

NEW SELECTIVITY IDEA IN THE "SQUARE-PEAK 3"

BUILDING YOUR OWN FRAME AERIAL

Amateur Wireless

Every
Thursday 3^d

and
Radiovision

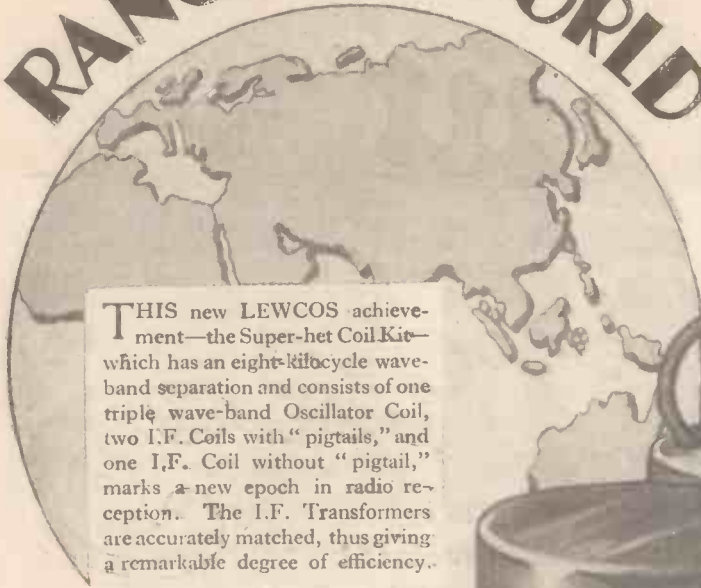
Vol. XVIII. No. 468

Saturday, May 30, 1931



A NEW
IDEA
GIVES HIGH
SELECTIVITY

RANGE THE WORLD



THIS new LEWCOS achievement—the Super-het Coil Kit—which has an eight-kilocycle wave-band separation and consists of one triple wave-band Oscillator Coil, two I.F. Coils with “pigtailed,” and one I.F. Coil without “pigtail,” marks a new epoch in radio reception. The I.F. Transformers are accurately matched, thus giving a remarkable degree of efficiency.

This Kit, which is recommended for the “Century Super,” can also be fitted with extraordinary ease in any set of similar design and the results will be truly astounding!

The small space available is completely inadequate to give even a short description of these wonderful new LEWCOS Coils, and you are invited to write for an illustrated explanatory leaflet.

with The LEWCOS (Regd)



SUPER-HET COIL KIT

(Provisional Patents Pending)

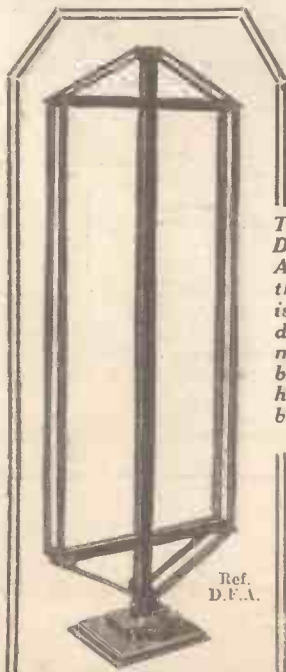
Designed and manufactured at our Leyton Works,

which is recommended for the
“CENTURY SUPER”
receiver described in “A.W.” No. 464

Price 50/-

Ref. S.H.K. No. 1.

BRITISH THROUGHOUT



BLACK

GREEN

RED

WHITE

BLUE

This is a photograph of the LEWCOS Dual Range Centre-Tapped Frame Aerial which is recommended for the “Century Super.” The Frame is wound with silk-covered Litzendraht wire and the switch and terminals are mounted on the moulded base, thus presenting a neat and handsome appearance. The wave-band change is effected by the turn of a knob.

Size: 30" high x 10" wide.

PRICE 32/6

Ref. D.F.A.



A TRIPLE COIL BASE FOR I.F. COILS (Ref. I.F.B.3)

Price 2/6

IS NOW AVAILABLE.

LEWCOS “Spaghetti Resistances” of 15,000 and 20,000 ohms each
PRICE 1/6 each
are specified for the
“Century Super”

LEWCOS RADIO PRODUCTS FOR BETTER RECEPTION

THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LIMITED, CHURCH ROAD, LEYTON, LONDON. E.16

Mention of “Amateur Wireless” to Advertisers will Ensure Prompt Attention

The P240 will give you increased volume and far better quality

Its huge power-handling capacity and extremely low impedance ensure this. It is sensitive, too, thus requiring a minimum of early amplification and giving a greater output—sufficient, in fact, to work a moving-coil speaker at ample volume for domestic purposes.

