

# MULTI-BAND S.W. RECEIVERS — See Page 471

# Practical and Amateur Wireless

**3<sup>d</sup>**  
EVERY  
WEDNESDAY

Edited by F.J. CAMM

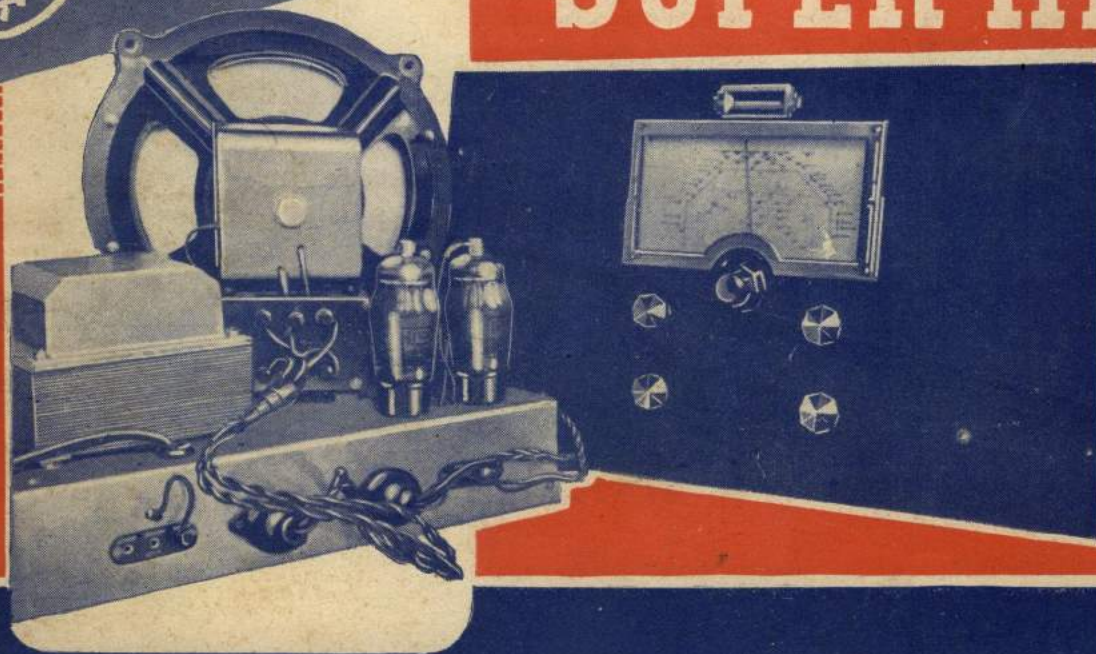
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Publication

Vol. 13. No. 331.  
January 21st, 1939

AND PRACTICAL TELEVISION

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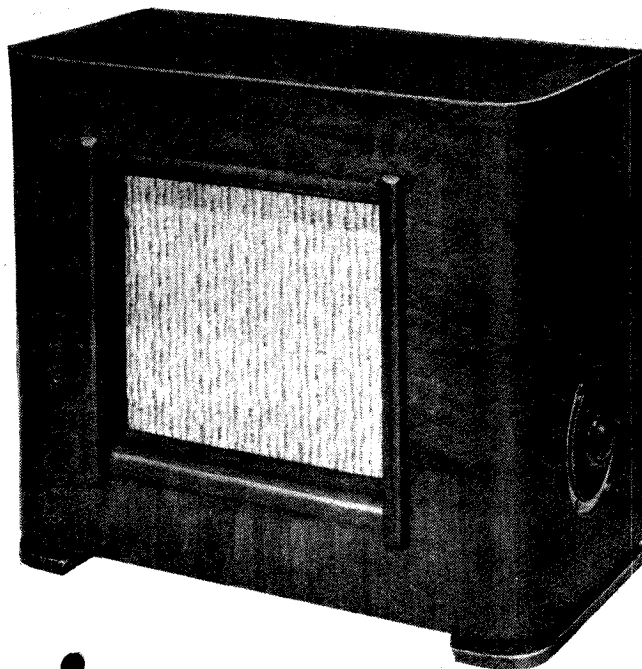
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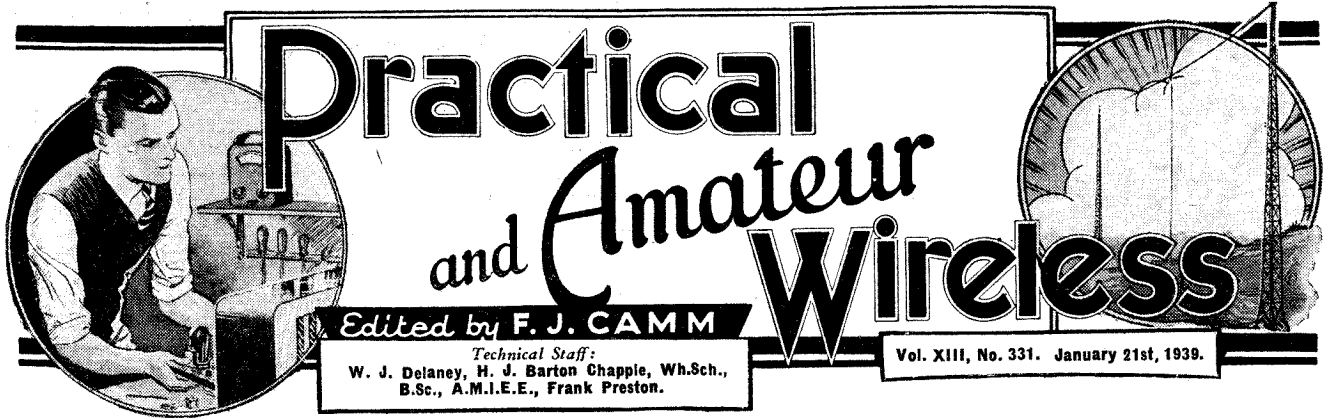
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# NEW SOUND FOR OLD— See Page 469.



## 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. 331. January 21st, 1939.

## ROUND *the* WORLD of WIRELESS

### Home-made Components

CONSIDERABLE interest has been aroused by our new series of articles describing the making of components. Many readers, however, are anxious to obtain instructions for making items which are either beyond the average home-constructor or which will not justify the work involved. Iron-core coils, for instance, cannot be satisfactorily made with ordinary materials. Suggestions for using ordinary iron wires or similar materials have been received, but it must be remembered that the core used in high-frequency components is a special powdered material suspended in a medium in such a manner that all particles are separated. Attempts have been made by some constructors to use wax and iron filings, but the results are not comparable with the commercial product. The cores are not obtainable from retail stores and, therefore, ordinary air-core coils are the only efficient component in this direction which may be made up. Iron stampings are obtainable in various shapes for transformers and chokes for L.F. circuits, and details for the construction of these components will be given in due course.

### Danish Police Radio

IT is now announced that following the completion of tests in Denmark the government and the Copenhagen municipality has provided a subsidy to enable the police force in that city to install a transmitter and transmitter-receiver equipment for use in police cars.

### Scophony for America

UPON his return to this country, Mr. S. Sagall has announced that a station is shortly to be erected in New York to work on the Scophony system, and that he is shortly returning to America to complete negotiations for the formation of an American Scophony company.

### Marconi Portrait

THERE is an annual custom of issuing a portrait of a pioneer in the field of electrical communications, adopted by the Bureau de l'Union Internationale des Tele-communications, and they have just produced an engraving of the late Marchese Marconi. Proofs, on art paper, may be obtained on sending 2.50 Swiss francs to the

Bureau's address, Effingerstrasse 1, Berne, Switzerland.

### B.B.C. Freeze-up

FOLLOWING the recent breakdowns due to freezing, and anticipating further cold spells before the spring, the B.B.C. have taken special precautions to avoid further troubles due to stoppage of the

men for the films in 1931. On numerous occasions he has taken his life in his hands and it has only been by continual rehearsal and perfect timing that serious disaster has been avoided. He is, however, quite unperturbed about the risks incidental to his profession. "I never," he says, "feel nervous about even the worst crashes. I have got it down to a job now. It is just like you doing your job." Listeners will certainly agree with the speaker's dictum that "We have to have perfect nerves and perfect self-control at this business." "That is why," he adds, "I do not drink and I do not smoke, but I do drink gallons of tea."

### Enter Sexton Blake

TO play the part of Sexton Blake, fiction's famous detective, in the new weekly serial thriller, the B.B.C. has chosen George Curzon, well-known actor, who has never before broadcast in this country. He has signed a contract to play twelve weekly ten-minute episodes from January 26th in the feature entitled "Enter Sexton Blake," which producer William MacLurg will include in the new variety programme called "Lucky Dip."

For the past five seasons, Mr. Curzon has played the part of Captain Hook in "Peter Pan," and has done a lot of other stage work. He has just finished making a film in which he is the dreaded villain, but the main point of interest is that he has played the part of Sexton Blake in three successful sound films. Before doing so he "had to read every Sexton Blake story I could get hold of, so as to find out what kind of man he was."

### European Table Tennis Championships

LISTENERS will be able to follow the progress of the Men's Singles Finals of the European Table Tennis Championships from a commentary which will be given by Stewart MacPherson from the Empire Pool and Sports Arena, Wembley, on January 28th. Stewart MacPherson, who is now a popular sports commentator, has previously broadcast a commentary on table tennis from Hastings Pier, where England met France. The preliminary bouts for the Wembley Finals will be staged at the Royal Albert Hall on January 27th, and a commentary on these will also be given by Stewart MacPherson.

### ON OTHER PAGES

	Page
Making Your Own Components .. .. .	467
New Sound for Old .. .. .	469
Short-wave Section .. .. .	471
Readers' Wrinkles .. .. .	474
On Your Wavelength .. .. .	475
All-wave All-stage Super-het .. .. .	476
Practical Letters .. .. .	480
Practical Television .. .. .	482
Queries and Enquiries .. .. .	487
Blueprint Service .. .. .	488

water supply at their various transmitters. In future, instead of draining out the water-cooling systems, the water will be kept circulating and the temperature will be taken every half-hour. At a given temperature the transmitters will be started up on low power to avoid freezing. Special arrangements are being made to maintain a skeleton staff through the night time.

### Tight Corners, No. 2

THE modern entertainment industry has brought into being a host of curious trades and professions, but perhaps none more fantastic than that of the car crasher. Reg Kavanagh, who, on January 20th, will tell listeners of some of his more spectacular accidents—though that, since they were deliberate, is hardly the word—formed a team of professional "stunt"

# ROUND the WORLD of WIRELESS (Continued)

## N.B.C. Network Invades Cuba

IT is reported that the National Broadcasting Company of America has taken over the ownership and operation of the 25-kilowatt station CMQ, at Havana (Cuba), thus increasing the transmitters in its network to the number of 174.

## Radio Montpellier Starts Again

THE old 2-kilowatt private station at Montpellier (France) has resumed its daily broadcasts on 309.9 m. (968 kc/s); it was previously working on 200 m.

## INTERESTING and TOPICAL NEWS and NOTES

### Another Mystery Station

LISTENERS report the reception of broadcasts from an illicit transmitter located in the Ukraine (U.S.S.R.), and from which propaganda talks may be heard daily at G.M.T. 06.45 and 17.00 on channels varying between 28 and 36 metres. An-

27th. Listeners will be taken "Behind the Scenes" just before the performance to hear green-room gossip and to catch the excitement of the twenty minutes before the rise of the curtain. This theatre is one of the oldest ventures of its kind in South Wales. It is composed entirely of amateur players and has a remarkable record of productions.

### Cinema Organ Recital

A BROADCAST from Chester's Regal Cinema will be heard by Northern listeners for the first time on January 25th, when Horace Pilling will be playing the organ there in a twenty-five minute programme of popular light music.

### The Microphone at Large

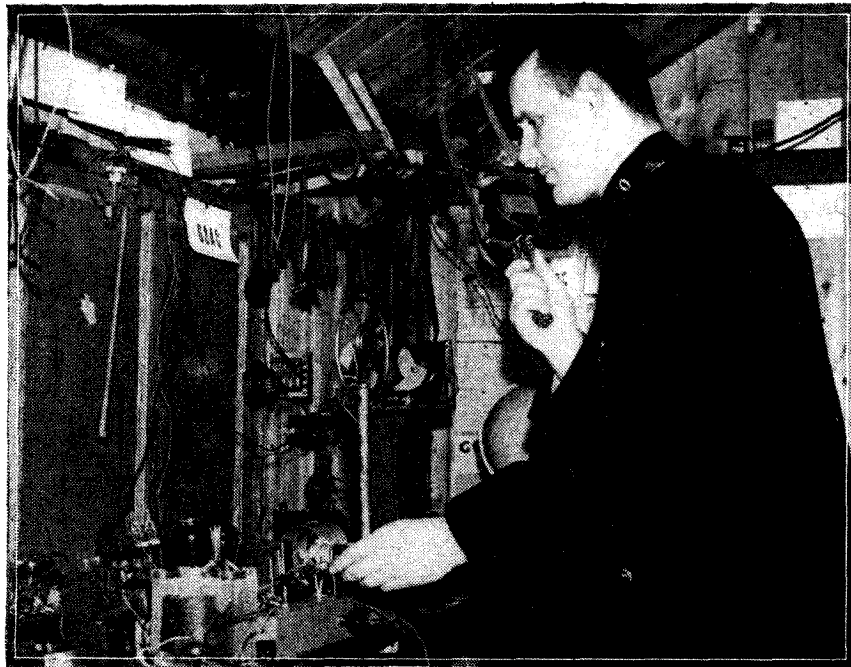
ON January 28th "The Microphone at Large" series will be continued by a visit to the Dukeries. The broadcast will be from a village which is on the edge of an industrial area, and S. P. B. Mais will study the impact of coal-mining, oil-drilling and iron-working on country life on some of the great estates. A number of local people, representing agriculture and industry, will be interviewed at the microphone. The programme is arranged by David Gretton and will be heard by Regional listeners.

### Studio Variety

A SHORT variety programme on January 23rd will include C. Capaldi, piano-accordionist, who has broadcast from the North and now lives in Gloucester; Barney Johnson, who has been a professional entertainer in Birmingham and South Staffordshire for thirty-five years, specialising in Black Country stories; and Maurice Turner, of Oxford, whose songs with ukulele were heard in Savoy Hill days.

### Midland Dance Band

HALF-AN-HOUR'S dance music by Percy Freeman and his Band will be heard by Midland listeners on January 26th. He first broadcast nine or ten years ago.



Mr. Stanley Hardman, a Bolton police officer, seen in the above illustration, is a radio enthusiast and has his own transmitting and receiving station at Tonge, Bolton. Assisted by his wife he operates transmitter G3AC, and is in daily radio communication with other enthusiasts on the 40-metre band in this country, and abroad.

(1,500 kc/s). Transmissions are made daily from G.M.T. 12.00-15.00, and from 17.00-18.00. This station must not be confused with P.T.T., Montpellier, a State transmitter operating on 224 m. (1,339 kc/s).

### Dutch Studios Exchange Wavelengths

THE usual quarterly change-over of channels was carried out on January 1st. Hilversum (1) now works on 301.5 m. (996 kc/s), and Hilversum (2) on 1,875 m. (160 kc/s), with a relay of its programmes on 415.5 m. (722 kc/s). The studios will again revert to their original channels on April 1st next.

### More U.S.A. "Maximum" Transmitters

WJSV, Washington, KSTP, St. Paul, and WCKY, Cincinnati, have been granted permits to install 50-kilowatt stations, the maximum power authorised by the Federal Communications Commission. KRDL, Dallas (Texas), to whom the same authority has been given, has already started on the construction of the new transmitter. Including the new licences issued, the number of ultra-high-power stations in the U.S.A. will now reach thirty-six.

nouncements are made in the Polish, Ukrainian and German languages.

### Italy Broadcasts in Sixteen Languages

FROM January 1st the E.I.A.R. has considerably increased its foreign language broadcasts, most of which are made on short wavelengths. News bulletins and special talks are now given in Arabic, Russian, French, Romanian, English, Bulgarian, Magyar, Slovene, Turkish, Greek, Spanish, Albanian, German, Italian, Swedish and Esperanto.

### Television Across the Atlantic

ACCORDING to a recent report B.B.C. television pictures transmitted from Alexandra Palace have been received in New York, a distance of 3,300 miles away. This is a record for long-distance reception of high-definition television. The pictures were picked up at the Riverhead receiving station of the Radio Corporation of America on Long Island, where a series of tests has been in progress.

### Behind the Scenes

THE next programme in the series entitled "Leisure Time" will come from Swansea Little Theatre, on January

## SOLVE THIS!

### PROBLEM No. 331

After he had installed an A.C./D.C. four-valve set, Rowland decided that the performance was capable of improvement. He noted some traces of instability and lack of range and decided that this was due to an inefficient earth connection. After improving this he still found results unsatisfactory and thought that they could be improved by connecting the metal chassis direct to earth. He did this and when he switched on failed to obtain any signals. Why was this? 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. 331 in the top left-hand corner and must be posted to reach this office not later than the first post on Monday, January 23rd, 1939.

### Solution to Problem No. 330

The 1-mfd. fixed condenser which Jackson used was internally short-circuited, and consequently the H.F. to the detector valve was shorted.

The following three readers successfully solved Problem No. 329 and books have accordingly been forwarded to them: D. Honnor, 79, Dyers Hall Road, Leytonstone, E.11. J. Edwards, 17, Benedict Street, Glastonbury, Somerset. F. W. Nunn, 9, Arundel Road, West Croydon, Surrey.

# Making Your Own Components—3

Constructional Details and Wire Data for Components Suitable for Bias Resistors, Anode Resistors, and Potential Dividers. A Simple Method of Making Experimental Grid Leaks is also Described

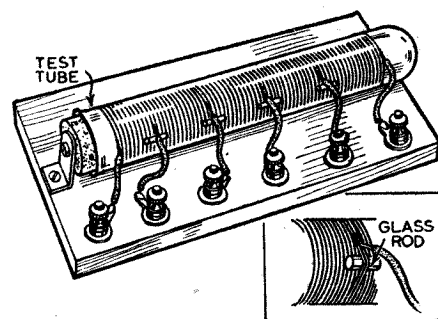


Fig. 2.—A potential divider which is still used in experimental power units. Inset is shown method of making tappings.

**FIXED** resistors are among the components construction of which can easily be carried out by the average home constructor with a moderate amount of mechanical skill. At the same time, it should be understood that high-resistance, low-wattage components of first-class quality can be bought so cheaply that home construction would not be justified. But high-wattage types, often referred to as power resistors, are far more expensive and at the same time are easier to make.

