £0 6s. Battery Three (SG, D, Pen) .. WM371
PTP Three (Pen, D, Pen) .. WM389
Certainty Three (SG, D, Pen) .. WM393
Minutube Three (SG, D, Trans) .. Oct. '35 WM396
All-Wave Winning Three (SG, D, Pen) .. WM400

Four-valve : Blueprints, 1s. 6d. each.
65s. Four (SG, D, RC, Trans) .. AW370
"A.W." Ideal Four (2 SG, D, Pen) .. 16.9.33 AW402
2HF Four (2 SG, D, Pen) .. AW421
Crusader's A.V.C.4 (2 HF, D, QP21) (Pentode and Class B Outputs for above : Blueprints 6d. each) .. 18.8.34 AW445
Self-contained Four (SG, D, LF, Class B) .. Aug. '33 WM331
Lucerne Straight Four (SG, D, LF, Trans) .. WM350
£5 5s. Battery Four (HF, D, 2LF) The H.K. Four (SG, SG, D, Pen) .. Feb. '35 WM381
The Auto Straight Four (HF Pen, HF Pen, DDT, Pen) .. Apr. '36 WM404

Five-valve : Blueprints, 1s. 6d. each.
Super-quality Five (2 HF, D, RC, Trans) .. WM320
Class B Quadradyne (2 SG, D, LF, Class B) .. WM344
New Class B Five (2 SG, D, LF, Class B) .. WM340

These Blueprints are drawn full size.
Copies of appropriate issues containing descriptions of these sets can in some cases be supplied at the following prices, which are additional to the cost of the Blueprint. A dash before the Blueprint Number indicates that the issue is out of print.

Issues of Practical Wireless .. 4d. Post Paid.
Amateur Wireless .. 4d. ..
Practical Mechanics .. 7d. ..
Wireless Magazine .. 13 ..

The index letters which precede the Blueprint Number indicate the periodical in which the description appears: Thus P.W. refers to PRACTICAL WIRELESS, A.W. to Amateur Wireless, P.M. to Practical Mechanics, W.M. to Wireless Magazine.

Send (preferably) a postal order to cover the cost of the blueprint and the issue (stamps over 6d. unacceptable) to PRACTICAL AND AMATEUR WIRELESS Blueprint Dept., George Newnes, Ltd., Tower House, Southampton Street, Strand, W.C.2.

Mains Operated.
Two-valve : Blueprints, 1s. each.
Consoclectric Two (D, Pen) A.C. .. AW403
Economy A.C. Two (D, Trans) A.C. .. WM286
Unicou A.C. D.C. Two (D, Pen) .. WM394

Three-valve : Blueprints, 1s. each.
Home Lover's New All-electric Three (SG, D, Trans) A.C. .. AW383
S.G. Three (SG, D, Pen) A.C. .. AW390
A.C. Pentaquester (HF Pen, D, Pen) .. 23.6.34 AW439
Mantovani A.C. Three (HF Pen, D, Pen) .. WM374
£15 15s. 1936 A.C. Radiogram (HF, D, Pen) .. Jan. '36 WM401

Four-valve : Blueprints, 1s. 6d. each.
All Metal Four (2 SG, D, Pen) .. July '33 WM326
Harris' Jubilee Radiogram (HF Pen, D, LF, P) .. May '35 WM386

SUPERHETS.
Battery Sets : Blueprints, 1s. 6d. each.
Modern Super Senior .. WM375
Varsity Four .. Oct. '35 WM395
The Request All-Waver .. June '36 WM407
1935 Super Five Battery (Superhet) .. WM379

Mains Sets : Blueprints, 1s. 6d. each.
Heptode Super Three A.C. .. May '34 WM359
"W.M." Radiogram Super A.C. .. WM366

PORTABLES.
Four-valve : Blueprints, 1s. 6d. each.
Midget Class B Portable (SG, D, LF, Class B) .. 20.5.33 AW389
Holiday Portable (SG, D, LF, Class B) .. AW393
Family Portable (HF, D, RC, Trans) .. 22.9.34 AW447
Two H.F. Portable (2 SG, D, QP21) .. WM363
Tyers Portable (SG, D, 2 Trans) .. WM367