Quality, too, is vastly improved and the P.240 will make a world of difference to any set using 2-volt valves—from the modest 2-valver to large sets designed to give an appreciable output.



**MAZDA P.240
CHARACTERISTICS**

Amplification Factor	-	-	-	7
Anode A.C. Resistance (ohms)	-	-	-	1,900
Mutual A.C. Conductance (MA/V)	-	-	-	3.7

PRICE 13/6

THE AMAZING

**MAZDA
THE
BRITISH
VALVES**



THE EDISON SWAN ELECTRIC CO. LTD.
*Incorporating the Wiring Supplies, Lighting Engineering
 and Radio Business of the British Thomson-Houston Co. Ltd.*
 Radio Division:
 155 Charing Cross Road, London, W.C.2
 Showrooms in all the Principal Towns

EDISWAN

V.121

Don't Forget to Say That You Saw it in "A.W."

"COMPENSATED RESPONSE" MEANS

Vitality!

**MAGNIFICENT
BRILLIANCE**

The Marconiphone Pick-up gives full prominence to the upper register—full perfection to violin or piccolo; it is faithful up to the highest recorded frequency, while its compensated response reduces surface noise to a negligible figure.

**SPARKLING
DEFINITION**

The Marconiphone Pick-up, with its light, freely suspended reed, gives crisp, sharply-defined reproduction. Its instantaneous response to transients eliminates the last trace of "wooliness."

The Marconiphone Pick-up has a sharply rising characteristic below about 200 cycles. Its compensated output at low frequencies brings out the roll of drums—the double-bass or cello—to astounding effect.

**THUNDEROUS
BASS**

The Marconiphone Pick-up is designed to provide full compensation for the slightest deficiency in recording. The output from an ordinary record is perfectly balanced over the whole musical scale.

**REALISTIC BALANCE
OF TONE**

3 GNS.

The Marconiphone Pick-up has a rotating head, ball-bearing carrier arm and quick-grip spring terminals. It is supplied in an attractive brown finish.



MARCONIPHONE

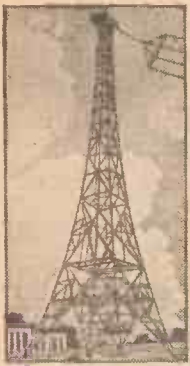


FIRST AND FOREMOST
NAME IN RADIO

PICK-UP

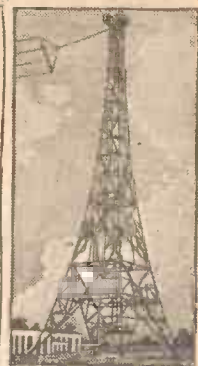
ADVERTISEMENT OF THE MARCONIPHONE COMPANY LIMITED, 210, TOTTENHAM COURT ROAD, LONDON, W.1

Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention



Amateur Wireless

and
Radiovision



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ASSISTANT EDITOR:
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NEWS · & · GOSSIP · OF THE · WEEK

ANOTHER SELECTIVITY IDEA

AMATEUR WIRELESS does not mean to give readers any cause to grouse about their sets! The most common trouble now is interference. On old sets even the local B.B.C. transmitters jam one another. In this issue is a description of yet another aid to selectivity, incorporated in a really fine receiver designed by our Technical Editor. It uses the new "square-peak" coil, and is described on pages 852 and 853.

LIKE A SHIP

"**A.W.**" ventured the opinion a long time ago that Broadcasting House bears a strong resemblance to a ship, and Colonel A. Val Myer, the architect, is being "chipped" by the daily press about the "H.M.S. Broadcasting House" appearance. In defence he says: "It has also been described as an iceberg, and as a gigantic breakwater, but those analogies are not quite so good. The battle-

ship effect is, of course, accidental. It has resulted from the shape of the site, and has been added to by the necessity of sweeping back the roof to comply with the building regulations. The problem to be faced in design was out of the ordinary, for broadcasting is so new. This is a modern building with a modern purpose, and we have tried to break away from the convention without being odd. There are no German or Continental effects; the design has a fundamentally traditional basis without being unnecessarily ornamental."

THE BIGGEST SET?