Those components required for automatically biasing a power or pentode output valve in a mains set, for example, are well within the scope of the constructor. What is more, a component can be made to the precise value required for any particular valve or circuit, whereas when

cut to the shape shown and all corners are rounded by rubbing down with glass-paper. Next two holes are drilled and terminals are fitted with soldering tags under the lower nuts. It is most convenient to use enamelled or oxidised wire, so that the turns can be wound side by side and allowed to touch each other, but bare wire may be employed provided that turns are spaced slightly.

In the first place it will be assumed that the wire is insulated with enamel or oxide. Carefully bare one end for a distance of about  $\frac{1}{2}$  in. by lightly rubbing with fine glass-paper or by dissolving the enamel by dipping it in methylated spirit, and then rubbing off the softened enamel with a rag. Tin the soldering tag and solder the wire using a small, clean soldering iron and employing resin or Fluxite as the flux.

The wire can then be wound on carefully, making sure that none of the turns overlaps and that the insulation is not damaged by scratching. Care must be also exercised to ensure that the wire is not stretched by pulling it too tightly. After winding on the full length, bare the other end and solder to the second soldering tag.

per quarter ounce in enamelled. The actual cost per yard is not great because there are several hundred yards in a quarter ounce, but if only a few resistors are to be made the cost of the smallest quantity that can be bought might be too high. An alternative is to use oxidised nickel-copper resistance wire. This is far less expensive, but has a lower resistance per yard. Details of a few gauges are given in table 2, from which it will be seen that the resistance per yard of 46 gauge is less than 150 ohms, as compared with the 343 ohms for nickel-chrome. Even so, the resistor taken as an example above could be made by using 1,150/150 or  $7\frac{1}{2}$  yds., which could easily be accommodated on the former shown in Fig. 1. In the majority

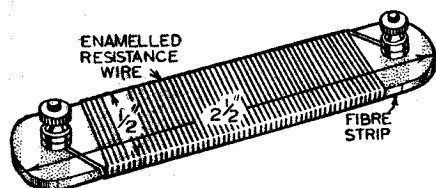


Fig. 1.—A simple and satisfactory method of making a wire-wound resistor.

buying ready-made components it is often necessary to compromise in order to make use of a part of standard value.

### Finding the Value

Suppose that a bias resistor were required for a valve with anode current and grid bias voltage of 35 mA and 40 volts respectively (at maximum anode voltage). The value of resistor required would be found by dividing the voltage by the current in mA and multiplying by 1,000. Thus, in the example chosen the resistance would be  $40/35$  times 1,000, or approximately 1,150 ohms. Consulting Table 1 on this page it can be seen that the 46-gauge wire listed is capable of carrying up to 250 mA, so it would be adequately stout for present requirements. It will be understood that the only important requirement when choosing wire is that it should easily be capable of carrying the maximum current likely to be passed through it when the finished resistor is in use.

The table shows that the resistance per yard of 46-gauge nickel-chrome wire is about 343 ohms. Consequently, it may be seen that the total length of wire needed is 1,150 divided by 343, which equals 3.35 yds., or about 3 yds. 10 ins. First, then, the length of wire should be cut off the reel. In measuring the wire take care that it is not stretched or damaged.

### Fibre-strip Former

A suitable former might consist of a strip of fibre as shown in Fig. 1. This is

### Using Bare Wire

Bare wire is slightly less expensive and sometimes more easily obtainable. The only difficulty in using it is to space the turns to prevent adjacent turns from touching. This is easily overcome by winding on with the wire a length of cotton thread, allowing this to run between every turn. After winding and finally attaching the end of the wire, the thread can be unwound since it is no longer required.

### Cost of Wires

The nickel-chrome wire suggested above is very expensive, costing about 5s. per quarter ounce in oxidised and about 8s.

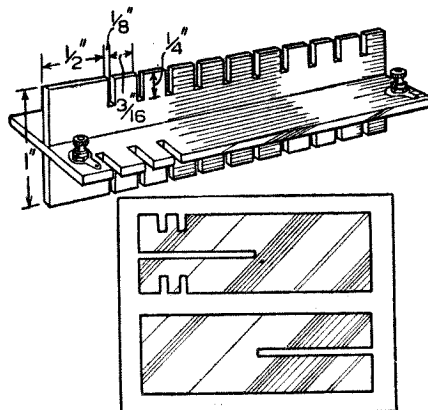


Fig. 3.—A resistor former built up from two strips of fibre.

TABLE 1. Nickel-Chrome Resistance Wire

S.W.G.	Ohms per yd. (approx.)	Yds. per lb. (approx.)	Approx. max. Current for 100° C (mA)
30	12,191	840	680
32	16,071	1,250	600
36	32,457	2,140	430
40	85.0	5,300	300
44	191.0	12,200	260
46	343.0	21,500	250

TABLE 2. Nickel-Copper Resistance Wire

S.W.G.	Ohms per yd. (approx.)	Weight (lb.) per 1,000 yds.	Max. Current for 100° C (mA)
30	5,575	1.40	590
32	7,350	1.06	470
36	14,840	.526	280
40	37,184	.210	150
44	83,664	.093	100
46	148,764	.053	70

of instances, this less expensive wire would be completely satisfactory.

Bear in mind, however, that different makes of wire might have different characteristics, and therefore if other wire than the Bulgian product shown in the two tables is used the required lengths must be calculated from the makers' data. Incidentally, Lewcos Eureka wire has characteristics similar to those shown for nickel-copper wire, while Lewcos nickel-chrome resistance wire has characteristics almost identical with those shown for Bulgian nickel-chrome.

### A Potential Divider

Another type of power resistor that it might be proposed to make is that often referred to as a potential divider. It is simply a tapped wire-wound resistor suitable for connection across an H.T. power unit output to provide a number of voltages, the voltages remaining sensibly constant irrespective of the current taken from them—within limits of about  $\frac{1}{3}$  to  $\frac{2}{3}$  of the total current passed by the resistor.

(Continued on next page.)

## MAKING YOUR OWN COMPONENTS

(Continued from previous page)

For a total H.T. output of, say, 250 volts a potential divider having a total resistance of about 5,000 ohms is suitable. At this resistance and voltage the current passed would be 50 mA. That means, in effect, that the total H.T. output current from the rectifier or smoothing choke should exceed the requirements of the receiver by 50 mA. When no more than about 5 mA is required from intermediate tapings, or when great accuracy of output voltage is not required (and it seldom is) the resistance could well be increased so that the "wastage" current through the potential divider does not exceed 25 mA—10,000 ohms for 250 volts.

Suppose it were required to make a 10,000-ohm unit and that 46-gauge nickel-copper wire were to be used, the total length required would be 10,000/150 (approximately), or about 67yds. This could well be wound on a glass test tube 1 in. in diameter and 6 ins. long. If the turns are wound side by side with insulated wire they will take up a length of about 3½ ins., but if bare wire were to be used and the turns separated by means of a length of thread, more than twice this length would be required. In that case, one long glass tube could be employed, or there could be two test-tube windings connected in series.

### Making Tappings

Tappings would be taken after about every 2,000 ohms, and these could be provided as shown in Fig. 2 by taking

a couple of adjacent turns over a short length of glass rod or fibre strip, baring a short length of the wire held off the former by the rod and soldering a length of flex, which would be brought out to a terminal or connecting socket. As before, great care must be exercised in winding, since the wire is extremely thin, although not as delicate as copper wire—46-gauge is about the thickness of a fine hair.

In all cases the winding is considerably simplified if wire of not less than (higher

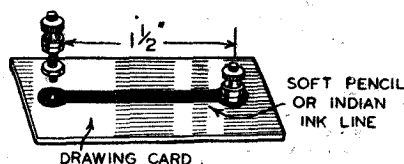


Fig. 4.—A simple experimental grid lead.

number than) 40-gauge is employed, but that means that a much greater length is necessary and that the resistor is appreciably more bulky than when using the finer wire mentioned. Nevertheless, resistors up to 1,000 ohms made from 40-gauge nickel-chrome wire—which costs about 6s. per half ounce—can be wound on a small fibre strip, as shown in Fig. 1, provided that the current to be passed through them is not more than half the maximum current given in the table; the current given applies when the wire is suspended in air so that there is free circulation round it.

It will be seen that only about 11½ yds. of 40-gauge nickel-chrome wire is needed

for a 1,000-ohm resistor, and as approximately 180 turns can be wound per inch when the wire is enamel-covered, such a length can be accommodated in a very small space.

### Non-inductive Components

When winding resistors to carry a current up to ½ amp. or so it is usually more convenient to wind the (insulated) wire on a former made from two strips of fibre, as shown in Fig. 3. In winding care should be taken that the turns are not scraped so that insulation is removed, whilst the complete winding should be well divided into a number of sections as shown.

This form of construction is also suitable when making a non-inductive resistor. All that is necessary is to reverse the direction of the winding for each slot. Thus, if the first slot is filled by winding clockwise, the direction of winding should be anti-clockwise for the second slot, clockwise for the third, and so on.

Grid leaks, which do not have to carry any appreciable current, can be made as shown in Fig. 4 by making a line with soft pencil or indian ink on a strip of drawing card or on a piece of fibre. First make two circles of black and drill holes through the centres of these for the terminals. Then join the circles together with a line. The width of this governs the resistance value, and the most suitable value in any circuit is obtained by adding to or subtracting from the total width. When the most suitable value has been found the complete component should be given a coat of shellac varnish to protect the "resistor" element from moisture.

## IMPORTANT BROADCASTS OF THE WEEK

### NATIONAL (261.1 m. and 1,500 m.)

Wednesday, January 18th.—Symphony Concert, from Queen's Hall, London.

Thursday, January 19th.—Congress Dances—film musical.

Friday, January 20th.—English Chamber Music—Stanford.

Saturday, January 21st.—England v. Wales: commentary on the Rugby match from Twickenham; Cricket: a commentary on the day's play in the Third Test Match, England v. South Africa, from the Kingsmead Cricket Ground, Durban.

### REGIONAL (342.1 m.)

Wednesday, January 18th.—Speeches from the A.A. Territorial Headquarters.

Thursday, January 19th.—Job to be Done, a symphony of industrial America, by Pare Lorentz.

Friday, January 20th.—Orchestral programme.

Saturday, January 21st.—Perdita, the story of Mary Robinson, compiled from her memoirs and devised by Cyril Roberts.

### MIDLAND (297.2 m.)

Wednesday, January 18th.—Abroad on Business: On the Continent, Selling Speciality Leathers, a talk.

Thursday, January 19th.—Orchestral concert.

Friday, January 20th.—The Sleeping Beauty, an excerpt from the pantomime at the Theatre Royal, Birmingham.

Saturday, January 21st.—A Concert by

Worcestershire Artists from the Winter Gardens, Malvern.

### WEST OF ENGLAND (285.7 m.)

Wednesday, January 18th.—A commentary on boxing from the Westover Ice Rink, Bournemouth.

Thursday, January 19th.—Choral and orchestral concert.

Friday, January 20th.—Western Magazine. Saturday, January 21st.—Perdita, the story of Mary Robinson compiled from her memoirs, devised by Cyril Roberts.

### WELSH (373.1 m.)

Wednesday, January 18th.—Choral programme.

Thursday, January 19th.—The Death of a Martyr, a play by Gwyn Jones.

## TELEVISION FEATURE

IN the new series of outside broadcasts on Sunday afternoons, the Post Office will come under the television lens on January 29th, when the mobile unit will visit the International Telephone Exchange at Faraday House.

A camera tracking slowly past the switchboard bays will show how the highly trained telephone girls—some of them speak four or five languages—maintain communication by wireless or cable with all parts of the world. It is hoped to arrange several interesting telephone conversations.

Friday, January 20th.—Song Across the Channel: The Welsh Region and Radio Eireann: a programme of National music.

Saturday, January 21st.—The Old Man's Secret, a story by D. T. Davies.

### NORTHERN (449.1 m.)

Wednesday, January 18th.—The North-countrywoman—1, A Personal Miscellany.

Thursday, January 19th.—Recital of Hymns from the Monkgate Methodist Church, York.

Friday, January 20th.—The Sheffield Philharmonic Society's Concert from the City Hall, Sheffield.

Saturday, January 21st.—Allez-Oop, Belle Vue's Tenth Mammoth Circus, from King's Hall, Belle Vue, Manchester.

### SCOTTISH (391.1 m.)

Wednesday, January 18th.—A programme of dances for String Orchestra.

Thursday, January 19th.—Scottish Music of To-day: C. H. F. O'Brien—orchestral programme.

Friday, January 20th.—A Gaelic Concert.

### NORTHERN IRELAND (307.1 m.)

Wednesday, January 18th.—The Spanish Captain: His adventures in Connaught and Ulster, feature programme.

Thursday, January 19th.—Choral programme from Coleraine.

Friday, January 20th.—A Hymn recital from the Cathedral Church of St. Patrick, Armagh.

# New Sound for Old

Practical Suggestions Concerning Some of the Older Types of Speaker Units, Showing How to Put Them Into Service Again, and Obtain Good Quality Reproduction

**A**LTHOUGH it cannot be denied that a good moving-coil loudspeaker properly matched to an equally good receiver or amplifier approaches the ideal method of reproducing amplified sounds as closely as modern conditions and apparatus permit, one cannot overlook the fact that some of the speakers of a few years ago are also capable of putting up quite a good performance.

Because of the wide publicity given to the moving-coil speaker, its efficiency, and its now more reasonable price, many constructors have obtained the impression

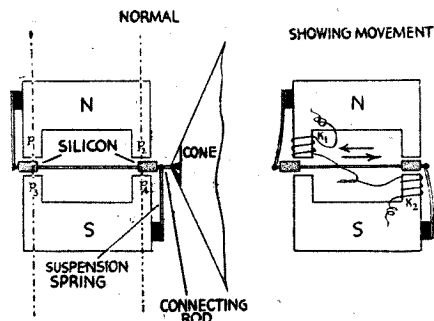


Fig. 1.—Depicts the operation of an inductor dynamic type unit which gives quite good response.

that all other speakers of the earlier type are only fit for the junk box or the dustbin. This is far from the truth, and it is rather ironical to note that many of those who hold the above views often go to the trouble and expense of securing a perfectly good moving-coil speaker, and then operate it under conditions which practically eliminate the possibility of the speaker giving anything like the quality of reproduction it can, or should.

The money spent on the purchase of a good moving-coil speaker will be more than repaid by the additional satisfaction obtained, but this only holds good if the signal or input to the speaker is capable of doing it justice. When the signal is in itself distorted or of unreasonable strength for a given speaker, then the finest moving-coil model will not give satisfaction to its owner.

## Early Types

Ignoring for a moment the question of inherent defects in the design of some of the speakers of a few years ago, and the fact that it is possible to find flaws in their response characteristics, let us consider other items which contributed to the general lack of quality, and which, incidentally, were more responsible for the dissatisfaction than the question of frequency response.

Going back to the very early days when we were more satisfied with volume than quality, it must not be forgotten that receiver design and L.F. amplification were far from perfect, and very little attention was given to the problem of matching the output valve with the speaker.

Loudspeakers were of the diaphragm and horn type, and in many instances were little more than an oversize telephone carpiece fitted with a horn or trumpet which

was not always designed to conform with acoustic requirements. Later on came the moving-iron, balanced-armature, and inductor types of units operating various forms of cones. These represented a step in the right direction towards better quality, and as their introduction coincided with a more general appreciation of the correct operating conditions necessary for good L.F. amplification, quality of reproduction started to become a serious consideration.

It is highly probable that most constructors will have at least one, if not more, of the speaker units mentioned above in the spares box, and the suggestions given below are intended to show that it is worthwhile devoting a little time to them and putting them once again in commission. If the magnets are still good, and that can easily be verified by testing their power of attraction with a small iron or steel blade, it is possible for them to be more sensitive than many of the moving-coil types; therefore, they can be very useful for short-wave and monitor work, apart from the question of extensions and room to room communications.

Typical diaphragm, inductive, and balanced-armature units are shown in Figs. 1, 2 and 3, and it is interesting to note that these can still be obtained from some of our advertisers who deal in surplus components.

The success of the reproduction obtained with units of these types does not solely depend on the efficiency and construction of the unit. The size, weight, and material of the cone have also to be considered, while the effective area of the surrounding baffle-board and cabinet will also directly affect the resultant response.

When these units were in more general use, it was a common practice to try to accentuate the low notes by fitting large cones made from soft material, which appeared to produce the desired effect. Unfortunately, however, the upper register and sensitivity of such an arrangement had been overlooked, and likewise the reproduction was inclined to be *woofy* and far from perfect on speech.

## Constructing Cones

Even if a cone is still fitted to the speaker you have in stock, it will be well worth while experimenting with others of different size and materials. If you are tempted to try

the existing cone, remember that if its surface is cracked, distorted, or flabby, you will only be wasting your time so far as quality is concerned. Fig. 4 shows how to mark out a cone for a given diameter and angle, and it is advisable to exercise care when doing this, cutting it out and sealing the two edges together. The vertical line AB is drawn to represent the exact height or depth of the cone required, while CD is drawn to represent the diameter.

The points CA and AD must be connected to form the triangle, and then with

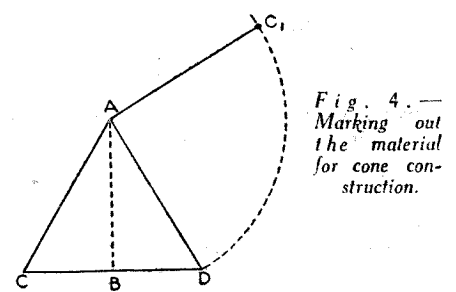


Fig. 4.—Marking out the material for cone construction.

the radius AD describe an arc as indicated by the line DC1.

The length of this line must be equivalent to the circumference of the cone at its base or, in other words, CD multiplied by  $3\frac{1}{2}$ .

The points A and C1 are then joined together and the piece to be cut out to form the cone is that enclosed within the points A, D, C1.

As this only gives the exact material for the cone it will be necessary to leave an additional  $\frac{1}{16}$  in. on to the edge AD to provide an overlap for fixing the two edges together. Stiff brown paper, Bristol board, good tracing cloth, and hot pressed drawing paper are all good materials for cone construction where a crisp response is required. For cones of a lower natural frequency, various kinds of blotting paper, the softer variety of brown paper, and buckram should be used, but whatever material is ultimately selected, a coat of dope, in the form of amyl acetate or a cellulose varnish, will, no doubt, be found beneficial, as the question of the cone being affected by the moisture in the atmosphere must not be overlooked.