SHORT-WAVE SETS—Battery Operated.
One-valve : Blueprints, 1s. each.
S.W. One-valve converter (Price 6d.) .. AW329
S.W. One-valver for America .. 15.10.39 AW429
Rome Short-waver .. AW452

Two-valve : Blueprints, 1s. each.
Ultra-short Battery Two (SG det., Pen) .. Feb. '36 WM402
Home-made Coil Two (D, Pen) .. AW440

Three-valve : Blueprints, 1s. each.
World-ranger Short-wave 3 (D, RC, Trans) .. AW355
Experimenter's 5-metre Set (D, Trans, Super-regen) .. 30.6.34 AW438
Experimenter's Short-waver (SG, D, Pen) .. Jan. 19, 35 AW463
The Carrier Short-waver (SG, D, P) .. July '35 WM390

Four-valve : Blueprints, 1s. 6d. each.
A.W. Short-wave World-Beater (HF Pen, D, RC, Trans) .. AW436
Empire Short-waver (SG, D, RC, Trans) .. WM313
Standard Four-valver Short-waver (SG, D, LF, P) .. Mar. '35 WM383
Superhet : Blueprint, 1s. 6d.
Simplified Short-waver Super .. Nov. '35 WM397

Mains Operated.
Two-valve : Blueprints, 1s. each.
Two-valve Mains Short-waver (D, Pen) A.C. .. AW453
"W.M." Band-spread Short-waver (D, Pen) A.C.-D.C. .. WM368
"W.M." Long-wave Converter .. WM389
Three-valve : Blueprint, 1s.
Enigrator (SG, D, Pen) A.G. .. WM352
Four-valve : Blueprint, 1s. 6d.
Standard Four-valve, A.C. Short-waver (SG, D, RC, Trans) .. Aug. '35 WM391

MISCELLANEOUS.
Enthusiast's Power Amplifier (1/6) .. WM387
Listeners' 5-watt A.C. Amplifier (1/6) .. WM392
Radio Unit (2v.) for WM392 .. Nov. '35 WM398
Harris Electrogram (battery amplifier) (1/-) .. WM300
De-Luxe Concert A.C. Electrogram .. Mar. '36 WM403
New Style Short-wave Adapter (1/-) .. WM388
Trickle Charger (6d.) .. Jan. 5, '35 AW462
Short-wave Adapter (1/-) .. AW456
Superhet Converter (1/-) .. AW457
B.L.D.L.C. Short-wave Converter (1/-) .. May '36 WM405
Wilson Tone Master (1/-) .. June '36 WM406
The W.M. A.C. Short-wave Converter (1/-) .. WM408



QUERIES and ENQUIRIES

S.W. Coils

"I recently obtained some parts for a 1-valve short-wave set and the coils which were supplied are made, I understand, for .0005 mfd. and .00016 mfd. condensers. Could you tell me if my coil is made for .00016 mfd. condenser? It has 8 turns of enamelled wire, and 2 turns of what looks like silver wire. It has stamped on the top rim "15" and "43."—J. F. (Wavertree).

THE coil in question is evidently intended for use with a standard short-wave tuning condenser having a maximum capacity of .00016 mfd. The numbers 15 and 43 indicate that the wave-range of the coil with the condenser in question is from 15 to 43 metres.

Coils for S.W. Receiver

"I am contemplating building an S.W. T.R.F. receiver and would be glad if you would tell me what type of coil, plug-in, or otherwise, to use. I intend using ganged .00016 mfd. tuning condensers."—G. N. (Cambridge).

FOR short-wave receivers of the type mentioned you cannot do better than use the standard 6-pin plug-in coils. These offer greater facilities than multi-range or 4-pin coils, and various circuits may be made up with the three coil windings which are provided.

Accumulator Rating

"I have recently purchased a new 2-volt accumulator, 20 Actual. Assuming this is properly charged, will you kindly answer the following query? My portable set has three valves, two using .1 amp. each and one .2 amp., making, I believe .4 amps. altogether. Using this set, say, three hours a day, how many hours should the accumulator last before it will want re-charging?"—W. C. (Ilford).