WHICH is the biggest set in the world? One naturally looks to America for a record of this nature, and it is said that the Waldorf Astoria Hotel in New York has one of the largest sets. Each of the 2,000 rooms can take any one of six programmes simply at the turn of a switch. In addition to radio, tea-time and dance music is relayed from the hotel ballroom, while

PRINCIPAL CONTENTS

News and Gossip	839
With the "O.B." Engineers at St. Martin's	841
Building a Frame for the "Century"	842
Giving Colour to Radio Music	843
In My Wireless Den	844
On Your Wavelength	847
Working the "B.B.C. Selective Two"	849
The How and Why of Radio	850
Without Fear or Favour	851
The "Square-peak 3"	852
The Cossor "Commander Four"	856
Readers' Ideas and Questions	858
We Test for You	860

TELEVISION'S FOUR "EYES"



Photo-cells connected to the television transmitter are housed behind this panel with its four windows, and small objects are rotated on turntables before the transmitter so that observers can watch the movement of the image. This is National Broadcasting Co. (American) apparatus

guests can if they wish switch on to the musical section of the talkies which are shown in the hotel cinema. Radio listeners are catered for by 150 rooms, each of which is fitted with a set connected to a common aerial above the hotel at a height of nearly 600 feet.

A TELEVISION "STUNT"

THE first "sale" has been made by television, or, at least, so it is said! Goods displayed by a manufacturer several miles away from a buyer in a large New York department store, followed immediately by the placing of an actual order for £1,000 worth of goods, is reported. The stunt, arranged by an American firm, was carried out recently by the television apparatus of the New York Telephone Company.

MORE FACILITIES

BY the way, talking of television, an announcement is made of the formation of a television company in France to exploit the invention and patents of Baird Television in France, Belgium, Luxembourg and the French and Belgian colonial possessions. It is expected that further

NEXT WEEK: MORE ABOUT THE NEW "SQUARE-PEAK" SELECTIVITY IDEA

NEWS & GOSSIP OF THE WEEK —Continued

facilities for television experiments in these countries will shortly be available, which is all to the good.

MORE MEN ANNOUNCERS

WE hear that the Italian broadcasting authorities intend gradually to replace their women announcers by male staff. Although no reason is given for the change, it is suspected that the shoals of letters addressed to women announcers making all kinds of offers, have something to do with the ban!

JACK PAYNE'S BIG OFFER

IT would seem that Jack Payne, leader of the B.B.C. Dance Band, is very much sought after. He has just received an offer running well into four figures for a week's performance in Berlin. And the B.B.C. has given him permission to accept the offer for the late summer. Every day Jack Payne receives letters from Holland, so perhaps he is waiting to see whether a higher bid comes from Amsterdam! Anyway, most listeners will agree that he deserves all he can get.

NEWCASTLE'S FATE

SO Newcastle is definitely to work on 479 metres, simultaneously with North Regional. This is the first time a high-power station and a low-power station have attempted to work on a single wavelength.

HEARING HIS OWN BROADCAST!



Christopher Stone, the popular B.B.C. gramophone record broadcaster, has made "announcement" records which are broadcast in the H.M.V. gramophone concerts from Rome and Radio Paris, and he is here listening to his own voice, from Paris!

A tuning fork is being installed at Moorside Edge and a new fork is on the way to Newcastle.

NATIONAL COMMON WAVELENGTH

THE wavelength of 288 metres, at present used as a National common wavelength for British relays, may become the exclusive wavelength for the Scottish National, when the plant at Falkirk is ready to operate. This is partly the reason for shifting Newcastle to 479 metres. Then again, on 288.5 metres Newcastle would have had to relay National programmes, whereas on 479 metres it will relay North Regional programmes, to which it will no doubt contribute.

SCOTTISH REGIONAL

WHILE the Scottish National will transmit on 288.5 metres, Scottish Regional will be on 376.4 metres. The frequency separation between the Scottish Twins

should therefore be adequate for all but very unselective sets. True to traditions, the Scottish Regional centre will economise by the use of only two masts for the two aerials, thus saving £4,000, the cost of a 500-ft. mast such as is erected at Moorside Edge.

NORTH NATIONAL

ALREADY test signals have been heard from Moorside Edge on 301 metres. As a preliminary to full North National tests, Aberdeen is fitting a new tuning fork ready for May 31 when it relinquishes its 301-metre wavelength and goes down to 288.5 metres. A week later, on June 8, North National on 301 metres will be heard in programme hours. While the Regional children's hour is in progress on 479 metres, dance music will be sent out from North National on 301 metres. During the late evening North National will also broadcast dance music while North Regional will do light music.