If the cone is to be of the fixed-edge

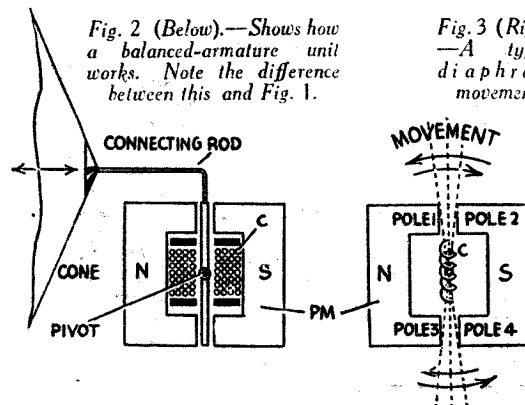
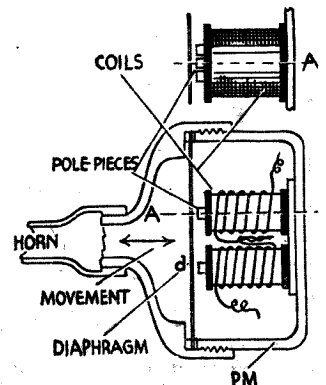


Fig. 2 (Below).—Shows how a balanced-armature unit works. Note the difference between this and Fig. 1.

Fig. 3 (Right). — A typical diaphragm movement.



## NEW SOUND FOR OLD

(Continued from previous page)

type, a narrow surround of linen or thin wash-leather must be cemented to the outer rim of the cone so as to form a flexible fixing to the baffle opening. In this direction, it is also worth while experimenting with one of the free-edge type of cones as illustrated in Fig. 5. To obtain the fold back effect a circle should be drawn on the material to represent the position for the fold back before cutting

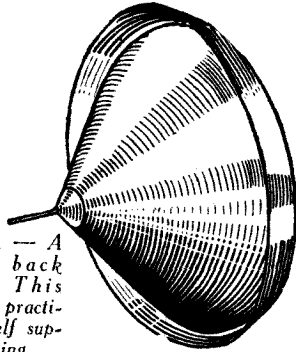


Fig. 5.—A folded back cone. This type is practically self supporting.

out the cone shape, the edges being stuck together in the normal manner. When the joint is dry and perfectly secure the outer edge of the cone should be taken in both hands and, while rotating it, gradually introduce the fold back until the outer edge is turned in the opposite direction to that of the cone. With an assembly of this kind, the apex or centre of the cone must be securely fastened to the operating reed of the unit by means of conical shaped washers lined with very thin baize, and held

in position by a fixing and locking nut. A long reed is not so efficient with this form of cone as a short one.

## Linen Speaker

Another type of reed operated speaker, which was quite popular and capable of giving most pleasant results, was the stretched linen model, a general idea of which is shown in Fig. 6.

It consists essentially of two strong wooden frames over which thin linen of even texture has been stretched to the utmost extent. The reed is then securely fastened to the centre point of the linen, and the unit mounted by means of suitable supports to the outer edges of one of the frames. The next step is to separate the two frames by means of four lengths of screwed rod, one in each corner of the two frames, or other suitable spacers which will allow the separating process to be adjusted until the required degree of tautness is obtained. The final operation is the doping of the linen in the same manner as mentioned for cones. With a unit of average size, the frames can be made as large as 2ft. square, and if experiments are carried out with these in conjunction with baffles and/or cabinets, the results can be particularly pleasing.

## Matching

As the pentode valve is now so widely used in the output stage of a receiver, and as the majority of the earlier types of speaker units were designed for operation with power and super power valves having a much lower impedance, it will be necessary to use a matching transformer when a pentode is employed to enable the best response to be obtained.

With the average modern power pentode, a transformer ratio of between 1.5 : 1 and 2 : 1 will be required, depending on the optimum load of the valve. For calculation purposes the speaker impedance can be taken as  $2\frac{1}{2}$  times its D.C. resistance. If it is not necessary to use a matching transformer, it is always advisable to employ a choke-filter output circuit to prevent direct current from flowing through the speaker windings, especially if the model is being used for extension work.

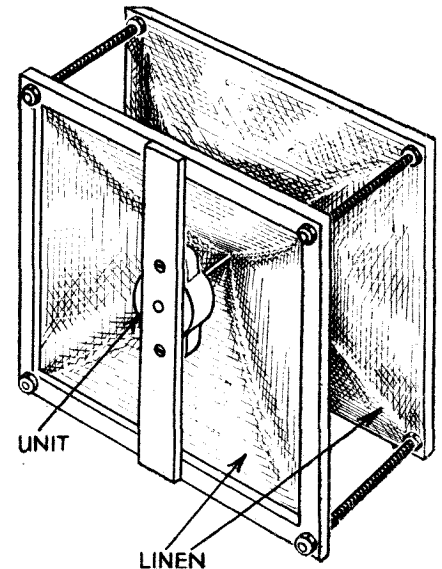


Fig. 6.—The original linen type of speaker. Properly made it can give very good response.

## Items of Interest

## American Radio Drama Producer's London Visit

WE are informed that William Robson, Director of the Columbia Workshop, the Experimental Drama Department of the Columbia Broadcasting System of America, has accepted an invitation from the B.B.C. to come to London at the end of January in order to produce several radio plays in this country.

William Robson is the leader of the most advanced school of American radio drama producers, and will choose outstanding examples of the American technique for his productions from London. His visit is a new indication of the close co-operation existing between the B.B.C. and broadcasting authorities in North America.

It will be remembered that earlier this year Val Gielgud was a guest producer for the Columbia Broadcasting System when he visited New York, and that Laurence Gilliam, on his way home from a six-months visit as a programme adviser to the Canadian Broadcasting Corporation, also produced a programme from New York for listeners in Great Britain.

At present H. Rooney Pelletier, Montreal Programme Director, is another visitor to the B.B.C., while Lance Sieveking, B.B.C. producer, is in Canada.

## 56,000 Miles Testing Radio Sets

TRAVELLING all over the world to report on radio reception and market conditions in distant lands is the job of Mr. Roy Moxham, of Coventry.

He has just returned home after making another round-the-world tour for his firm, General Electric Co., Ltd. He was away for nearly a year, travelling 56,000 miles at an average of more than 170 miles a day. He was a passenger in 21 different aeroplanes and 12 ships, and he visited 21 countries.

During this tour Mr. Moxham travelled 17,000 miles by air and he called at 32 main overseas branches of the G.E.C. radio organisation and on 31 of the company's principal agents. He went from Liverpool

to the west coast of Africa and thence to Nigeria, the French Cameroons, South Africa, Northern and Southern Rhodesia, Kenya, Tanganyika, India, Burma, Siam, the Malay States, China (Hong Kong and Shanghai), Australia, New Zealand, Canada, the United States, and then back to Britain.

He had many adventures, of which the most thrilling was a flight from Bangkok to Hong Kong, while Japanese fighters were in the sky. His pilot took the precaution of covering the plane with Union Jacks. August Bank Holiday week-end he spent snowbound in a roadman's shack in the heart of the New Zealand Alps.

On a previous tour Mr. Moxham took a radio set to the foot of Mount Everest and tested reception there.

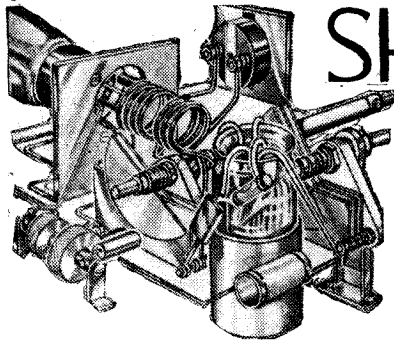


Using a gong for sending the time signal from one of the Rome radio stations.

## B.B.C. Director-General to be Televised

THE B.B.C. inform us that a special television feature will be a transmission at 10.30 a.m. on January 26th, when Mr. F. W. Ogilvie, the Director-General, will speak for a few minutes on television prospects. He will be followed by Mr. C. O. Stanley, Chairman of the Television Development Sub-Committee of the Radio Manufacturers' Association.





# SHORT-WAVE SECTION

## MULTI-BAND S.W. SETS

How to Use Standard Plug-in Coils to Avoid the Necessity of Coil Changing  
By W. J. DELANEY

The main difference now is that the unused coils are on the "earth side" of the circuit, whereas in the former arrangement the dead end is "in the air" at the high potential end. A simple test with a home-made coil will show that in the latter case there is a definite loss at certain wavelengths which is not observable with the Fig. 2 arrangement.

### Switch Contacts

In many of the ideas which have been proposed for coil changing, the majority aim at changing the complete coil for each band, thus introducing six contacts. Again, two or more coils will be left out of circuit on each band, and if these coils are entirely unconnected it will be found that they introduce all kinds of erratic results—again the effects depending upon the wavelengths in use. A number of tuners have been made up and used in an experimental multi-band receiver, and it was found that these erratic effects were most noticeable on the 25 to 35-metre band and not on the 10 to 20-metre band, in spite of changes in various component values. The simplest scheme for coil changing is to mount the desired number of coils on a flat base upon which standard coil-holders are mounted. The pins of the holders are all made equal in length and travel over spring fingers made from thin brass. In its simplest form the arrangement shown in Fig. 3 is suggested, the flat coil unit being made to travel from front to rear by means of a threaded rod or a simple push-pull plunger having notches cut in it to ensure accuracy in placing the contacts. With an arrangement of this type a two-coil circuit could be built up, a vertical screen between the two sets of coils ensuring stability by cutting out interaction.

An alternative scheme which is often advised is to mount the coils on a circular disc which is rotated in order to select the required coil. Modifications of these two ideas will no doubt suggest themselves to various readers, and it should be noted that instead of moving the coils, exactly the same effect may be obtained by moving the contacting strip or strips, flexible leads being used in this case, and a limited travel being provided with some form of stop device to avoid damage to the leads.

### Coil Positions

With the ideas suggested it will be found that, as the coils are all arranged

THE majority of experimenters who devote most attention to the short waves use the simpler types of receiver, generally of the Detector-L.F. type. In spite of its good performance and ease of handling, it has one great drawback—namely, coils have to be changed when a different waveband is required. Much of the popularity of the so-called "all-wave" receiver is due to the fact that many bands may be covered merely by the operation of a simple switch, and the

are imposed. Firstly, to get down below 10 metres, every possible source of loss has to be removed, and a suitable tuning condenser would have a very small coverage if the set were required to tune up to 100 metres. This means that we are restricted, in a set of the type referred to, to a rather narrow band, say, from 10 to 50 metres, but for all ordinary purposes such a receiver should be capable of fulfilling all normal requirements. Above 50 metres a compromise may be effected as shortly to be described, but for maximum results it is better to adhere to the narrower band mentioned.

Among the many ideas which have been suggested from time to time by manufacturers and also by readers of this paper, the commonest would appear to be the use of three or four coils mounted on some

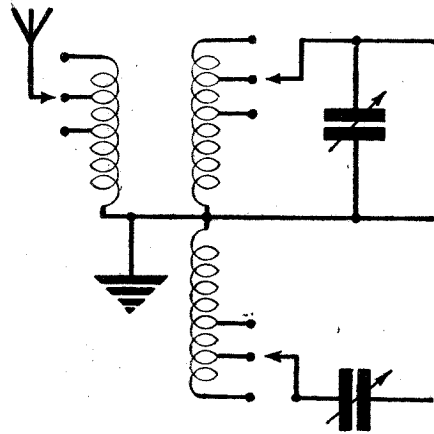


Fig. 1.—The circuit for tapped coil wave-changing—based on three separate bands.

inferiority of performance—when compared with a specially-designed receiver—is thereby counterbalanced. To obtain the advantage of switched wave-changing on the short waves, many experimenters and manufacturers have endeavoured to build multi-band short-wave tuners, and although in the majority of cases these perform quite well, there is still much room for improvement. The type of receiver first referred to will, in order to obtain maximum results, utilise a 6-pin coil, in which there are three separate windings—aerial, grid and reaction coils. One of the most obvious ways of making a multi-band short-wave tuner would, therefore, be to wind a coil for the highest band required, and tap this for the lower wavelengths. At the best, this would only need a three-point switch, as the low-potential ends of the three windings could be made common and taken to earth as shown in Fig. 1. The main disadvantage of this arrangement is that a considerable amount of "dead end" is left when the lowest wavelength is required, and on the short waves, the lower we tune the greater become the effects of losses.

### Separate Coils

It would appear, therefore, that in a multi-band short-wave set we must design the receiver round the shortest wavelengths required, and adapt it for the higher ranges. This means at once that certain limitations

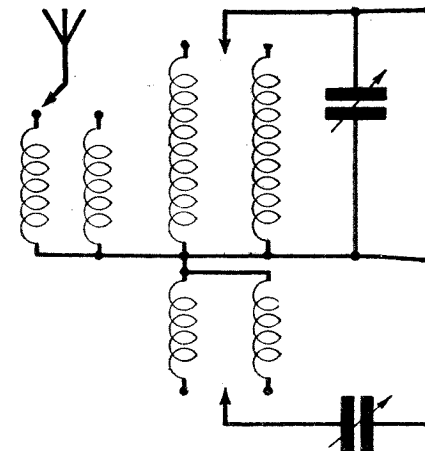
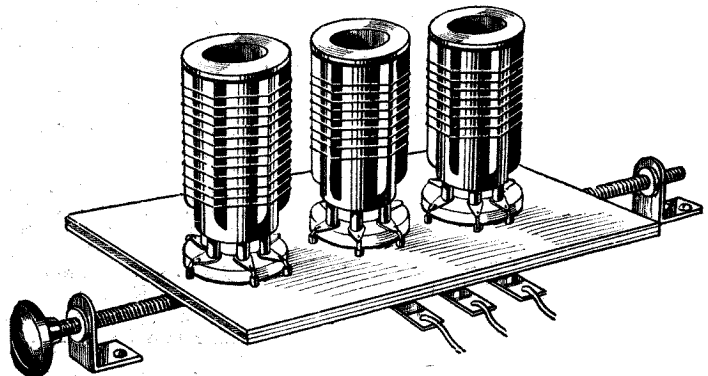


Fig. 2.—Separate coils used for wave-changing avoids dead ends at the H.F. end of the coil.

Fig. 3.—One suggestion for using separate coils on a moving coil base.



kind of base with a selector switch to pick out the desired coil. In Fig. 2 may be seen a method of carrying out such selection merely by having three switch points, although this still leaves a certain amount of dead end such as was mentioned in connection with the tapped coil idea.

in the same plane there is some form of absorption or interaction in spite of the fact that only one of the set of coils is in circuit. Tests have shown that this effect varies according to the type of winding, the spacing of the coils, and the wavelengths in use. In an endeavour to overcome this and to

retain the advantages of coil switching, several interesting schemes were tried, but

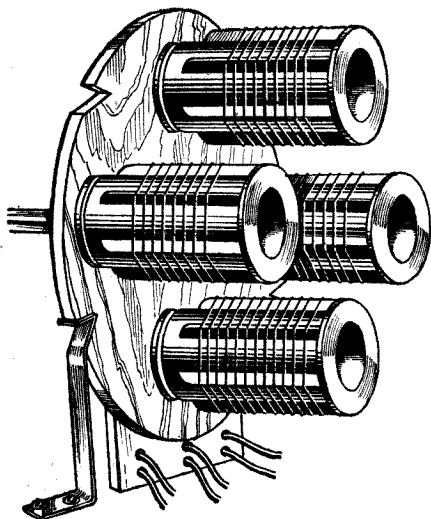


Fig. 4.—A rotating coil holder with locating device.

finally it was found that maximum results were obtained when the coils were so placed

that all windings were at right angles. Three coils were the maximum used, and it was thus not a difficult matter to place these on a panel so that each coil was at right angles to the remaining two. Standard 6-pin plug-in coils were used, and it was found possible to use the three-point switching arrangement of Fig. 2, a test on a very weak signal on the 14-metre band giving no improvement in volume when the unused pair of coils were removed. A flat board was employed for the coil mount and a wiping contact was provided in the centre for the earth connection. This was in contact

through the whole travel, whilst the remaining three points were changed for each band. Strips from a flash-lamp battery were employed as the "fingers" for these three points, and to provide good contact the small plungers from electric lamp-holders were used.

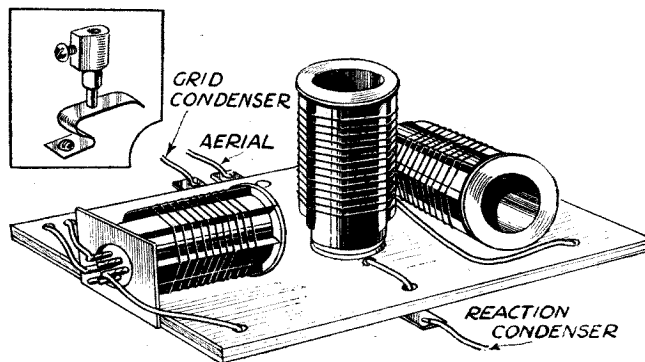


Fig. 5.—Three coils each at right angles on a changing base.

Strips of ebonite were placed between the contact fingers so that the metal plungers rode smoothly on to the fingers without fouling in each direction. The method of mounting the coils and the contact

device may be seen in Fig. 5. Instead of standard plug-in coils home-made components could, of course, be employed and the result with the scheme will be found to justify the time required in making up the tuner.

## Leaves from a Short-wave Log

### Martinique's Winter Schedule

FZFF6, Fort-de-France, Martinique, *The French Voice of the West Indies*, on 30.93 m. (9.7 mc/s), has established its winter programme schedule as follows. Daily: G.M.T. 16.15-17.45, with an extra programme on Sundays from G.M.T. 19.00-21.00. Every Monday and Wednesday, from G.M.T. 19.00-19.30, a concert by French artistes is given for English and American listeners. Announcements are made in French and English throughout the programme. The broadcasts open with the striking of seven chimes, and close down with *La Marseillaise*. The studio possesses a male and female announcer.

### A Good Signal from Cuba

BROADCASTS from COBX, Havana (Cuba), on 32.61 m. (9.2 mc/s), now working on 500 watts, are now heard at excellent volume between G.M.T. 03.00-06.00. The call is *Radio Nacional*, as the short-wave station relays the medium-wave transmitter CMBX in the Cuban capital. Interval signal: one stroke on a high-pitched gong, followed by another on a lower note, usually every 15 minutes during the programme. Announcements are made in Spanish and English. Address: Radiodifusores CMBX y COBX, San Miguel, 194, Havana (Cuba).

### New Ultra-short-wavers

STATION WOR, Newark (N.J.), U.S.A., of the Mutual Broadcasting System of America, has recently inaugurated an ultra-short-waver, W2XJI, New York, operating daily on 26.3 mc/s from G.M.T. 17.00-23.00.