NORMALLY all that is necessary is to divide the ampere-hour capacity of the accumulator by the consumption of the valves, and this will give you the number of hours for which the battery may be used. The actual rate is less than the intermittent rate, and it is usual to consider the latter figure, or one between the two rates, in order to find the rating of the battery used with a wireless set. The

total current of your set is .4 amps., and the rating of the cell may be taken as, say, 30 ampere-hours. Therefore, you could obtain just over 70 hours' use before the cell would need re-charging. At three hours a day this gives you about 23 days' use. It is worth while, however, obtaining a good voltmeter, hydrometer or other cell tester so that a check may be kept on the condition of the battery.

Small Soldering Iron

"While I was at Radiolympia I noticed a soldering iron which I now desire to purchase, but I do not know who the makers are. The iron was not an exhibit, but was being used on a stand demonstrating

RULES

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

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

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

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

Send your queries to the Editor, PRACTICAL AND AMATEUR WIRELESS, George Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.E. The Coupon must be enclosed with every query.

the manufacture of meters. The instrument had a removable bit consisting of a piece of metal about $\frac{1}{16}$ in. in diameter and 6 ins. long. The heating element was placed almost at right-angles to the handle. I have been trying to trace the makers since the show so if you could trace them it would help me considerably."—K. C. K. (Bromley).

WE think from your description that the iron referred to is the Solon Pencil-bit soldering iron. This is obtainable, we understand, with a movable head so that it may be used at right-angles when desired, and the small pencil bit is replaceable.

The makers are Henley's Telegraph Works Co., Ltd., Holborn Viaduct, London, E.C.1.

Earth Return Lead

"I have noticed in some receivers that braid or stranded material similar to it is used in some parts for wiring and should be glad to know why this is, and what advantages, if any, it possesses."—H. Y. R. (Margate).

FOR earth return leads in the H.F. circuits a low-resistance connection is highly desirable and it is quite a common practice to use the screened sleeving used for normal screening purposes. This is flattened or stretched from one point to another and well tinned and soldered. From an H.F. point of view this has a much lower resistance than a solid wire of equivalent size.

Combined H.T. and G.B. Battery

"I am the possessor of a battery set in which the makers advise the use of a 130 volt H.T. battery with grid bias combined. As these batteries are rather expensive I was wondering if I could use a 120-volt H.T. with a separate grid bias which should be 10½ volts, and if it will make any difference in the performance of the set. Will you let me know how to do this?"—F. R. F. (Edmonton).

IN the type of battery referred to a single lead is provided at H.T. negative and this point in the battery is combined with the G.B. positive point. Thus, to use two separate batteries you will have to attach a short length of flex to your present H.T. negative plug and fit another plug to the additional lead for insertion in the G.B. positive socket. This will make no difference to the performance of the set.

Using Speaker with Class "B"

"I am making your Acme 4 receiver, but the speaker sent to me is fitted with a Universal (not Class "B") transformer, but only power and pentode stages. Is it possible to fix another transformer to the speaker? If so, please give me approximate price and details."—A. L. H. (Snelston).

WE do not recommend the inclusion of a further transformer between your speaker and the set. It would be better to disconnect the existing transformer on the speaker and to obtain a Class "B" output transformer having a low-impedance output which could be connected direct to the speech coil. A suitable matching transformer may be obtained from various firms who advertise in these pages.

The coupon on page 174 must be attached to every query.

Full of Interest

Illustrated constructional articles for building simple S. W. Receivers • low and medium power Transmitters • Amateur Communication Receiver Pre-selector • Cathode-Ray Oscilloscope etc. From your Radio Dealer; W. H. Smith & Sons, or in difficulty send 1/2 to Stratton & Co. Ltd., Eddystone Works, Bromsgrove St., Birmingham London Service Webb's Radio, 14, Soho St., W.1

EDDYSTONE Short Wave MANUAL

ENGINEERING OPPORTUNITIES

Free!

268 PAGES

This unique Handbook shows the easy way to secure A.M.I.C.E., A.M.I.Mech.E., A.M.I.E.E., A.M.I.A.E., A.M.I.W.T., A.M.I.R.E.E., and similar qualifications. WE GUARANTEE—"NO PASS-NO FEE." Details are given of over 150 Diploma Courses in all branches of Civil, Mech., Elec., Motor, Aero, Radio and Television Engineering, Building, Government Employment, etc. Write for this enlightening Handbook to-day FREE and post free.