BROADCASTING HOUSE

DECORATIONS at Broadcasting House are receiving a good deal of the B.B.C.'s attention. Subject to engineering needs, each department is responsible for the decorations of its particular studios. It is now possible for the engineers to say how much wood, glass and upholstery is required for each

studio to produce the required acoustic effects.

CRAMPED OFFICES

UNDOUBTEDLY the office accommodation at Broadcasting House has been sacrificed to make room for "bigger and better" studios. One suggestion was that



WIFE: "John, couldn't we have one of those 'wireless fans' I've just read about? This room gets so very stuffy."

pink walls, white furniture and a daylight lamp gave the illusion of spaciousness, but we hear that pale buff will be the predominant colour of the walls in most of the offices! But a panelled wall will indicate that the occupant is a member of the Control Board.

ENGINEERS ARE HUMAN!

THE other day a B.B.C. engineer was showing a lady friend round the studios at Savoy Hill. He stopped in front of the microphone in one of the talks studios to demonstrate how broadcasting is done. After some minutes another engineer popped his head into the door of the talks studio and gently explained that the microphone was in use at that time for some tests. Would the first engineer kindly demonstrate elsewhere? He did!

LONDON ANNOUNCER

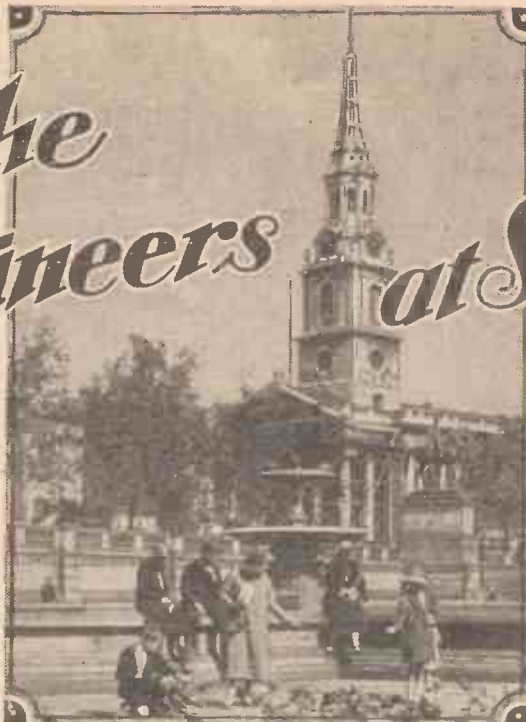
THAT London station announcer with a voice somewhat reminiscent in its intonation of a school master, namely, Mr. E. H. Wheldon, will leave the B.B.C. towards the end of the summer to become one of His Majesty's Inspectors of Schools. In a recent temporary exchange of announcers, Mr. G. D. Adams of London has been in Birmingham and Mr. Cowper has been announcing from the London studio, instead of from the Midlands.

B.B.C. ON TOUR

AN interesting tour for inquiring spirits on the staff of the B.B.C. is now being planned, with the idea of their visiting some of the broadcasting organisations of European countries. The itinerary, at present under discussion, may be from Brussels to Cologne, on to Coblenz, Mülacker, Stuttgart and finally Strasbourg. We hope it keeps fine for them!

With the O.B. Engineers at St. Martin's

The B.B.C. Outside Broadcasts engineers have tackled many difficult problems in relaying programmes from places outside the studios.



Here an "Amateur Wireless" Special Commissioner describes the arrangements at a popular "O.B." centre

Of all the B.B.C. church broadcasts, there is no doubt that that from St. Martin's-in-the-Fields, London, is among the most popular.

Greatly to the credit of the B.B.C. engineers, the hundred and one difficulties connected with broadcasting from such an "echo-ey" place as a church have been overcome and now, within two or three hours' notice, the engineers can rush off in the O.B. van, make a balance test and get the microphones slung up in the best positions so that they "pick up" well from the pulpit, are not drowned by the organ, or are not too near some member of the congregation who has a particularly bad cough!

Getting the Lines

As the B.B.C. likes to make Sunday broadcasts in connection with a large

number of denominations, these microphone-in-the-church problems have to be confronted and quite frequently there is all too little time in which to get lines from the Post Office and make the balance tests. At St. Martin's, of course, the microphones are nearly always in the same position and really only one big change in the layout has been made since broadcasts were first made from this popular church.