W5XD, Dallas (Texas), broadcasts daily (Monday to Friday inclusive) on 31.6 mc/s from G.M.T. 16.30-18.30.

A new experimental station, W9XA, located at Kansas City (Missouri), has been recently logged on several occasions during the past fortnight on 26.45 mc/s.

### Special Swiss Broadcasts

TRANSMISSIONS destined to the North and South American continents will be carried out by the Swiss broadcasting organisations every Monday at midnight, preceded by a 15-minute programme of popular music, in the period February 6th to March 13th. The broadcasts will be made simultaneously by HBL, 32.1 m. (9.345 mc/s), for North America, and by HBP, on 38.48 m. (7.797 mc/s), for South American States.

### U.S. Radio Plans for Olympic Games

THE N.B.C. is already organising its personnel for the relay of the running commentaries on the Olympic Games which are to be held in 1940 at Helsinki (Finland). The broadcasts of the various events will be telephoned to Berlin, thence transmitted through the German short-wave stations at Zeesen, to be picked up at Riverhead (Long Island) for conveyance by cable to Radio City. Transmissions will be made daily throughout the period July 20th to August 4th inclusive.

### More Broadcasts from the Argentine

THE Argentinian Ministry of Foreign Affairs through the Government station LSY3 (LRA), on 16.56 m. (18.115 mc/s), and LRA1, 30.96 m. (9.69 mc/s) broadcasts every Friday at G.M.T. 20.00 and 22.00 a special news bulletin and talks destined to European listeners. They are given in Spanish, Portuguese, French, German and English.

### Asuncion Reported to be Testing

A CORRESPONDENT informs us that he has picked up a test broadcast from Asuncion (Paraguay), in which the announcer gave the call ZP2. Originally heard on 32.5 m. (9.23 mc/s), it was later again logged on 25.62 m. (11.71 mc/s). Some doubt may be cast on the latter

channel, as the broadcast may have been confused with a transmission from ZP14, Villarica (Paraguay), on 25.59 m. (11.725 mc/s).

### Regular Broadcasts from Iraq

YJG, situated at Bagdad, is now daily on the ether between G.M.T. 13.30-21.00 on 41.67 m. (7.2 mc/s). In addition to a news bulletin and occasional announcements in English, transmissions mostly consist of native music. The broadcast closes down at G.M.T. 21.00 with the playing of the Iraqi National Anthem.

### And from Turkey

THE three short-wave transmitters in use at Ankara are TAR, 16.38 m. (18.3 mc/s), 60 kW.; TAQ, 19.74 m. (15.195 mc/s), 20 kW.; and TAP, 31.7 m. (9.465 mc/s) of the same power. TAP may now be heard daily from G.M.T. 18.00-20.00, the two other stations still being in an experimental stage. The call is: *Radio Ankara* and occasionally *Radio Turquie*. Announcements are made in the Turkish, German, French and English languages, and although most of these are given out by a man, the news bulletin destined to English hearers is broadcast by a woman.

Address: Radio Ankara, Turk. Muehendisler Birligi, 5 No Lu Oda Yeni-Sehei, Ankara (Turkey).

### Europe's Mystery Station

RADIO *Libertad*, alias *The Freedom Station* alias *Der Deutsche Freiheits-sender*, to give it its numerous titles, still continues to broadcast anti-Fascist and anti-Nazi propaganda in German, Spanish and Italian. The transmitter would appear to be located in Madrid (Spain), although announcements are made to the effect that all reports should be addressed to 13, Boulevard d'Aragnon, Paris (France).


Nominally working on 29.8 m. (10.067 mc/s), on occasions you may pick up a statement that the station will "shift to 30.1 m., then five minutes later to 30.8 m. and back again to 29.8 m." in order to dodge the continuous barrage of interference put up to drown its transmissions.

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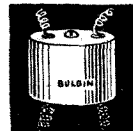
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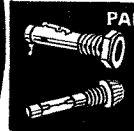
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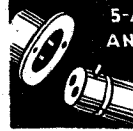
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92, Queensway, Bayswater, London, W.2.  
Please send Abridged List of Chassis, free.

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**A "HIVAC" ACHIEVEMENT**

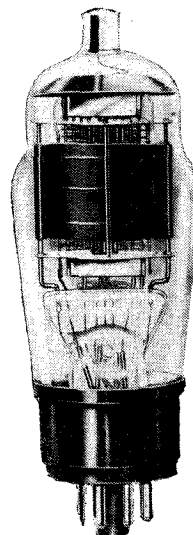
The production by the High Vacuum Valve Co., Ltd., of the HIVAC-HARRIES ALL-STAGE valve is an achievement which has made history in the radio industry. With the Hivac All-stage valve you have one type which operates with high efficiency in any stage of any circuit.

**" PRACTICAL WIRELESS "**  
**ALL-STAGE ALL-WAVE SUPERHET**  
described in this issue, employs  
**HIVAC VALVES ONLY.**

**OUR SPECIAL OFFER**

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**COMPLETE KIT OF NINE VALVES for only £4-1-0**



The KIT includes 7 type A.15 (as illus.) All-stage valves and 2 type UU 120/500 rectifiers.

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**THE SCIENTIFIC**  
**VALVE**

**BRITISH MADE**

British Made by High Vacuum Valve Co., Ltd., 111-117, Farringdon Rd., London, E.C.1.

A PAGE OF PRACTICAL HINTS

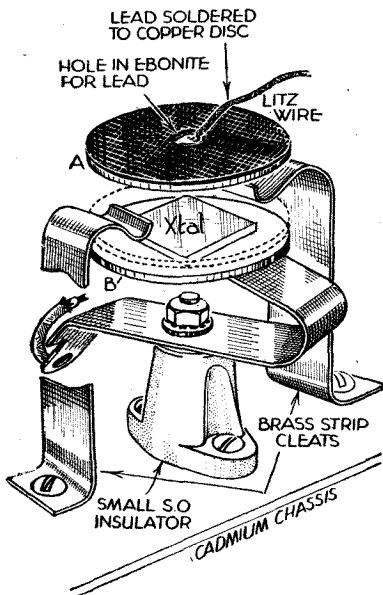
SUBMIT YOUR IDEA

READERS WRINKLES

THE HALF-GUINEA PAGE

A Resilient Crystal Holder

MANY methods of holding a crystal suggest themselves, but to stabilise resonance, it is necessary for a good deal of



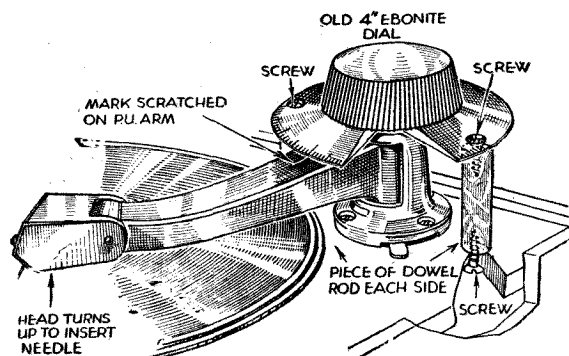
A method of mounting a crystal for stabilising resonance.

trial by error experimenting in the case of loose crystals.

The illustration shows how, by introducing a certain amount of resilience into the assembly, the disc brought to bear upon the crystal is fairly well maintained at an even pressure, whilst taking into consideration the possible chassis vibrations.

Both discs (A) (B) are of copper or brass, and (A) is insulated from the brass side cleats by a disc of reasonably thin ebonite glued to the top.

(B), on the other hand, is soldered to the springy strip which is clamped by a nut and shakeproof washer to the small insulating or stand-off pillar, this pillar providing insulation from the cadmium chassis.



This calibrated pick-up will be found useful for home broadcasting.

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

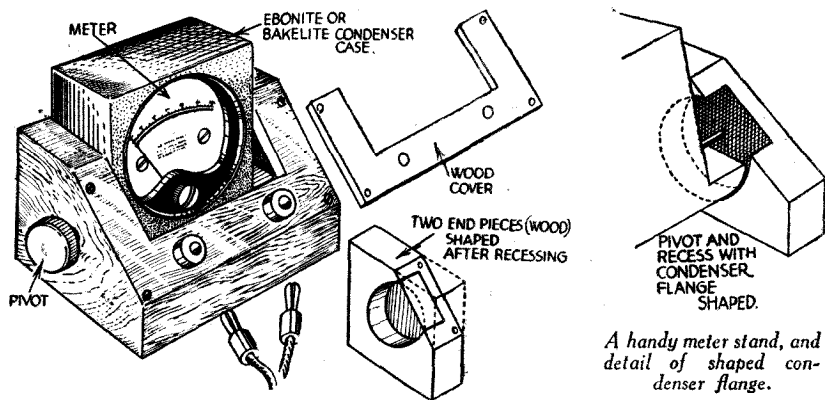
All wrinkles in future must be accompanied by the coupon cut from page 486.

It will be seen that a finer Litz wire lead is taken from the disc (A), the reason being, of course, to ensure that there is no transmission of movement to the disc, and ultimately the crystal, should the wiring get in any way disturbed.—P. L. OSBORNE (Birmingham).

piece of 1/4 in. dowel rod, two screws, and an old ebonite dial. The dial required is the type very popular some years ago, and is of the shape shown in the diagram. It is about 4 in. diameter, and is calibrated in degrees. (It is very likely that the experimenter will have such a dial in his spares box.)

This is mounted above the pick-up arm with the centre of the dial corresponding to the axis of the pick-up arm. It is supported just above the arm, allowing a small clearance, by means of two pieces of dowel rod of suitable lengths fixed opposite one another near the outer edge of the dial. The rod is fixed by drilling holes in the dial and passing small brass screws through them into the dowel rod. The bottom is fixed in the same way to the motor-board.

Next, a mark should be made on the pick-up arm just outside the outer edge of the dial. It is very simple now to set the needle on the part of the record required. The record should be run through and, when the music required begins, the turntable should be stopped and a reading taken. This is done by noting the position



A handy meter stand, and detail of shaped condenser flange.

A Calibrated Pick-up

BEING interested in the home broadcasting of plays, I have devised the following simple arrangement for a pick-up of the turn-up-end type. When broadcasting plays it is often necessary for music to be played between scenes, and very frequently the piece of music suitable is somewhere in the middle of the record. Although, by noting several times the exact position of the needle, it is possible to guess roughly where it should be placed during the play, this is a very unsatisfactory method, and is not very accurate. Some form of calibration is therefore necessary.

The only materials required for this arrangement are a

of the mark on the pick-up arm in relation to the markings on the dial, and the reading will be in degrees. The script can be marked, say, like this:

End of Scene 2. Fade in music—record 5288A, position 105°.

This arrangement will give a fairly good degree of accuracy.—R. WITHEY (Llanelly, S. Wales).

A Simple Meter Stand

SOME pieces of 1/4 in. thick mahogany, together with an old condenser case, were used for making this meter stand.

Two circular recesses, one in each end piece of mahogany, are made, the size of which should correspond to the width of the condenser case used.

A corner of each piece of wood is cut away, the cut being across the top of each recess. A screw is inserted in each centre acting as a pivot. The meter is set in the centre of the condenser case, as shown.—C. PARKIN (Hull).

# ON YOUR WAVELENGTH



## Seeing Across the Atlantic

THE newspapers have hailed the recent freak reception in America of the Alexandra Palace television transmissions as a phenomenon, and most of the newspapers said that this is the first time it has been done. Having a good memory for what has been done before, I looked up the first issue of a journal published in 1928, wherein it was stated that at the beginning of that year the record distance over which television had been publicly demonstrated was between London and Glasgow, by Baird. Then on February 9th, 1928, Baird spanned the Atlantic with television reception. This was, of course, on the low-definition system. This latter demonstration was witnessed by Press representatives and privileged guests, and the transmissions commenced at midnight, or 7 p.m. New York time. This transmission was the first in which the Atlantic was spanned. In order to give the watchers at the New York end an opportunity to get their receiving apparatus in trim, the image of a ventriloquist's doll was transmitted. The "image sound" which this doll produced was transmitted over a telephone line to the Baird Company's experimental station at Coulsdon, and from there it was flashed across the Atlantic on a wavelength of 45 metres. The signal was picked up by an amateur receiving station at Hartsdale on the outskirts of New York, and after the necessary amplification the signal was applied to the receiving televisor, and was clearly visible upon the ground-glass screen, measuring 2in. by 3in. Those who witnessed the reception in New York were Captain O. G. Hutcheson, joint Managing Director of the Baird Company; Mr. Clapp, one of the company's engineers; Mr. Hart, the owner of the amateur wireless station at Hartsdale, and Reuter's representative. After the doll's head image had been satisfactorily tuned in, the transmitter was started up, and a receiver operator at Purley, near London, was called up and asked that Mr. Baird should take his place before the transmitter instead of the doll. Mr. Baird complied with this request, and for half an hour sat before the trans-

By *Thermion*

mitter until the message came through from New York that his image had been seen. Mr. Baird was followed by Mr. Fox, a Press representative; another journalist was similarly televised. Last week's freak reception in America of our television transmissions indicates that our old ideas about the Alexandra Palace transmissions being limited to the optical spectrum are so much bunk, and indicates that we are trying to find theory to fit fact. The performance shows that when we understand our practice a little better and have devised a correct theory, we shall be able to transmit pictures in this country over greater distances. The peculiar turn of fate which carried the pictures across the Atlantic via the ether on ultra-short wavelengths is a broad hint to our television engineers to drop some of their technical jargon and to get busy with long-distance transmission in this country.

## Television Interference

SEE that a certain firm marketing ignition suppressors has embarked upon a campaign to lessen interference due to the ignition system of motor-cars. It is said that the Government departmental vehicles will soon be suppressed, and it is also stated that motor manufacturers will follow suit voluntarily and without waiting for legislation. If they do so, you may take it as a fact that legislation will follow. The firm in question makes the suggestion that every manufacturer of television receivers should insist upon their staff fitting suppressors to their cars; that dealers be asked to advise their television customers to do so, and to sell each customer a set of suppressors, and that the B.B.C. should make a rule that all their vans and employees' cars are suppressed. Even if all these suggestions are adopted it will not solve

the television interference problem. There are nearly five million vehicles on the roads, but, in any case, by far the greater proportion of interference does not come from motor vehicles. I also express the opinion that the Government will not introduce legislation until television has become a National service, instead of merely local to London as it is at present. It is unthinkable that every motorist should have to fit suppressors merely because a few thousand people wish to look in. I think that the problem is one which must be solved by the designers of television apparatus. Car manufacturers, on the other hand, state that the fitting of suppressors for ordinary car radio purposes is unnecessary as it does not give rise to interference. Personally, I am of the opinion that the use of ultra-short wavelengths for television will not last for ever. Once the television wavelength has been increased the problem, so far as motor-cars are concerned, will vanish.

## The Listeners' Service Bureau

THE old Listeners' League has been disbanded, and now bobs up again as the Listeners' Service Bureau with more or less the same facilities. For 2s. 6d. a year the Bureau offers an insurance cover (one announcement says a "free insurance," but I am not quite sure how the 2s. 6d. ties up with this statement), which includes damage to sets by fire, burglary, lightning, storm, etc., up to £50 on one set, or a maximum of £100 on two or more sets. £5 will be paid on damage to an aerial, and third party risks are covered up to £500.

## Crooners Again

REVERTING to the subject of crooners, here is an amusing story culled from an Irish contemporary:

"A crooner died in very needy circumstances, and a friend had a 'whip round' at the broadcasting studios to pay for his funeral expenses.

"The first person he approached was the very hard-boiled commissionaire.

"'I'm collecting money to bury a poor crooner,' he said, 'could you spare just a shilling?'

"'Certainly!' replied the other. 'Here's ten shillings—bury ten of them!'"

THE main details of the circuit were described last week, and there is nothing that needs further comment. The mains power pack consists of two full-wave valve rectifiers with anodes strapped together and connected in parallel. This arrangement is necessary, because the total current consumption of the receiver is approximately 156 mA, and this output is beyond one UU 120/500 rectifier.

It should be noted that a manufacturers' type mains transformer, with colour-coded leads, has been used. A fuse is incorporated in the H.T. positive lead, and filter condensers in the mains leads themselves.

The B.P.120 coil unit is supplied complete with all trimming and padding condensers adjusted to suit the J.B. bar-type condenser specified.

Before dealing with the construction, the uses of switches S5 A, B, C and D (actually one 4-pole three-way switch) may be explained.

S.5 A is to switch the aerial from the frequency changer to the leaky-grid detector circuits for distant or local reception, S.5 B controls the selectivity, S.5 C breaks the H.T. supply to grids G2 and G4 of valve V1, thus putting the frequency changer stage out of action when receiving "locals" and preventing break-through, and S.5 D switches over the output from superhet to straight of valve V3 to the volume control.

### Switch Operations

The combined switch has three positions, and the operation of the various switches is as follows:

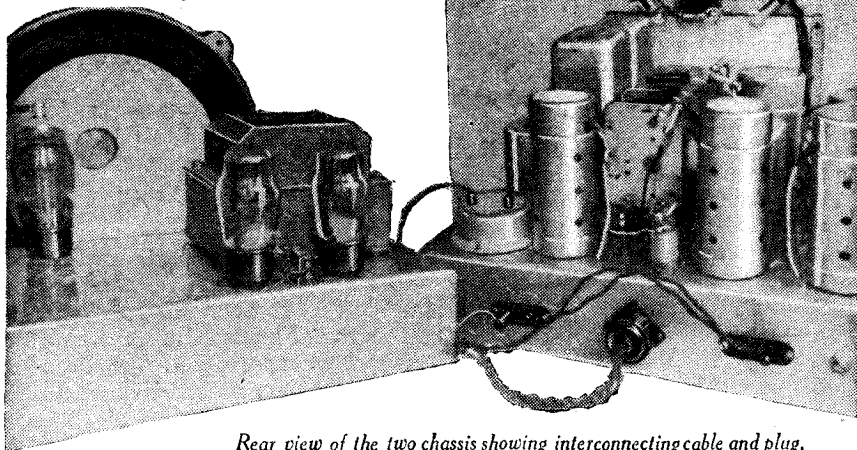
*Position 1.*—Distant reception as a superhet with maximum selectivity:

S.5 A—aerial to terminal G. S.5 B—brown lead of IFT1 to earth. S.5 C—switch closed. S.5 D—output of diode section of V3 to volume control.

*Position 2.*—Distant reception as a superhet with maximum quality:

S.5 A—aerial to terminal G. S.5 B—yellow lead of IFT1 to earth. S.5 C—switch closed. S.5 D—output of diode section of V3 to volume control.

*Position 3.*—Reception of local station



Rear view of the two chassis showing interconnecting cable and plug.

only. Maximum quality reception as a straight receiver:

S.5 A—aerial to coil. S.5 B—switch open. S.5 C—switch open. S.5 D—output of leaky-grid triode section of V3 to volume control.