British Institute of Engineering Technology,
409, Shakespeare House, 17, 18, 19, Stratford Pl., W.1

Miscellaneous Advertisements

Advertisements are accepted for these columns at the rate of 3d. per word. Words in black face and/or capitals are charged double this rate (minimum charge 3/- per paragraph). Display lines are charged at 6/- per line. All advertisements must be prepaid. All communications should be addressed to the Advertisement Manager, "Practical and Amateur Wireless," Tower House, Southampton Street, Strand, London, W.C.2.

RECEIVERS, COMPONENTS AND ACCESSORIES
Surplus, Clearance or Secondhand, etc.

RADIOMART
THE SHORT-WAVE SPECIALISTS

CHOKES.—Interleaved "American Smoothing" Chokes, 20 h. 100 m/a; with 5/8. Our price 3/11. Ditto: 40 m/a; our price 1/11.
MICROVARIABLES.—All brass construction, latest ceramic insulation. The finest condensers made; 15 mmfd, 1/4; 40 mmfd., 1/7; 100 mmfd., 1/10. Transmitting Type.—070in. spacing, 15 mmfd. (neutralising), 2/9; 40 mmfd. Tuning, 3/6. These are quality.
PUSHBACK Wire, 6yds., 6d., heavy, 9d. Resin-cored Solder, 6l., 6d. Screened Flex, single, 6d. yd.; twin, 9d. yd. Assorted Solder Tags 6d. packet. Handtimers, 6d. each.
W.B. 8in. Permanent Magnet Speakers at one-third Cost. Extension Type (no Transformer), 7/6. Standard Type (with Transformers), 12/8.
SPEAKERS.—We carry large stocks. Magnavox, 10in. energised 1,000 or 2,500 ohms, 19/6. Jensen, 8in. 2,500 ohms with transformer, 7/6; energised 8in., 1,200 ohms with transformer, 6/11.
UTILITY 7/6 Famous Micro Dials, 3/8; Radiophone 00016 Short-wave Condensers, 3/6. Short-wave HF Chokes, 5-100 ohms, 9d. Centralab Pots, all sizes, 1/6; switched, 2/-; 20,000 ohms Pots, 1/-; Tubular Glass Fuses, 2d. Milliammeters 25 m.a. upwards, 6/8; super, 6/8.
THE NEW RAYMART CATALOGUE shows dozens of New Short-Wave Components and is yours for 14d. post free.

A splendid range of short-wave components is always ready for immediate despatch. The right goods at the right prices.

RADIOMART
44, HOLLOWAY HEAD, BIRMINGHAM, 1

CONVERSION UNIT for operating D.C. Receivers from A.C. Mains, improved type, 120 watt output at £2/10/0. Send for our comprehensive list of speakers, resistances and other components.

WARD, 46, Farringdon Street, London, E.C.4.
Telephone: Holborn 9703.

ALL goods previously advertised are standard lines, still available. Post card for list free.
VAUXHALL UTILITIES, 163a, Strand, W.C.2.
Over Denny's the Booksellers. (Temple Bar 9338.)

ALL lines previously advertised still available.—
Radio Clearance, Ltd., 63, High Holborn, W.C.1.
Holtorn 4631.

SOUTHERN RADIO'S Wireless Bargains, guaranteed and post paid; Garrard radiogram units, 42/-; Telsen Midget iron-core coils, W349, 3/6; dual range coils, 2/6; with aerial series condenser W76, 3/3; triple-gang superhet W476, 14/6; triple bandpass W477, 14/6; twin-gang W478, 9/-; Telsen A.C./D.C. multimeters, 5-range, 8/6; Sunbeam 4-valve A.C./D.C. superhet receiver, complete with valves and moving-coil speaker, 50/-; Brand new sealed cartons. American type valves, 6/-; parcels of useful components assorted, value 21/-, 5/- per parcel; thousands of more bargains.—Southern Radio, 46, Lisle St., London, W.C.1. Garrard 6653.

BANKRUPT BARGAINS.—List free. State set B requirements. All new goods. Portadyne 1938 all-wave 5v. superhets, A.C. and A.C./D.C., £5 10s. Spencer 4v. A.C./D.C. superhet transportables, 77s. 6d. Ferguson chassis, complete 5v. all-wave A.C./D.C. superhets, 75s. Traphonic 1938, 112s. A.C. and A.C./D.C. superhets, all-wave, £6 17s. 6d. Many others. Complete stock all types of valves.—Butlin, 6, Stanford Avenue, Brighton.