# BUILDING AN ALL-WAY

This Week We Continue the Description of this N

### Constructional Details

Having made and drilled the chassis, commence with the output stage and power pack, and mount the mains transformer and all components in position. Wiring is quite straightforward, and should not take long. Wire up the speaker lead with four-core flex, if obtainable (otherwise two lengths of ordinary twin flex will do), and having connected the grids of the output valves to the chassis so as to make sure that they will obtain a grid bias supply, you can join leads "X" and "Y" together, and switch on at the actual mains power point. If a slight hum is heard in the speaker after the valves have warmed up you can take it that the output stage is at least in some semblance of working order.

With regard to the radio chassis, the first thing to do here is to mount the condenser and coil unit. The wavelength range on short waves depends a good deal on the layout used. By mounting the coil unit quite close to the tuning condenser, and so having only  $\frac{1}{2}$  in. of wire between the coils and condensers, the maximum wavelength range is obtained. In order to do this, and allow the wave-change switch to clear the tuning dial, it is necessary to mount the condenser on 4BA rods about  $1\frac{1}{2}$  in. above the chassis. Having done this, the leads to the condensers should be soldered, and the coil unit then fixed in position. It is a bit tricky connecting these soldered leads to the coil unit terminals. If extreme wavelength coverage on short waves can be sacrificed in favour of ease of construction, the coil can be mounted farther way, but this will, of course, mean increasing the length of the chassis somewhat.

Having made these connections the rest of the components may be fixed to the chassis, and the valve heaters, dial lamps, etc., wired up.

tively "earthed." This is done by connecting the screen to chassis, preferably at each end where the leads are long.

Check the wiring carefully, and then insert the coupling plug and output lead. Set wavechange switch to medium waves, leave S.5 in position 1 (maximum selec-

### LIST OF COMPONENTS FOR THE

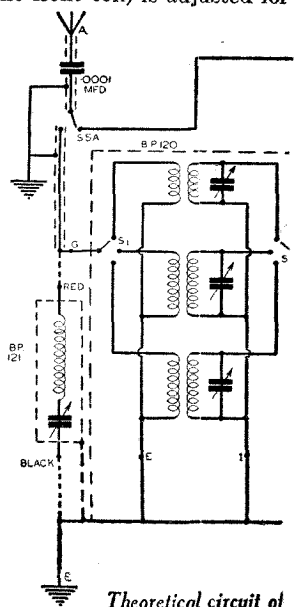
- One Varley B.P.120 465 k/c all-wave coil unit.
- One Varley 465 k/c I.F. transformer, type B.P.122.
- One Varley 465 k/c I.F. transformer, type B.P.124.
- One Wearite P.H.F.2 coil, complete with trimmer.
- One J.B. 5-gang bar-type condenser with all-wave dial.
- Five 5-pin valveholders—Clix V111.
- Six octal valveholders—Clix V218.
- One octal ceramic valveholder—Clix V248.
- Five valve screens—Bulgin type 5000.
- One aerial-earth socket strip—Bulgin P.51.
- One plain socket strip—Bulgin.
- One mains input socket strip—Bulgin P.62.
- Two 10-way group boards—Bulgin C.32.
- One 5-way group board—Bulgin C.31.
- One 4-pole 3-way midget rotary selector switch—Bulgin S.204.
- One L.F. choke, 30 henries at 120 mA.—Wearite H.T.14.
- One mains transformer, 200-250 volts primary, secondaries 500-0-500 v., 4 v. 3A C.T., 15v. 5A C.T., manufacturers' type, colour-coded leads—London Transformer Products.
- Three 5-pin cable plugs—Bulgin P.36.
- One baseboard fuseholder with 250 mA fuse—Bulgin F.12.
- One 50 ohm  $\frac{1}{2}$ W resistance—Dubilier F.1.
- One 20,000 ohm  $\frac{1}{2}$ W resistance, Dubilier F.1.
- One 100 ohm  $\frac{1}{2}$ W resistance, Dubilier F.1.
- Two 1 meg.  $\frac{1}{2}$ W resistances, Dubilier F.1.
- One 15,000 ohm 1W resistance, Dubilier F.1.
- Two 2,000 ohm 1W resistances, Dubilier F.1.
- One 450 ohm  $\frac{1}{2}$ W resistance, Dubilier F.1.
- One 50,000  $\frac{1}{2}$ W resistance, Dubilier F.1.
- Two 250,000 ohm  $\frac{1}{2}$ W resistances, Dubilier F.1.
- One 2 meg.  $\frac{1}{2}$ W resistance, Dubilier F.1.
- One 1,000 ohm 1W resistance, Dubilier F.1.

\*Complete kit of Hivac Valves is offered

tivity), and switch on. It should be possible to at least receive the local station. Then adjust the medium-wave oscillator trimmer (the middle one on the rear coil) until the station is heard at the correct dial setting, after which the medium-wave aerial trimmer (middle one front coil) is adjusted for maximum volume.

### Adjusting the Trimmers

The trimmers should be adjusted on a station as low down on the scale as possible, after which a station at the other end, such as Brussels or Athlone should be tuned in. If it comes in at the correct position, check the L.F. transformers to make sure that they are all



Theoretical circuit of

# VE ALL-STAGE SUPERHET

## ew Receiver, and Give Constructional and Wiring Details

set for maximum volume. If the station is too low on the scale, unscrew the I.F. trimmers slightly until the station is received at its correct setting and then adjust them all for maximum volume. If the station comes in above its correct wavelength screw the I.F. trimmers down about

should hold good for all parts of the scale.

Now turn the wave-change switch to long waves, set the scale to Luxembourg, and adjust the long-wave oscillator trimmer (top rear coil) until the station is received at its maximum volume. Now tune in

frequency round about 465 kc/s but, unless they are all accurately adjusted to exactly 465 kc/s, selectivity will suffer, and the stations will not all come in at their correct settings. The liner is simple to use. Connect the input circuit to the main H.T. line and earth, and the output to condenser C1 and earth. An 0.1 mfd. condenser should be joined between terminal "B" of the coil unit and earth. If an output meter is available, simply adjust the I.F. trimmers until a maximum reading is obtained. If no meter is used, carry out the adjustments for maximum whistle. Lining up I.F. transformers is by far the most difficult

### ALL-WAVE ALL-STAGE SUPERHET.

- One 40,000 ohm 1W resistance, Dubilier F.1.
- Two 100,000 ohm 1W resistances, Dubilier F.1.
- Four 50,000 ohm 1W resistances, Dubilier F.1.
- One 200,000 ohm 1/2W resistance, Dubilier F.1.
- One 100 ohm 1W resistance, Dubilier F.1.
- One 120 ohm 1W resistance, Dubilier F.1.
- One 8,000 ohm 1W resistance, Dubilier F.1.
- One 30,000 ohm 1W resistance, Dubilier F.1.
- One 50,000 ohm volume control, Dubilier type B.
- One 250,000 ohm volume control, Dubilier type J.
- Twelve 0.1 mfd. tubular condensers, Dubilier type 4003/S.
- Three 0.0001 mfd. condensers, Dubilier type 690W.
- Two 0.0002 mfd. condensers, Dubilier type 690W.
- One 0.01 mfd. condenser, Dubilier type 4601/S.
- One 0.5 mfd. condenser, Dubilier type 4608/S.
- One 0.005 mfd. condenser, Dubilier type 691W.
- Two 25 mfd. electrolytic condensers, Dubilier type 3016.
- One 50 mfd. electrolytic condenser, Dubilier type 3016.
- One 2 mfd. condenser, Dubilier type LEG.
- Two 4 mfd. condensers, Dubilier type LEG.
- One 0.01+0.01 mfd. condenser, Dubilier type BE328.

Approximate cost £11 10s. 6d.

### VALVES:

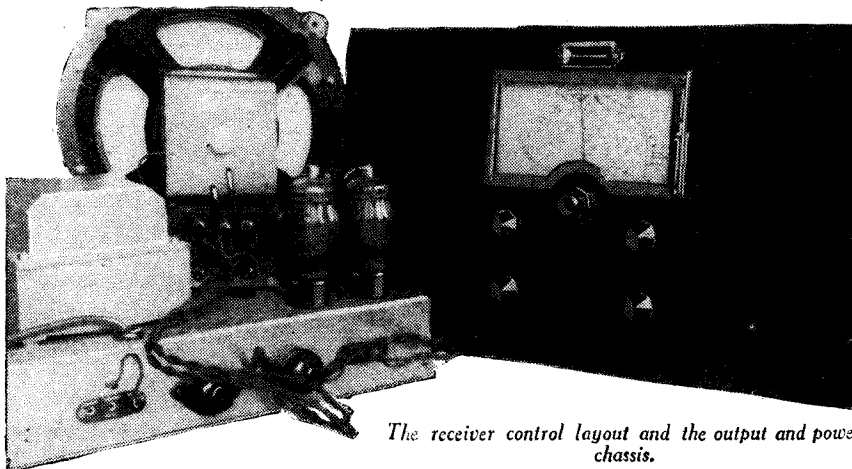
- 7 Hivac-Harries All-Stage Valves, type A.15. }
- 2 Hivac UU.120/500 rectifier valves. }

### LOUDSPEAKER:

- One 1,250 ohm field mains-energised speaker with transformer to match push-pull output stage, 12,000 ohm centre-tapped—W.B. type EM/S.

by the makers at a special price of £4-1-0.

half a turn, and repeat the above procedure. When the top part of the scale is tuned correctly, return to the bottom and readjust the medium-wave trimmers to bring the station in at its correct setting. Again tune in at the top end of the scale, and adjust the I.F. trimmers once again to make the setting correct. This time the adjustment



The receiver control layout and the output and power chassis.

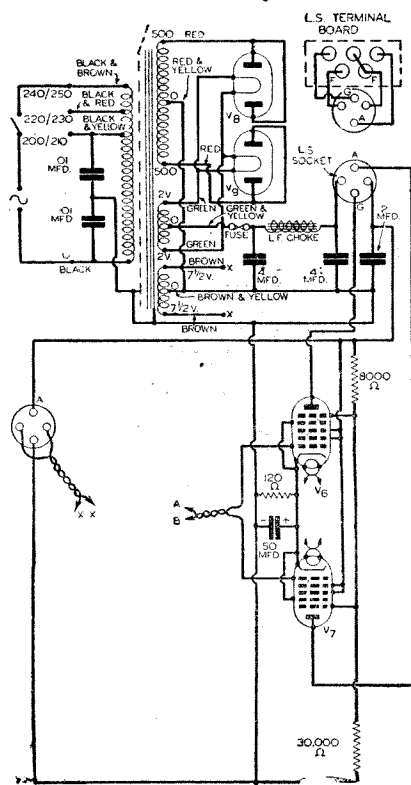
Hilversum, and note whether Droitwich, Radio-Paris and Hilversum come in at their correct settings on the dial. If they are high up on the scale, screw up the long-wave padding condenser (left-hand rear of coil unit). If they are too low, unscrew the padder. Having made this adjustment so that the stations come in correctly, return to Luxembourg, and adjust the long-wave aerial trimmer (top front coil) for maximum volume.

### Operating Notes

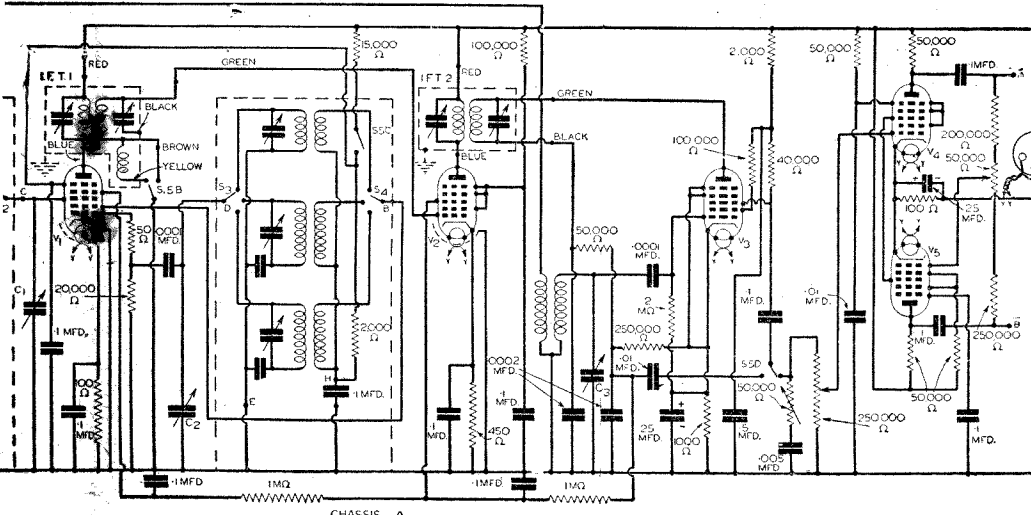
By proceeding slowly and carefully the trimming need not prove difficult, but it becomes far easier and more accurate if a Bulgin 465 kc/s I.F. liner is used to adjust the I.F. transformers. It is obvious that these can all be brought into line at any

part of trimming, and the Bulgin accessory is well worth while to any serious experimenter.

Having completed the medium- and short-wave adjustments, "go round the dial" and see what stations you can tune in.



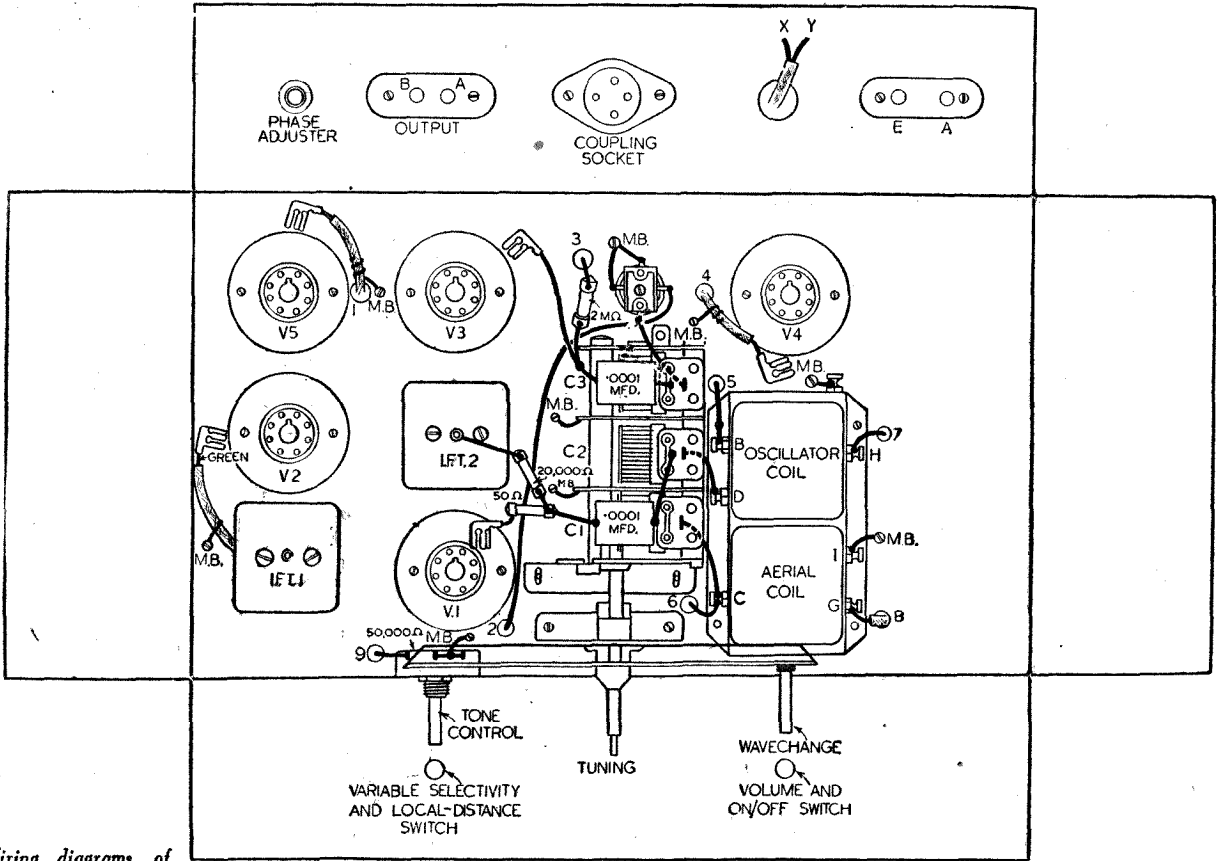
CHASSIS B



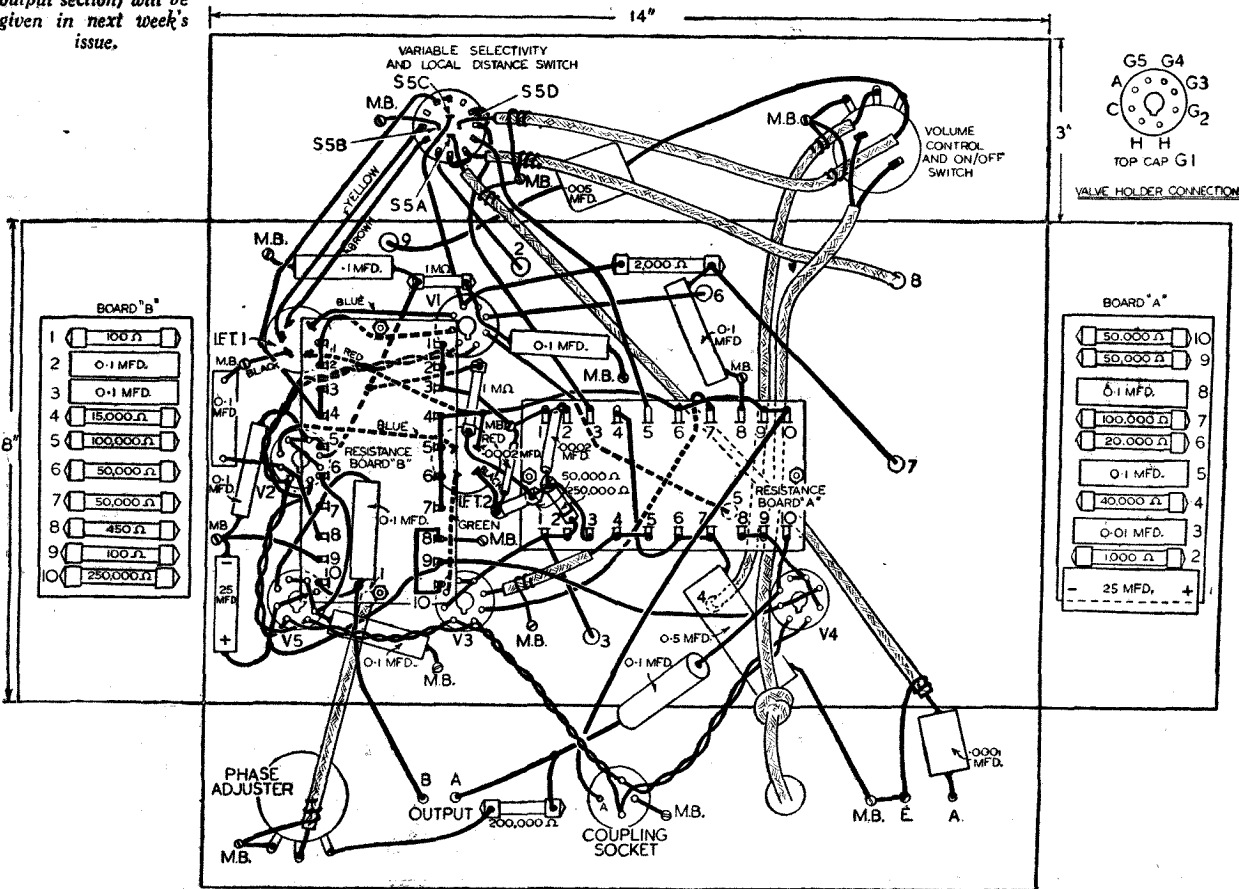
CHASSIS A

the All-wave All-stage Superhet, showing the division of the receiver and mains sections on the two separate chassis, A and B.

WIRING DIAGRAMS OF THE ALL-WAVE ALL-STAGE SUPERHET



Wiring diagrams of chassis B (mains and output section) will be given in next week's issue.





# Notes from the Test Bench

## Screening a Lead

**I**N some cases of exceptional instability it is found essential to resort to screening, even of those leads which should not normally be so treated. An instance is in the lead to a top grid cap of a valve where a low capacity between the grid and earth is necessary to avoid loss of signal strength. In many cases a thick wire is pushed into a length of screening sleeving and this is earthed, with the result that the equivalent of quite a high capacity is joined between grid and earth. A receiver was recently tested where this had been done, and results were very inferior. A simple plan in such a case is to use a very thin wire for the connecting lead, and the largest diameter-screening sleeving which is obtainable. Push the wire well into the sleeving and it will adopt a zig-zag course, reducing capacity loss.

## A Soldering Hint

**A**N I.F. transformer was recently inspected to trace a fault, and it was found that a lead attached to the pre-set condensers had broken adrift, having probably been poorly soldered in the factory. As this lead was at the top of the can it appeared at first that the trimmer unit would have to be unscrewed and the entire coil dismantled, but it was subsequently found possible to resolder the connection by adapting a standard soldering iron. The connecting wire was very thin and there was only a small tag attached to one side of the pre-set condenser, so that very little heat was required. A length of 18 tinned copper wire was therefore wrapped round the bit of the soldering iron, and although this was an electric model, sufficient heat was carried along the wire to enable the joint to be re-made satisfactorily. This could not be carried out, of course, where a large expanse of metal is present to conduct away the heat of the iron.

## Anti-interference Aerial

**A** LISTENER recently experienced severe trouble from machinery, signs and trams, and although he tried many types of home-made anti-interference aerial he found it impossible to obtain noise-free results owing to inability to put the aerial high enough or otherwise place it due to lack of garden space. Eventually we suggested a buried aerial, and this was made from a 150-turn plug-in coil of the old two-pin type, which was enclosed in an old copper screening can. A lead was soldered to one pin on the coil and taken through a copper disc enclosing the can, and subsequently joined to the aerial terminal. The can was buried 12in. below the ground.

# HERE'S QUALITY RADIO

|| That Saves You £ £ £ 's ||

**Pr. Wireless ALL-STAGE ALL-WAVE SUPERHET**  
**Pilot KIT "A" CASH, C.O.D. 12 Gns.**  
 CARR. PAID  
 Yours for 21/9 down and 12 monthly payments of 2/10.

Comprising all first specified parts for the receiver, including Varley and Wearite coils, I.F. and Mains Transformers, and ready-drilled Receiver and Power Unit Chassis. Wire flex and screws, but less valves, cabinet and speaker.

**SPECIFIED VALVES.** Complete set of 9 Hivac valves, Cash or C.O.D. 24:1:0 for add 7/- to Kit "A" deposit and monthly payments.

SEND NOW FOR DETAILED PRICE LIST

**S.T. 900 ALL-WAVE BATTERY SUPERHET**

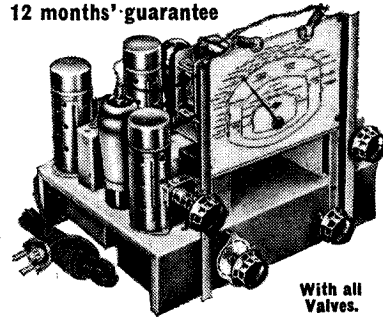
**WITH FREE DIAGRAM AND INSTRUCTIONS**  
 Build now this amazing all-wave receiver tuning from Television to 2,000 metres. Kit "A" comprising ALL parts less coils and valves, but with free station-name dial.

**55/6 CASH, OR 5/- DOWN** balance in 11 monthly payments of 5/3.

**S.T. 900 COMPLETE KIT.** As Kit "A" but including 10 B.T.S. One-Shot Inductors. Station-name dial and full constructional details less valves. 75/6 cash or C.O.D. (You save 7/-) or 6/- down and 12 monthly payments of 6/6. If specified valves required, add 30/3 to cash price, or add 2/9 to deposit and to each monthly payment.

**YOU SAVE £3:3:0 on this MODERN 8-STAGE ALL-WAVE A.C. SUPERHET CHASSIS**

12 months' guarantee



With all Valves.

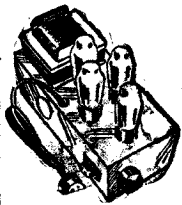
8 Stages, 6 valves. Provides 3-watts high-fidelity output, 4 wave-ranges, 10-2,000 metres. Automatic volume control. Illuminated easy-to-read scale engraved station names and metres. Pick-up sockets. Size 11 1/2" wide, 9 1/2" high, 2 1/2" deep. Replace your old receiver NOW. Secure this wonderful value-for-money chassis and enjoy radio listening at its best. Guaranteed for 12 months.

**Normal Value 9 1/2 Gns. OUR PRICE £6:19:6**

TERMS: 8/9 deposit and 18 monthly payments of 8/9. Specially matched speaker 27/6 extra or same deposit but add 1/10 to each monthly payment.

**8-Stage ALL-WAVE RADIOGRAM.** Above quality replacement chassis housed in beautiful cabinet, tastefully veneered in walnut. Garrard Motor and high-fidelity speaker fitted. Guaranteed for 12 months. Normal Value 19 gns. **OUR PRICE 13 gns. or 15/- down and 18 monthly payments of 17/6.**

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Employs a highly efficient 4-valve push-pull output circuit. Undistorted output of 6-7 watts, with pleasing tone balance. Sound range 500 feet. Specially constructed on a steel chassis with volume control fitted. Recommended for speech and gramophone amplification. Complete with 4 valves, fully tested and ready for immediate use. Normal value 25 5s.

**OUR PRICE £3.10.**  
 Terms: 5/- down and 11 monthly payments of 6/9.

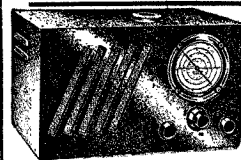
**Real PROFESSIONAL MIKES at a Great Saving**



For Home Broadcasting, P.A. work, Crooning, etc.—see that you invest in a Quality Mike. Peto-Scott Microphones are built up to the standard of sensitivity and robustness essential for home and professional use. Order your Peto-Scott Table or Floor-stand model NOW. Both models employ the new Peto-Scott high-fidelity Transverse Current Type Microphone Unit and are supplied complete with trans-

former and 25 feet of flex ready for instant connection to your radio set or amplifier.  
**TABLE MODEL** as illustrated. Cash or C.O.D. 25/- or 2/6 down and 9 monthly payments of 8/-.  
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**OWN A SET that will get you REAL SHORT-WAVE THRILLS**



**TROPHY 3**

Battery and A.C. models. Amazing sensitivity over the complete wave-range 6.2 (television) to 650 metres. Metre-calibrated dial. Moving coil speaker incorporated with provision for using phones. Pleasing metal cabinet, fully guaranteed and supplied complete with inductors for 12-62 metres.

**A.C. MODEL.** Cash or C.O.D. 46 6s., or 7/6 down and 18 monthly payments of 7/9.  
**BATTERY MODEL.** Cash or C.O.D. 45 12s. or 7/- down and 18 monthly payments of 7/-.

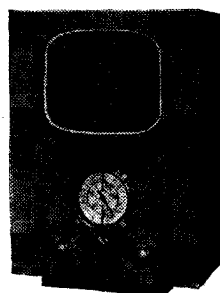
N.B.—If coils required for complete coverage, 6.2-550 metres, add 16/9 to cash price or 1/- to deposit and payments.

**YOU SAVE £3:3:0 ON THIS 1939 ALL MAINS ALL WAVE**

**5-valve S/HET NORMAL VALUE £9 : 19 : 6**

**SPECIAL OFFER CASH C.O.D. £6.19.6**

- 5 Valves, 6 Stages.
- All-waves. 16-2,000 metres.
- Automatic Volume Control.
- Station-name dial.
- F.U. Sockets.
- 3 Watts Output.
- Beautifully walnut veneered cabinet.
- All mains A.C./D.C.

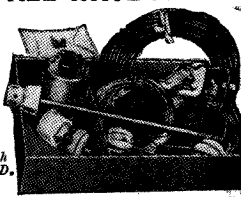


Here is marvellous value in modern Radio. A complete ready-to-play 1939 all-mains all-wave 5-stage super set at an amazingly low cash price and superior on terms for as little as 5/- down. All-world reception is provided on 16-2,100 metres and the speaker incorporated ensures natural reproduction right up to the full output of 3 watts. The beautifully finished cabinet will grace any home furnishing scheme. 5/- deposit secures balance in 18 monthly payments of 8/10. **ORDER NOW—SAVE 3 5/6.**  
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**5/- DOWN**

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# LETTERS FROM READERS

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

## A Library Nucleus

SIR,—Many thanks for "Practical Wireless Service Manual" awarded to me in "The Best Set I Ever Built" competition. This book, plus the one you awarded me in the same week of 1937 and the one I received as a Christmas present, make a splendid nucleus of works by the Editor for forming a library around. Like all other things, interest grows by what it feeds on, and an occasional browse in these books helps to digest the food PRACTICAL AND AMATEUR WIRELESS prolifically supplies.—W. H. STACEY (Ringmore, Devon).

## A Prizewinner's Thanks

SIR,—Please accept my best thanks for the book which I received for submitting the correct solution to Problem No. 326. I should like to mention that I started taking *Amateur Wireless* some time before its amalgamation with *Practical Wireless* and have kept every copy, considering them to constitute a valuable reference library. Chiefly as a result of knowledge gained from your valuable magazines, I have been able to make quite a useful spare-time hobby of wireless service work.

Best wishes for the future of PRACTICAL AND AMATEUR WIRELESS.—L. H. ELKINS (Newbury).

## A Five-valve Battery S. W. Superhet

SIR,—I must congratulate your paper on completing another year of good work towards the cause of amateur radio, and I am very grateful to PRACTICAL AND AMATEUR WIRELESS for a year's good reading. During the year you have given the details of many short-wave receivers, and one communications receiver, but what I think is lacking is a short-wave battery communications receiver employing from five to six valves, for the man who is either out of the power line, or who does not like using mains on the short waves. A suggestion for a circuit which I now put forward is as follows: R.F. amplifier, frequency-changer and oscillator, iron core L.F. stage, 2nd det. A.V.C., and 1st L.F. output pentode; if it were extended to six valves a separate oscillator could be included. Instead of a double diode-triode and output pentode, a double diode-pentode could be used, thus enabling the valves to be kept down to five, with a separate oscillator.—C. HEYNE (Briton Ferry, Glam.).

[What do other readers think of this suggestion?—Ed.]

## A 20-metre Log from Notts

SIR,—Here is a log from a Nottingham district which may be of interest to other readers; also a copy of my log-book. All stations received by loudspeaker. Receivers: three-valve, all-wave, and 0-v-1, home-made. QSL cards from VK2XU, W7BVO, W2IKV, and others.

D.X. on 20 Metres  
VK2XU, K4EMG and K4FAY, YV5AG, VP6YB and VP6MR, VP7NH and

VQ4KTB, PYIAF, PY2AH, PY7AI, ZBIL, W1=33; W2=37; W3=25; W4=10; W5=2; W6=2; W7=3; W8=17; W9=9; VEI=6; SU=4; CN=7; FA=4; I=4.

Date.	G.M.T.	Wave-length	Recr.	Call.	QRM	QSB	Weather	Station Worked or Called.	Rpt. Q R
7/11/38.	22.14	20m.	A.W.	VP6MR	NH.	---	Fine	Calling GMSMN	5 8
10/11/38	22.08	20m.	A.W.	W3FJU	NH.	---	Fine	Signing OH W9EYW	5 9
11/11/38	19.20	20m.	A.W.	W2JKQ	NH.	---	Fine	Calling G5ML	4 8

This above is an example of my log-book entry. Further details in a report includes aerial, district, power, and distance from London.—CHARLES SHEPPERSON (Orston, Notts).

## Multiple Mains Connections

SIR,—I should like to add a comment to the article on Multiple Mains Connections in the B.L.D.L.C. section of your issue dated December 24th, 1938.

In dealing with the loading of a light pendant it is pointed out that great care must be exercised not to overload the flex in order to avoid the risk of fire. Actually, there is another factor which comes into force before the carrying capacity of the flex is considered. This is the capacity of the lamp-holder; in accordance with the

CUT THIS OUT EACH WEEK.

## Do you know

—THAT a directional aerial array may be aligned by using a compass and map and a known station bearing.

—THAT it is often necessary to mount an L.F. transformer at an angle to the baseboard to avoid interaction.

—THAT hum troubles may often be introduced by vibration through a baseboard or chassis, and not only by field interaction.

—THAT it is sometimes possible to add a split winding at each end of a standard H.F. choke to convert it into an all-wave type.

—THAT loudspeaker cabinets may be lined with various materials to avoid resonance effects.

—THAT one of the cheapest materials for the above purpose is ordinary corrugated cardboard.

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 Berne Convention and the U.S.A. Reproductions or imitations of any of these are therefore expressly forbidden.

I.E.E. regulations the maximum current which can be taken from it is 2 amperes, and it is necessary to keep the connected load within this figure to avoid overheating.—FRANK WEBB (York).

## Amateur Transmitting—the Friendly Spirit?

To Norman A. L. Timbers, Esq. (G5TR)

DEAR O.M.—With reference to your letter of the 28th instant, in PRACTICAL AND AMATEUR WIRELESS (issued dated December 31st, 1938), I beg to inform you that I, the writer of the "sour grape" letter of the 3rd inst., do swear by all I hold sacred that the contents of the said letter were emphatically true to their finding. That is to say, I spoke the truth as was my experience.

You admit there "are a few exceptions" and I was unlucky to meet the "exceptions" and spoke of my findings accordingly, thus you will note that I did not pour unfair criticism on the amateur radio sphere, but only on individuals who, singularly, dwell in the sphere.

No, Sir, not "nearly all amateurs are willing to allow others to inspect their stations." Ever heard of "class distinction" . . . without a doubt! And I have met the so-called amateur "toffs" who are grand spouters till it comes to giving a learning chap a little help. See also letter in PRACTICAL AND AMATEUR WIRELESS of December 17th, 1938, in "Thermion's" page, column 2, writer being E. D., of Aldershot, which proves that I am not the only "sour grape" in amateur radio, and if space allowed, I am sure there would be many more with the same experience as I have encountered.

However, I far from resent your harsh remarks, which, of course, come from "treading on your pet corn"—that is, you being a fully-licensed amateur. No offence in the remark, O. M., and I am sorry that distance is such—London to Lancashire—that it makes it impossible to materialise your sincere "welcome to get acquainted." I believe you meant it.

I am sure you will agree that there is a big difference in the psychological effect of schoolboy to man and of man to man. Who would care to snub a schoolboy when he pays the approached person the honour of inquiring from him?

By the G.P.O. being unfair, my reference meant in this respect: How is it that youngsters of fifteen, sixteen and seventeen (not so much the latter age) are holders of the A.A. licence, whereas, on the other hand, conscientious fellows (oh, yes, there are many who are more unlucky than unlearned) just fail in getting their A.A. licence.

Of course, a junior has a guarantor, but where does the qualified knowledge to have and to hold (until twenty-one years of age) from the age of fifteen come in?

Anyhow, I hope you won't take my letter as a rude one, because it is far from being meant as such.

Although still on my own in a "one-eyed" little place, I am getting on quite nicely; even so, my pace is slow, and I am not daunted. My luck will change some time. Without prejudice to your letter, O. M., very best 73's and a 1939 of fb; good health, and tons of QSOs not forgetting the "sour grapes"—, best left alone unless one feels better for "plucking" at one.—A GENUINE GUY STILL (Haves, Middlesex).

# Broadcast Talks

It is interesting to note that in addition to the retention in the B.B.C. programmes of such tried favourites as "World Affairs," "The Week in Westminster" and "The World Goes By," several new series are to be included in the schedule of talks for January to March, 1939.

On Sundays, F. Buckley Hargreaves will continue his fortnightly film talks, which will alternate at 6 p.m. with "Book-shelf." The speakers in the latter programme will be chosen from a regular panel which includes Sir Hugh Walpole, Desmond MacCarthy, Frank Swinnerton, Arthur Bryant and John Brophy.

The five-minute Monday talks from New York on "The Week on Wall Street" will continue. In the Regional programme a new series entitled "Recent Inventions" will alternate at 7.30 p.m. with "Science Review." At 8 p.m., in the National programme, W. E. Williams will be the editor of a series of talks entitled "Children at School."

## The Press To-day

A series of ten talks on "The Press To-day" will be heard each Tuesday at 9.25 p.m. on the National wavelength. The rise of the Press in this country will be described and many aspects of journalism will be touched on by speakers with first-hand experience. The series opened on January 3rd with a talk by Tom Clarke on "How a Newspaper Works." On Wednesdays, E. Donough O'Brien will continue his "Whitehall Tour." Visits will be paid, among other places, to the Foreign Office, the Air Ministry and the Ministry of Transport. Also on Wednesdays, the popular last-minute news feature, "The World Goes By," will continue. Mr. F. Rayns will continue his Friday talks on "Farming To-day."