LOUDSPEAKER REPAIRS

LOUDSPEAKER repairs, British, American, any make, 24-hour service, moderate prices.—Sinclair Speakers, Alma Grove, Copenhagen Street, London, N.1.

REPAIRS in Moving Coil Speakers, Cones and Coils fitted and Rewound. Fields altered. Prices Quoted including Eliminators. Loudspeakers repaired 4/-; L.F. and Speech Transformers, 4/-, post free. Trade invited. Guaranteed. Satisfaction. Prompt Service, Estimates Free.—L.S. Repair Service, 5, Batham Grove, London S.W.12. Battersea 1321

PREMIER

1938 RADIO 1939

PREMIER SHORT-WAVE KITS

are all sold complete to the last detail. All valves and coils are included as well as theoretical and wiring diagrams, and lucid instructions for building and working. Thousands are giving excellent results all over the world. Each Kit uses plug-in Coils and the Coils supplied tune from 13 to 170 metres. All Kits are supplied with a steel chassis and Panel.

- 1 Valve Short-Wave Receiver or Adaptor Kit 17/6
- 1 Valve Short-Wave Superhet Converter Kit 20/-
- 1 Valve Short-Wave A.C. Superhet Converter Kit 22/6
- 2 Valve Short-Wave Receiver Kit 25/-
- 3 Valve Short-Wave Screen Grid and Pentode Kit 55/6

Premier Battery Chargers. Westinghouse Rectification. Complete Ready for use.

To charge 2 volts at 1 amp., 10/-; 6 volts at 1 amp., 16/6; 6 volts at 1 amp., 19/6; 12 volts at 1 amp., 21/-; 6 volts at 2 amps., 32/6.

MOVING IRON METERS.—Any range between 70 and 500 m/a. Also 1, 3 or 5 amps. Read A.C. or D.C. Flush Bakelite case, 2 1/2 in. diam. B.E.S.A. standard specification 89. 5/9 each.

UTILITY Micro Cursor Dials, Direct and 100-1 Ratios, 3/9.

PREMIER Short-Wave Condensers, all-brass construction, with Trolitul insulation, 15 mmfd., 1/6; 25 mmfd., 1/7; 40 mmfd., 1/9; 100 mmfd., 2/-; 160 mmfd., 2/3; 250 mmfd., 2/6.

SHORT-WAVE COILS, 4- and 6-pin types, 13-26, 22-47, 41-94, 78-170 metres, 1/9 each, with circuit. Special set of S.W. Coils, 14-150 metres, 4/- set, with circuit. Premier 3-band S.W. coil, 11-25, 19-43, 38-86 metres. Suitable any type circuit, 2/6.

PREMIER S.W. H.F. Chokes, 10-100 metres, 8d. each. Pie-wound, 1/6 each. Screened, 1/6 each.

MOVING COIL SPEAKERS.—Magnavox 8in. T.M. Speaker, with Transformer, 10/6. Rola 8" P.M., 15/-, 10" P.M., 19/11.

All Valves previously advertised still available. Have you had our 1938 Catalogue, Handbook and Valve Manual? 60 pages of Radio Bargains and Interesting Data. Price 6d.

ALL POST ORDERS TO: Jubilee Works, 167, Lower Clapton Road, London, E.5. Amherst 4728.
CALLERS TO: Jubilee Works, or 165, Fleet Street, E.C.4. Central 2833, or 50, High Street, Clapham, S.W.4. Macaulay 2381.

NEW RECEIVERS AND CHASSIS

ALL ARMSTRONG Radio chassis, including Press Button models, exhibited at Radiolympia can be seen and heard at our Showrooms. Demonstrations daily. Armstrong chassis are sent on 7 days' approval, carriage and packing free. Armstrong Company have fully illustrated technical catalogue describing all models.—Armstrong Company, 100, St. Pancras Way (formerly Kings Road), Camden Town, London, N.W.1. Gulliver 3105.

VALVES

AMERICAN Valves in Sealed Cartons, all types, 5/6, post paid.—Valves, 661/3, Harrow Road, N.W.10.