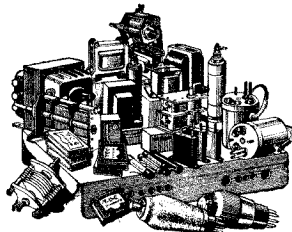
Alistair Cooke will continue talking "Mainly About Manhattan" on Thursday evenings. The speakers in "The Week in Westminster," to be broadcast each Friday at 6.45 p.m., will be Ronald Cartland, M.P., Wilfred Roberts, M.P., and Fred Marshall, M.P. At 9.25 p.m. talks entitled "Tight Corners" will be given by people whose adventurous lives have involved them in hairbreadth escapes of one sort or another. The first speaker will be a man whose profession it is to crash aeroplanes. This series will be followed by "Australia Speaks," which will run on the same lines as "Canada Speaks." The difficulties of direct transmission have made it necessary for the talks to be recorded in Australia. They will be introduced each week by Michael Terry, an Australian living in London.

On Mondays and Wednesdays Eric Gillett will be heard giving readings from Tolstoy's epic historical novel, "War and Peace." Talks on the theatre, short stories, parlour games and spelling bees will continue in the programmes and there will be several discussions on vital topics of the day.

Further details of all these talks will be found in a booklet called "Broadcast Talks, January to March, 1939," which may be obtained on application by post to the B.B.C. Publications Department, 35, Marylebone High Street, London, W.1, price 2½d. post free, or on personal application to Broadcasting House, Portland Place, London, W.1, or to any B.B.C. Regional office, price twopence.

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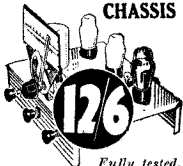
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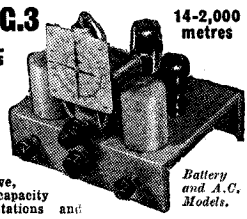


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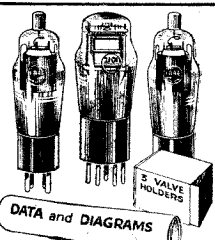
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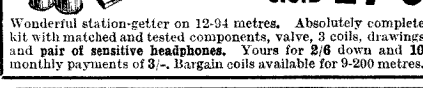
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Practical Television

January 21st, 1939. Vol. 3. No. 135.

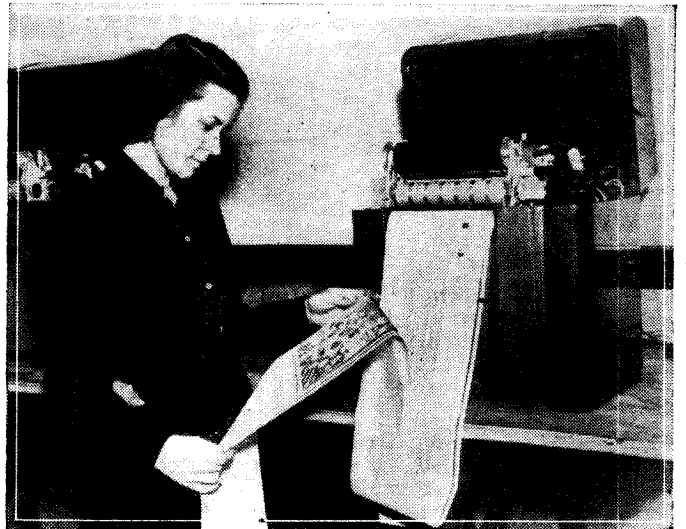
A Welcome Gesture

THE vexed question of interference, insofar as it upsets the performance of television receivers, has been the subject of investigations by more than one technical committee, and the conclusion has been reached that the worst offender is the ignition systems of motor vehicles of all classes. Any domestic residence, within fifty yards or so of a road on which there is a considerable volume of traffic, has been almost ruled out as a prospective site for a television receiver installation, because the pictures have been ruined by the familiar light splashes which appear on the screen, while, in addition, the accompanying sound has also suffered. Valiant attempts have been made by television manufacturers to overcome this trouble, but this has meant very elaborate and

apart from the case of expensive high-powered racing-car engines, there will be no material reduction in efficiency. This voluntary effort on the part of the motor-car industry is indicative of the helpful spirit existing between British industries.

Standardised Terms

THE Technical Section of the R.M.A. Television Development Sub-Committee, under the Chairmanship of H. J. Barton-Chapple, are to be congratulated on the work they have done in connection with the standardisation of television terms and receiver-control markings. The whole of their recommendations were set out in detail in PRACTICAL AND AMATEUR WIRELESS dated December 31st, 1938, and it is clear that the committee were guided by the feeling that some of the chaos which



Reading the world's first radio newspaper as it emerges from the receiver. Details of the apparatus, and an illustration of the transmitter were given in last week's issue.

expensive aerial arrays often located in a most inconvenient position, with the result that there is a long length of feeder cable. It was recognised, however, that the only right and logical way of tackling the problem was to suppress the cause of the interference at its source, and not evolve a cure or palliative at the receiving set itself. It was known that the Government were sympathetic to the representations which had been made to it from responsible quarters, but legislation is inevitably hide-bound by long periods of delay. It is for this reason that the news of active co-operation from the Society of Motor Manufacturers and Traders is regarded as a most welcome gesture. By all accounts this body has been convinced of the serious situation in which the growing industry of television was placed, and has agreed to investigate the position. The solution is very inexpensive, and merely consists of fitting suppressors to the engine ignition system. Opinions vary as to whether this upsets engine performance in any way, but the Institution of Automobile Engineers are carrying out tests, and it is hoped that,

existed in the early days of radio should be avoided in the new science of television. The editor of this journal, Mr. F. J. Camm, has, right from the first issue, always been opposed to any looseness of expression, and although it is difficult now to break away from what has become accepted practice in the realm of radio terms and expressions, there is certainly no need to follow this practice in television. A recent investigation brought to light the fact that with the commercial television receivers on the market, quite widely differing terms were being used to mark controls which really carried out identical functions in the sets. Not only does this lead to confusion in the dealers' shops when demonstrations are being undertaken by the salesmen, but the customer is often at a loss to understand what is being done. By reducing the number of major controls on the front of the set to the barest minimum, and having uniformity of marking for both major and minor controls, it is certain that every set will be handled more intelligently, and increased efficiency from the point of view of picture quality will accrue.

# TELEVIEWS

## Long-distance Television

THE recent report of the reception in America of television pictures of Joan Miller has conjured up visions of world-wide television services in the ordinary daily press. As readers of this journal will know, this is far from the truth. It is not the first time that the human face has been seen as a televised image on the other side of the Atlantic, for Baird spanned the continents nearly eleven years ago, using a wavelength of 49 metres, and followed this up a little later with mid-Atlantic reception on the *Berenaria*. Two years ago R.C.A. engineers started studying the long-distance transmission properties of ultra-short waves, and built a special directive aerial system at Riverhead for this purpose. Consistent scientific observation has enabled them to forecast with a remarkable degree of accuracy the range of wavelengths which will give long-distance reception at certain periods of the year. This is based primarily on the reflective properties of the different ionised layers of the upper atmosphere. As a general rule, it has been found that except on rare occasions the reflective properties do not extend to wavelengths below 10 metres. On the other hand, the uppermost and densest of the layers attains its maximum density during the winter months, November and February being particularly favourable months, and it is at these periods that vision and sound signals from Alexandra Palace have been seen and heard by the Americans. Another curious factor that has been learned by using the directive receiving aerial array is that these television signals often travel by the longer route to America, the better results being secured with the aerial beamed on the west instead of the east. Until very much more data has been accumulated dealing with the vagaries of the propagation of ultra-short waves, it will be impossible to be at all dogmatic or lay down hard and fast rules. One thing is certain, however, and that is the pessimistic figures for vision signal service areas is at least doubled or trebled unless the environment at the site of reception has some very peculiar geographical features.

## Small Screens Not Favoured

ALTHOUGH the Germans are still not in an advanced stage as far as their television service is concerned, they appear to have fairly definite views as to the minimum size of the picture for domestic receivers. The 5in. and 7in. cathode-ray tubes are by no means popular, and it is for this reason that several manufacturers are carrying out experiments with projected pictures, particularly front projection. To meet this last-named case some tube designers have departed from normal practice, and developed a form of projection C.R. tube whose screen is not at right angles to the scanning and picture reconstituting beam of electrons. This normally brings about a keystone or trapezium distortion in the picture shape, but by applying an electrical correction to the line scan deflection pulses this is rectified quite efficiently. From the angulated C.R. tube fluorescent screen a properly designed lens focuses the picture on to an inclined mirror, and from here the electron beam passes to a second mirror which gives a front reflection on to a lid screen inclined about ten degrees from the vertical. The results that have been achieved in this way so far are most promising, and really follow the accepted practice of cinemas or even home-cine outfits.

Furthermore, although there is an additional light reflecting surface it has been found that this does not entail such a high degree of light loss as arises in the case of a screen manufactured for back projection, such as is popular in this country. There is also a reduction in the directional effect of the picture, and this is most important when it is desired to give any form of demonstration to a large gathering of people. With directional screens, the angle of vision is too narrow to give comfortable viewing except to a relatively small audience.

## C.R. Tube Screens

IT had always been apparent with normal cathode-ray tube television receivers that the picture on the screen where the electrons strike the powder surface is much brighter than that observed on the reverse side. If the screen powder that is bound

to the glass face by a coating mixture is too thick, then picture brightness suffers very materially. It is for this reason that a proposal has been put forward for covering the large glass end of the tube bulb with a loose powder of such a depth that it forms a smooth plane surface. This means, of course, that the tube has to be used and mounted in an inverted position so that the powder can stay in place as a result of gravitation. Observation of the picture would then be undertaken by means of a reflecting mirror and, due to the thickness of the fluorescent powder layer, is considerably brighter than that seen by the more usual method of viewing. Then, again, if by chance the screen was burned, due to the beam of electrons becoming stationary, normality would be restored by agitating the powder material until a fresh surface was presented to the beam of electrons.



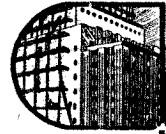
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# LATEST PATENT NEWS

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume or in bound volumes price 2s. each.

## SUPPLY SYSTEMS FOR VACUUM AND LOW-PRESSURE DISCHARGE APPARATUS.—Baird Television, Ltd., and Merdler, L. R. No. 492,665.

In a television receiver the cathode-ray tube 1 or other electronic picture re-constituting device has its control electrode supplied with a bias voltage from a power pack 3 which is connected in series in the anode-cathode circuit of the tube with at least part of a second power pack 4 which supplies the anode potential whereby the anode to cathode potential is increased. The biasing source 3 for the modulating electrode also supplies the receiving valves or scanning oscillators. The power pack 3 for the modulating electrode is connected to a potentiometer 2 from which appropriate tappings are taken to the cathode and modulating electrodes so that part of the voltage of the source 3 is added to that of the pack 4 in the anode to cathode circuit. (Fig. 1.)

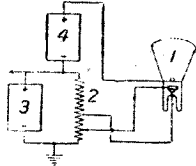


Fig. 1.

## ADJUSTING WIRELESS APPARATUS; FRICTION GEARING.—Plessey Co., Ltd., Morrison, P. H., and Packman, P. J. No. 492,548.

In an adjusting device for rotatable shafts, for example, the tuning shaft of a radio receiver, a hollow shaft 12 screwed at 13 to the tuning condenser shaft 10 is rigid with a cup member 14 secured to a knob 15 which is manually rotated to effect approximate tuning directly. For fine tuning, a thumb wheel 20 projecting through a slot in the knob 15 is rotated. The thumb wheel is keyed to a spindle 21 rotatably mounted in the cup member 14, and drives a shaft 32 through reduction gearing comprising

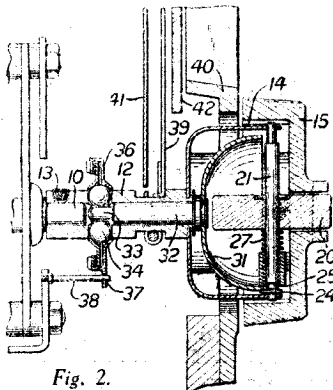


Fig. 2.

flanges 24, 25 pressed by a spring 27 frictionally to engage and rotate the edge of a cup member 31 rigid with the shaft 32. The shaft 32 drives the condenser shaft 10 through epicyclic reduction gearing comprising balls 34 mounted in a cage formed by holes in the hollow shaft 12 and engaging the reduced end 33 of shaft 32 and conical rings 36 resiliently held together and anchored at 37, 38. A tuning pointer 39 is fixed to the shaft 12 and moves between a scale 41 and window 42 carried by an escutcheon 40. The pointer is arranged parallel to the axis of the thumb wheel 20, and, during fine tuning, moves in the same direction as that of the projecting portion

of the thumb wheel. The pointer may, alternatively, be driven rectilinearly by a cord from the shaft 12 and co-operate with a rectangular dial. (Fig. 2.)

## VARIABLE CONDENSERS.—Hunt, Ltd., A. H. No. 491,642.

In a variable condenser of the "trimmer" type a clamp 228 holds the flexible plate 224 against the base 220 and bears a stiff tongue 240 extending under the base, pierced with a threaded hole for tight engagement of the adjusting screw 230 which passes freely through the base. The flexible plate has a downwardly extending part clamped by the

flange 238 of the bracket and also a bent-over part held by the rivet 244 which also engages the tongue 240. The fixed plate 22 is riveted to the base at 242. Arms extending sideways from the bracket may bear feet 254 to secure the condenser to a panel. Modifications are described in which a "gang" of such condensers are held in a

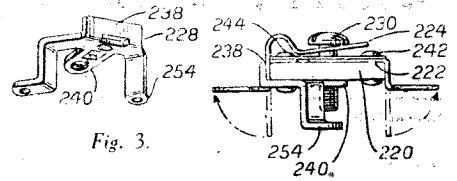


Fig. 3.

single bracket electrically connecting all the movable plates. The threaded hole for reception of the screw 230 may be slit at the side to give a resilient grip. (Fig. 3.)

## NEW PATENTS

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

### Latest Patent Applications.

- 37239.—Barraclough, G. D.—Radio receivers employing automatic frequency control. December 22.
- 37403.—Cork, E. C., and Dean, J. N.—Capacity-loaded aerial conductors. December 23.
- 37375.—Edwards, E. J., Cope, J. E., and Pye, Ltd.—Superheterodyne receivers. December 22.
- 37271.—Farnsworth Television, Inc.—Electronic amplifier. December 22.
- 37373.—Jones, W., and Pye, Ltd.—Television, etc., systems. December 22.
- 37374.—Jones, W., and Pye, Ltd.—Saw-tooth oscillation generators. December 22.
- 37372.—Jones, W., Cope, J. E., and Pye, Ltd.—Television, etc., systems. December 22.
- 37493.—Kolster-Brandes, Ltd., and Brand, P. M.—Control of television receivers. December 23.
- 37492.—Kolster-Brandes, Ltd., Beatty, W. A., and Chatterjea, P. K.—Radio-receiving systems. December 23.
- 37458.—Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—Radio receiving-sets. December 23.

### Specifications Published.

- 497646.—Marconi's Wireless Telegraph Co., Ltd.—Radio receivers and the like.
- 497490.—Triggs, W. W. (Operadio Manufacturing Co.)—Selective-tuning mechanism for radio-receivers.
- 497605.—Farnsworth Television, Inc.—Means and method for transmitting synchronising pulses in television.
- 497442.—Marconi's Wireless Telegraph Co., Ltd.—Microphones.
- 497691.—Clay, R. S.—Stereoscopic television.
- 497692.—Marguerat, R., and Chevrier, M.—Diaphragms for loudspeakers.
- 497626.—General Electric Co., Ltd., and Jones, F. R.—Television receiving-sets.
- 497461.—Bauer Ges., E.—Feeding devices for strips bearing sound records.
- 497631.—Zeitline, V., Zeitline, A., and Kliatshko, V.—Cathode-ray tubes.
- 497551.—Marconi's Wireless Telegraph Co., Ltd.—Cathode-ray television-transmitting tubes.
- 497555.—Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—Thermionic amplifiers.
- 497566.—Rupp, H.—Means for transmitting television and the like comprising a photo-electric mosaic.

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

*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.

**R. P. D. (Callington).** We have no details of the receiver and cannot, therefore, advise you regarding valve replacements. We do not recommend the building of a new set from parts dismantled from old sets in view of the possibility of introducing faulty parts which are causing dissatisfaction in the old sets.

**O. E. B. (Crawley).** Owing to the differences in filaments it is not possible always to carry out your idea. The current is the most important item, and the circuit should be adjusted to pass that current—the resistance then automatically taking care of itself.

**J. J. (Recess).** A correspondence course would be the most satisfactory procedure in your particular case.

**S. J. H. (S.E.5).** There is no open-circuit. At points 3 and 5 the wires are twisted together and taken to one side of the switches. Thus the entire coil is in

circuit on long waves and a part short-circuited on medium waves. Thin wire is used to avoid bulkiness, as mentioned in the article.

**R. M. (Stourmouth).** The "Constructor's Encyclopedia" will explain any terms with which you are not familiar, and articles are published in these pages from time to time which will help you.

**J. S. McD. (Belfast).** A transformer and rectifying valve should be all that is necessary for the conversion.

**L. B. (Bristol, 3).** Have you modified the connections as mentioned on page 277 of the issue dated November 26th last?

**P. B. B. (Edenbridge).** The coil is not now obtainable, and you should use a Wearite Unigen or similar component.

**A. S. (Sunderland).** We think it would be advisable to communicate with the makers of your set, explaining the effects you have noticed.

**F. J. D. (N.8).** We have not described a set of the type you require. You would obviously need a superhet of the most advanced form, and it would cost much more than the figure mentioned.

**H. F. C. (Plumpton).** The Air Hawk is practically identical with the suggestion in your letter, except that it is for mains operation and uses separate plug-in coils.

**H. L. (Blotchley).** We suggest you communicate with Messrs. Peto-Scott and H. McCarthy, Ltd., whose advertisements appear in our pages.

# 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.

**RADIO, PHYSICAL AND TELEVISION SOCIETY**  
**Headquarters:** 72a, North End Road, West Kensington, W.14.

**Meetings:** Friday evenings at 8.15 p.m.  
**Hon. Sec.:** C. W. Edmans, 15, Cambridge Road, North Harrow, Middx.

ON Friday, January 6th, a committee meeting was held at which various arrangements were made regarding meetings to be held early in the second half of the 1938/39 session. Earlier in the week members had visited the Physical Society's annual exhibition, held at the Imperial College of Science.

Lectures arranged to be given in the near future include "Interference Suppression," by Mr. Walters, of Messrs. Belling and Lee, Ltd., to take place at the Society's headquarters at 8.15 p.m. on Friday, January 20th. Other lectures that have been arranged include lectures by representatives of "The Automatic Coil Winder and Electrical Equipment Co., Ltd.," and by "Messrs. Mullard, Ltd."

Further particulars may be obtained from the hon. secretary.

**DOLLIS HILL RADIO COMMUNICATION SOCIETY**  
**Headquarters:** Brainerd School, Warren Road, Cricklewood, N.W.2.

**Hon. Sec.:** E. Eldridge, 79, Oxgate Gardens, Cricklewood, N.W.2.

THE annual general meeting was held on January 3rd, and a new committee was elected, the secretary and treasurer being re-elected. The subscription is to remain at 2s. 6d. per annum. Meetings are held at headquarters on alternate Tuesdays at 8 p.m., and we shall be very pleased to see any readers of PRACTICAL AND AMATEUR WIRELESS, and their friends, who care to attend. The next meeting will be on January 31st and any further details may be obtained from the hon. sec. at the above address.

**THE CROYDON RADIO SOCIETY**

**Headquarters:** St. Peter's Hall, Ledbury Road, S. Croydon.

**Meetings:** Tuesdays at 8 p.m.  
**Hon. Pub. Sec.:** Mr. E. L. Cumbers, 14, Campden Road, S. Croydon.

THE next meeting of the above society takes place on Tuesday, January 24th, when an illustrative talk on "Electrical Waves and Currents" will be given by the hon. secretary, Mr. L. F. Marshall.

**BRADFORD SHORT-WAVE CLUB**

**Headquarters:** Bradford Moor Council School, Leeds Road, Thornbury, Bradford.

**Hon. Sec.:** G. Walker, 33, Napier Road, Thornbury, Bradford, Yorks.

ON Friday, January 27th, Mr. C. A. Sharpe (G6KU) will give a talk, the subject dealing with station operation. The next lecture will be on February 10th, and will be given by Mr. Beaumont, of Ambassador Radio, Ltd., Brighouse. His subject will be Short-Wave Receiver Design.

The club transmitter is still in operation on the 1.7 mc/s. band and it is hoped to participate in the transatlantic tests in February. Negotiations are proceeding for the purchase of a Sky Buddy for club use, and probably by the time this goes to press one of these

receivers will be in the club's possession. Further particulars regarding the club may be obtained from the secretary.

**THE EXETER AND DISTRICT WIRELESS SOCIETY**

**Headquarters:** Y.W.C.A., 3 Dix's Field, Southernhay, Exeter.

**Meetings:** Mondays at 8 p.m.  
**Hon. Sec.:** Mr. W. J. Ching, 9, Sivel Place, Heavitree, Exeter.

THE above society commences the second half of its winter session on January 30th, when a film display will be given, showing the activities of the Radio Society of Great Britain. The talk which accompanies the film will be given by H. A. Bartlett (G5QA, of Exeter). A detailed programme will be forwarded, but it may be mentioned that some of the outstanding events are:

1. A visit to the local telephone exchange.
2. A lecture by Dr. Wroth (Exeter radiologist).
3. A lecture by D. R. Barber, B.Sc., F.R.A.S., entitled, "Atmospheric Electricity."
4. A talk by Mr. G. S. Bradley entitled, "Ultra-Short-Wave Links of the Post Office."

From the brief synopsis it will be seen that the society are, as usual, putting on some pretty good events, and all those interested should get in touch with the secretary.

## PERSONAL PARAGRAPHS

**Mr. Stephen de Laszlo**

WE regret to record the death of Mr. Stephen de Laszlo, son of the late Mr. Philip de Laszlo, the artist. He was involved in a motoring accident on the London-Newmarket road on December 30th, in which his wife was killed. Mr. de Laszlo, who was thirty-three, was managing director of the High Vacuum Valve Co., Ltd., and succumbed to his injuries a week after the accident. He leaves a son aged four years.

**Mr. C. A. Hiscock**

WE also regret to record the death of Mr. C. A. Hiscock, secretary of Messrs. Pye, Ltd. He was a director of Invieta Radio, Ltd., Orr Radio, Ltd., and United Radio Manufacturers, Ltd., and was discovered shot dead in his car recently.

**Radio Honours**

SIR JOHN REITH, late Director-General of the B.B.C., was appointed Grand Commander of the Royal Victorian Order, and Miss Cecil Dixon, of the B.B.C., was awarded the M.B.E., in the New Year's Honours list. Amongst other radio personalities who figured in the list were Cecil Graves, Deputy Director-General of the B.B.C., who was made a Knight Commander of the Order of St. Michael and St. George; Alderman Gilfrid G. Craig (director of Cryselco), who was created a Knight Bachelor; and Councillor Harold W. Sellers, of Leeds, who received the O.B.E.

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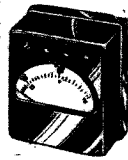
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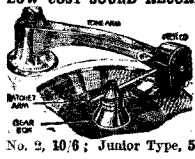
**WESTINGHOUSE A.C./D.C. METAL.** Wall type "R." Steel case, 12 in. by 10 in., 200/250 volts. A.C. mains to 40 volts 3 amps. D.C. for 40 Radio Cells. Guaranteed. 27/7/6. Similar one for Car Battery Charging, 15 volts 6 amps., D.C. output. 28/17/6. Fine model also for A.C. mains with D.C. output of 280 volts 250 m.a., 27/2/6. Two 50-volt circuits, each of 750 m.a., D.C. from A.C. mains. Is another bargain at 48/10.

**D.C. CHARGERS.** Davenset, D.C. 2 circuits 1 and 3 amp., or 2 and 6 amp., with meters and plated control wheels, 25/10/-.

**DIX-MIPANTA VEST POCKET TESTER.**—A wonderfully versatile moving-iron multi-range meter for service on A.C. or D.C. jobs. No projecting terminals. THREE ranges of volts: 0-7.5, 0-150, 0-300. Used for MILLIAMPS, reads: 12 1/2 m.a. and 75 m.a. In black bakelite case. Measures only 2 1/2 in. by 2 1/4 in. with pair of test leads and plugs. Leaflet "N" gives full information. 19/6.



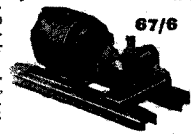
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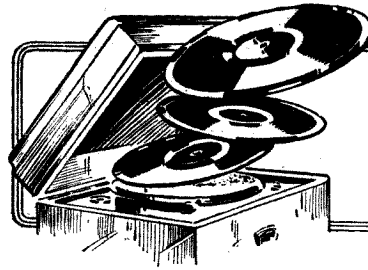
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## Impressions on the Wax

### A REVIEW OF THE LATEST GRAMOPHONE RECORDS

**T**HROUGHOUT his long career John McCormack was one of the most popular of the "H.M.V." celebrity artists, and it was fitting, therefore, that after his farewell concert at the Royal Albert Hall, this great singer should record two of the most appropriate of the items from his programme. They are "When I Have Sung my Songs" and "Earl Bristol's Farewell" on *H.M.V. DA 1446*.

Peter Dawson must have discovered the secret of perpetual youth; in his latest recordings of songs with organ accompaniment his voice is as round and mellow as ever. "The Lord is King" is another of his own compositions, for it is now an open secret that McCall is Peter Dawson's pen-name. Coupled with it is a re-recording of O'Hara's "There is no Death"—*H.M.V. B 8832*.

Every radio fan has heard of Mr. Walker's little problems each week in "Band Waggon," and now the H.M.V. Company have recorded him in the January list. His job as a rag and bone man brings him into touch with all sorts of people and queer happenings.

The record contains his famous signature tune complete for the first time, and Mr. Walker propounds one of his problems. A slip of paper is enclosed with the record asking purchasers to send in their solution of the problem. Mr. Walker promises, in his own handwriting, to send them a reply during the last week in March. The number of the record is *H.M.V. BD 637*.

Mr. Walker is not the only Band Waggoner on records this month. Arthur Askey is on top of his most comical form in "I Pulled Myself Together" and "Ding Dong Bell" on *H.M.V. BD 619*.

### Dialect Folk Songs

**B**ETWEEN the humour of an Askey and the humanity of "Our Bill's" songs of English country people, and we don't mean County, the only link is the radio. For without the radio, millions of people would have been denied hearing Freddie Grisewood's imaginary character. Mr. Grisewood has made a study of folk songs and the people he has heard singing them in remote country places. Thus Mr. Grisewood has created "Our Bill," and Bill's first record contains the tragic-comic "Berkshire Tragedy" on one side and "A Sad Ending" and "Oliver Cromwell" on the reverse side of *H.M.V. BD 636*.

Outstanding among the swing records is one that was made under the supervision of Hugues Panassie, who is considered the greatest international authority on this music. Mr. Panassie, who wrote the famous book on the subject, "Hot Jazz," is now in New York, but before he left Paris he met Teddy Hill and his Orchestra, a coloured American band. With the aid of leading soloists from this band and other well-known musicians he supervised some remarkable performances. Two of these are recorded on *H.M.V. B 8826*. The first side contains "I Got Rhythm," and it certainly

has. The performance is unique in that it is by a trio of trumpets, accompanied by trombone, guitar, string bass and drums. There is no piano, and there are no saxophones or clarinets. The title on the reverse is "Japanese Sandman," and it is played by Dicky Wells and his Orchestra.

Benny Goodman and his Orchestra play "Blue Interlude" and "My Melancholy Boy" on *H.M.V. B 8841*, and Tommy Dorsey and his Orchestra have recorded the old nursery tune "Stop Beating Around the Mulberry Bush" on *H.M.V. B 8842*. On the other side Dorsey leads a smaller band, which he calls "His Clambake Seven," in a new film tune called "You Must have Been a Beautiful Baby."

### Vocal

**B**ENIAMINO GIGLI'S latest record is a novelty, for the famous Italian tenor here sings in German. True, it is the original language of the two famous songs concerned, Schubert's "Serenade" and Brahms' "Wiegenlied" which have been introduced into Gigli's latest film "Marionette"—*H.M.V. DA 1657*.

Another well-known tenor who has also recorded his latest record in German is Richard Tauber, but this is no surprise. He sings "Gypsy Moon" and "Vienna, City of My Dreams" on *Parlophone RO 20427*.

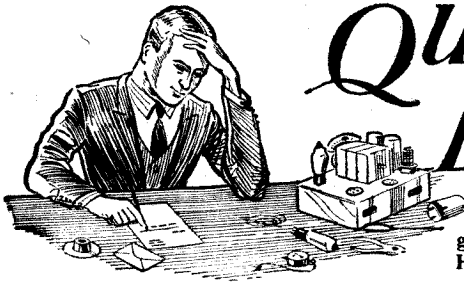
In the Parlophone "Classic series" appear a number of interesting records. First we have the German tenor Herbert E. Groh singing "Serenade" and "Mattinata" on *Parlophone R 2600*. Next we have a number of orchestral recordings including "Hansel and Gretel" selection by Frederic Hippmann and his Orchestra on *Parlophone R 2603*; "First Waltz Medley" by Orchestra Mascotte on *Parlophone E 2604*; and "Tango Torero," coupled with "Gypsy Serenade" on *Parlophone R 2606*.

Leslie A. Hutchinson ("Hutch") has made two records this month. The first includes the popular hit tune of the moment "When Mother Nature Sings Her Lullaby" coupled with "Love Makes the World Go Round" on *Parlophone F 1310*, and the other is "Two Sleepy People," from the film "Thanks for the Memory," and "When a Cigarette Was Burning" on *Parlophone F 1311*.

Dance music is supplied by a number of bands, among these being "Stop Beatin' Round the Mulberry Bush" and "Why Doesn't Somebody Tell Me These Things?" played by Harry Roy and his Band on *Parlophone F 1299*; "Tu-li-Tulip Time" and "Honey Chile," played by Nat Gonella and his Georgians on *Parlophone F 1301*; and the popular "The Chestnut Tree" coupled with "Blue Skies Are Round the Corner," played by "The Band Waggoners" on *Parlophone F 1315*.

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# QUERIES and ENQUIRIES

to use 5, 7 and 9 pin valves, but am experiencing some difficulty. Could you give me any hints in this connection?"—H. Y. E. (Ryde).

ALTHOUGH it would be possible to assemble on a test panel a valve-holder of every type now in use, and to connect all common electrode points together, it may be found that a simpler device could be built round a series of adapters. By fitting a 9-pin holder in place of the 5-pin mentioned in your letter, you could obtain a series of adapters for all types, which would go into the 9-pin holder and the appropriate valve could then be inserted into the adapter. Messrs. Bulgin supply suitable adapters at 3s. each.

## A.C. or A.C./D.C. ?

"I have been given to understand without any specific reason that an A.C. mains model is preferable for use on A.C. mains to a Universal model A.C./D.C.

## RULES

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

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

A stamped addressed envelope must be enclosed for the reply. All sketches and drawings which are sent to us should bear the name and address of the sender. Requests for Blueprints must not be enclosed with queries as they are dealt with by a separate department.

Send your queries to the Editor, PRACTICAL AND AMATEUR WIRELESS, George Newman, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. The Coupon must be enclosed with every query.

As I am contemplating purchasing a mains set, I would be grateful if you will be good enough to inform me if this is correct, with any obvious reason?"—W. L. McC. (Ely).

THE A.C. model is preferable only because it is possible to obtain a greater output, and in some cases improved efficiency. This is due to the fact that A.C. may be stepped up, and in a straightforward A.C. receiver the input circuit consists of a transformer from which 400 or 500 volts may be obtained to feed the more efficient A.C. types of valve. In the A.C./D.C. receiver you are restricted to the mains input voltage, less the slight loss occasioned by the half-wave rectifier which is usually fitted.

## Slow-motion Drive

"I have a rather old set in which the condenser is driven from a pulley on a control spindle, some kind of cord being wrapped round the two. I find, however, that owing to age and wear the cord slips from time to time and erratic tuning is the result. Is there any simple way of overcoming this trouble as the cord is extremely difficult to get at and is wrapped two or three times round a small pulley behind an

escutcheon and dial-light holder, and I think I should have difficulty in fitting on a new one?"—H. D. F. (N.W.5).

THE simplest solution would be to dress the cord with some medium which would shrink it and at the same time provide a "grip." Ordinary shellac, well diluted with methylated spirit, sometimes proves effective, whilst powdered resin may be applied by passing the cord through the finger and thumb dressed with this powder. You should, however, inspect the pulleys and other points over which the cord passes to make certain that no oil or similar matter has been deposited there and is responsible for the trouble.

## Repairing Accumulator

"I have a small accumulator in my portable which is apparently leaking and although I have asked several friends, nobody seems to be able to tell me how to repair it. I wonder if you could give me any assistance in this case?"—H. G. (Bromley)

IT is first necessary to make quite certain that the cell is actually leaking and that any moisture which you have noticed is not due to spray or the effect of fumes from the vent. If you suspect a leak, the best plan would be to empty the acid out carefully into a receptacle so that it may be poured back when the repair is completed. Next obtain some distilled water and pour this into the cell, wiping the outside perfectly dry. If the leak is very small evidence may not be forthcoming until some hours have elapsed, but eventually you should be able to trace the hole. Most probably a seam has opened, unless the cell has been dropped. Next obtain a quantity of amyl acetate from the local chemist and dissolve in this some perfectly clean celluloid. Cleaned photographic films are suitable for this. Cut a small square of the material and after brushing the solution round the hole (when the water has been poured out and the cell properly dried on the outside) place the square of celluloid over the solution and press firmly in place. Add some more celluloid to the solution until it is thick and creamy and carefully paint round the edges of the patch. The original acid may then be poured back. If the damage is only a small gap in the seam it may be possible to repair this merely by wiping some of the solution into the gap and pressing the edges down, leaving under pressure for a few minutes.

## Matching Coils

"I have found two old 'matched' coils in my junk box and have endeavoured to use these in a simple set without success. It appears that tuning 'runs out' at the ends of the two scales and I believe this indicates that the coils have become unmatched somehow. How can I re-match them without elaborate apparatus?"—T. S. A. (W.1).

THE most likely cause of the trouble would be that the turns have become displaced. You should, therefore, carefully move the end turns until the coils are matched again, and this should not prove difficult. If desired, the coils could be adjusted singly in a simple detector circuit, ascertaining the tuning position of, say, three stations on each band, and adjusting both coils so that readings are identical.

The coupon on page 486 must be attached to every query.

## Wave-trap Effects

"I am rather troubled with the performance of my four-valve set and believe I have traced the cause of the erratic behaviour. I have experienced some trouble from the local station, and to avoid this I made up a wave-trap from an old spare coil. I now find that when I want the local it is very much reduced in strength, and to get full volume I have to cut out the trap. Is this in order?"—R. W. (Barnet).

THE trap is presumably an acceptor circuit and its purpose is to prevent the signal from passing to the tuning circuit in the receiver. If the trap is properly made and sharply tuned it will obviously do its work, and therefore, when the station to which it is tuned is required it will be unable to pass the trap. You must, therefore, alter the tuning of the trap circuit, or alternatively short-circuit it by means of a simple on/off switch.

## Transmission For Beginners

"I am desirous of taking up the study of wireless with a view to qualifying for the Civilian Wireless Reserve and have commenced to subscribe for your paper. I notice there is a book on transmission in your lists which is recommended. Is this suitable for a beginner without much knowledge? Also can you inform me of the address of the London H.Q. of the Civilian Radio Reserve?"—F. G. B. (S.W.11).

THE book is quite suitable for a beginner, especially if it is studied in conjunction with the "Wireless Constructors' Encyclopaedia," which will explain clearly any terms with which you are not familiar. For details regarding the Reserve you should write to the Under-Secretary of State, Air Ministry (Signals (C.W.R.)), Kingsway, London, W.C.2.

## Home-recording

"I was interested in your reply to a correspondent in a recent issue in which you said records could be made quite simply from the wireless broadcasts by using the pick-up. You mentioned two firms who supplied blank records. Will you please give me the full names and addresses of these concerns?"—M. S. (Leeds 7).

THE blanks, together with tracking apparatus and other accessories, may be obtained from the V. G. Manufacturing Company, Ltd., of Gorst Road, North Acton, London, W.3, or from Electradix Radios, of 218, Upper Thames Street, London, E.C.4. The former company issue a neat booklet describing the process and their products, together with some valuable hints. The booklet costs 6d.

## Valve Tester

"I am anxious to build a valve tester and have found a circuit in one of your back numbers, but this has a 5-pin valve-holder. I have tried to modify this so as

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