CABINETS

MANUFACTURERS' surplus cabinets for Radiograms, Radio sets and Loudspeakers. Large and varied stock. Inspection invited, or send particulars of your requirements, with measurements of chassis. Photos sent for selection. (No catalogue.)—H. L. Smith & Co., Ltd., 287-289, Edgware Road, London, W.2. (Pad. 5891.)

MISCELLANEOUS

NEW, different.—Imported American Radio Magazines, Books, Samples and Catalogue, 2/6.—G. A. Final, 15, Nashleigh Hill, Chesham.

"THE OUTLINE OF WIRELESS," by Ralph Stranger. Fifth Edition, 8s. 6d.—This book which covers the subject from A to Z, is to be recommended to all who desire to master the theory of Modern Wireless. At all Booksellers and Newsagents, or by post 9s. from George Newnes, Ltd. (Book Dept.), Tower House, Southampton Street, Strand, London, W.C.2.

EVERYMAN'S WIRELESS BOOK, by F. J. Camm, 8s. 6d. An invaluable book of reference, explaining the operation, upkeep and overhaul of all types of wireless receiver. 200 illustrations. From all Booksellers and Newsagents, or by post 4s. from George Newnes, Ltd. (Book Dept.), Tower House, Southampton Street, Strand, London, W.C.2.

THE PRACTICAL MOTORIST'S ENCYCLOPEDIA, by F. J. Camm, 8s. 6d. net. A lucid exposition of the principles, upkeep and repair of every part of the car. 442 illustrations. From booksellers everywhere, or by post 4s. from George Newnes, Ltd. (Book Dept.), Tower House, Southampton Street, Strand, London, W.C.2.

TELEVISION.—Newnes' Television and Short-wave Handbook, by F. J. Camm, deals authoritatively with Scanning Systems (Drums, Mirror Screws, Discs, etc.), Neon Lamps, The Cathode-Ray Oscillograph. How to build Short-wave and Ultra-short-wave Receivers. Fully illustrated, 8s. 6d. From your booksellers, or by post 4s. from George Newnes, Ltd. (Book Dept.), Tower House, Southampton Street, Strand, London, W.C.2.

SIXTY TESTED WIRELESS CIRCUITS, by F. J. Camm, 2s. 6d.—This handbook contains every modern circuit complete with instructions for assembling, component values, and notes on operation. Obtainable at all Booksellers and Newsagents, or by post 3s. from George Newnes, Ltd. (Book Dept.), Tower House, Southampton Street, Strand, London, W.C.2.

ADVERTISEMENT INDEX

	Page
Automatic Coil Winder and Electrical Equipment Co. Ltd.	Cover ii
British Institute of Engineering Technology	180
Eddystone Short Wave Manual	180
Electradix Radios	174
International Correspondence Schools, Ltd.	176
London Radio Supply Co.	177
New Times Sales Co.	173
Peto-Scott Co., Ltd.	171
Premier Supply Stores	Cover iii
Technological Institute of Gt. Britain	174
Whiteley Electrical Radio Co., Ltd.	170

QUALIFY FOR THE CIVILIAN RADIO RESERVE
with this wonderful new book
WIRELESS TRANSMISSION FOR AMATEURS
By F. J. CAMM

This book explains not only how to build amateur transmitting sets, but also how to learn the Morse code and obtain the licence. It deals with the subject in a simple yet fascinating way, and the text is rendered even more lucid by the use of many practical and easily understood diagrams.

From all booksellers 2/6 net, or by post 2/9 from
GEORGE NEWNES, LTD. (Book Dept.),
Tower House, Southampton Street, Strand, W.C.2.

THE BOOK YOU SHOULD HAVE
WIRELESS COILS, CHOKES AND TRANSFORMERS: AND HOW TO MAKE THEM.
By F. J. CAMM.

An important new Handbook for every home constructor and anyone interested in radio. With Special Chapters on Selectivity, Break-through, Coil Winders, Coil Troubles and their Remedies. 180 pages, cloth bound, with 126 easy-to-follow illustrations.

From all booksellers 2/6 or by post 2/10 from the Publishers,
GEORGE NEWNES, LTD. (Book Dept.),
Tower House, Southampton St., Strand, London, W.C.2.

ALL THE LATEST WELDING METHODS EXPLAINED

COMPLETE WELDER

1/2 WEEKLY PARTS

NEWNES COMPLETE WELDER deals with the very latest methods and equipment for forge-welding, oxy-acetylene welding and metal cutting, thermit welding, and other non-electric methods, and also with electric arc-welding, electrical resistance welding, and the atomic hydrogen process.

The IMPROVER, APPRENTICE and STUDENT will find this practical part publication packed with vital knowledge that would in ordinary circumstances take years to learn. It is a real step to a key job!

TO BE COMPLETED IN ABOUT 30 WEEKLY PARTS

COMPLETE WELDER

1/2 PART

DEALING WITH UP-TO-DATE METHODS OF GAS AND ELECTRIC WELDING



IN THIS PART
 OXY-ACETYLENE HIGH PRESSURE WELDING
 PRINCIPLES OF ARC WELDING
 PRINCIPLES OF RESISTANCE WELDING
 SPOT WELDING MACHINES
 USING MUREX ARC WELDING PLANT
 DATA SHEET
 ARC WELDING PROCEDURE FOR FILLET WELDS

WRITTEN BY PRACTICAL

FIRST PARTS NOW ON SALE

To be completed in about 30 weekly parts.

INVALUABLE TO
 Men in Electrical Manufacture
 Welding Operatives
 Motor and Aircraft Welders
 Engineering and Ship-building Welders
 Also
 Students—Apprentices—Improvers

GET YOUR COPIES TO-DAY

1/2 of all Newsagents and Bookstalls or direct from the Publishers, GEORGE NEWNES, LTD., Tower House, Southampton Street, Strand, London, W.C.2. (1/2 each part.)

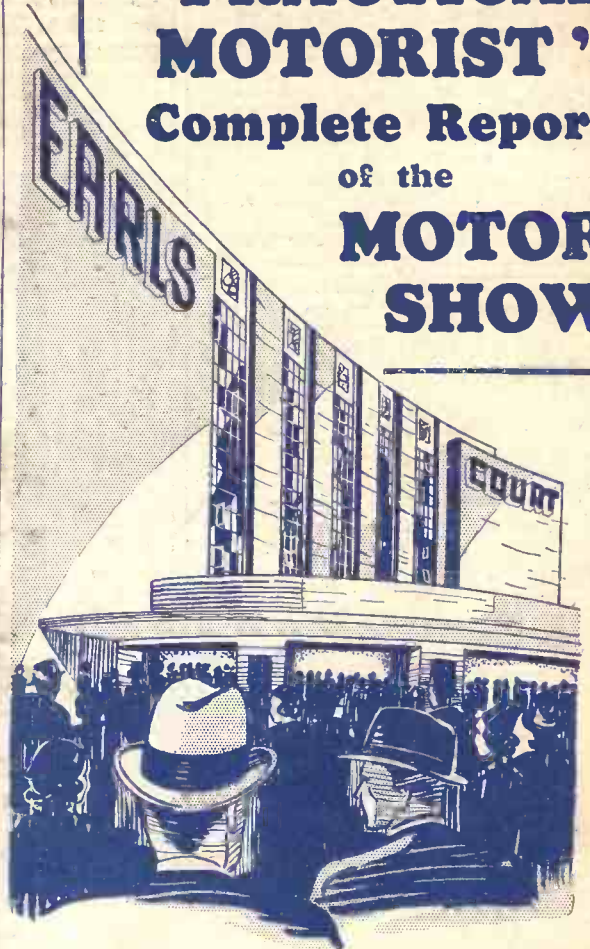
Over 1,000 illustrations and action photographs and many useful Tables, Data, etc.

Written by welders highly skilled in the various processes.

George Newnes, Ltd.

"PRACTICAL MOTORIST"

Complete Report of the MOTOR SHOW



HERE is the most readable Show Number — a complete stand-to-stand report of the Earls Court Exhibition. It contains detailed descriptions and illustrations of the latest accessories on view, and full reports of the cars recently introduced.

These special features are in addition to the usual practical articles, the latest news of the motor world, "Waysider's" provocative feature, and invaluable repair work information.

This grand number of PRACTICAL MOTORIST will sell out quickly! Get your copy now to avoid disappointment.

PRACTICAL MOTORIST

3^p OUT NOW

Of all Newsagents and Bookstalls, or by post 4d. from the Publisher, George Newnes Ltd., Tower House, Southampton Street, Strand, London, W.C.2

George Newnes, Ltd.