The special broadcast services attract very large congregations and it is no uncommon sight on a Sunday evening, to see people queueing up to get into St. Martin's during the radio hour, for the simplicity of the broadcast service draws

many to the church who prefer to attend in person. When St. Martin's was first chosen as a broadcasting centre a third microphone was slung up on the balcony near the organ, but it was found that this gave too much organ in relation to the volume of sound picked up from the congregation, and the "fade" on this special microphone for the organ had to be turned down to the very soft position. Recently the engineers have done away with this microphone and now there are only the suspended microphone and the microphone placed above the pulpit.

The Amplifier Room

The whole service is conducted from the pulpit and so there is no need to have a large number of microphones for the choir and so on.

The O.B. engineer sits up in a little room on the right-hand side of the church at the top of a winding flight of stairs and through a small window he can see what is going on in the church below. A length of flex runs down to a red light in front of the pulpit's reading desk.

The engineer listens on a separate phone line to Savoy Hill, until the Control Room officials tell him that the announcer has finished in the studio. Then the engineer in the church flashes the red light and the service starts.

Some three million listeners all over England join in the singing at St. Martin's.

St. Martin's is reckoned to be an "easy" church so far as broadcasting goes and there are only two microphones. One "mike" is suspended on a wire cable about half-way down the body of the church and is well above the heads of the congregation. The organ, which broadcasts well, is on a balcony at the end of the church remote from

The new 2-kilowatt (aerial) relay transmitter to be installed at Treves (Germany) will be fed by the Frankfurt-on-Main studio and will work on a common wavelength (259.3 metres) with this station when the new 25-kilowatt plant for the latter city has been erected.

The lifeboats of the new American ocean liners *President Coolidge* and *President Hoover* which were recently launched have been equipped with wireless transmitting and receiving apparatus working on a wavelength of 600 metres, thus permitting the boats themselves to broadcast SOS calls.

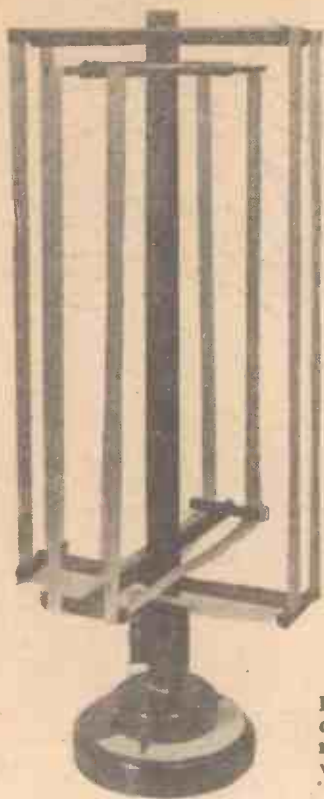
INSIDE ST. MARTIN'S



This view of the inside of the famous London church, from which broadcasts are so frequently made, shows where the two "mikes" and the signal light are placed

MAKING A FRAME FOR THE "CENTURY SUPER"

Constructional details of a simple frame aerial which can easily be made and which will give fine results in any big set such as the "Century." It covers the medium and long waves



Here is the frame complete and ready to work with the "Century"

IT is safe to say that sets such as the "Century Super" have created a new vogue for frame aerals. It is, of course, against the Post Office regulations to work a super-het., which is a receiver of an oscillating type, on an outdoor aerial and it is for this reason that a frame (which, technically, is a closed circuit) is essential.

As is well known though, the sensitivity of the "Century Super" is so far above the average that even with a medium-performance frame it is possible to log approximately one hundred stations, and this proves that, given the right receiver, the sensitivity of the frame aerial is of a satisfactory order for modern conditions.

It is possible to purchase the cabinet and the frame aerial ready made for the "Century Super," but as so many readers

want to carry out the whole of the constructional work, we are here giving particulars of a simple frame aerial which is designed for the "Century Super," and which anyone can make up.

The essential part of the frame is a pillar of hard wood and the rest of the frame should also preferably be made of some good hard wood. The cross pieces are of 1/2-in.-diameter dowelling and each piece should be 10 in. long. Four sections are required. The central pillar is drilled so that each piece of rod may be passed through and it is secured at the centre point with a woodscrew.

The general scheme of construction is apparent from the accompanying sketch. On the end of each cross piece an ebonite winding support is placed. These are ebonite strips measuring 3 in. by 3/8 in. by 1/4 in. Preferably small notches should be filed for the medium- and long-wave windings as shown. This is not really necessary

but prevents the windings from sliding along the supports if, when complete, the frame is accidentally knocked. These ebonite supports are attached to the end of the cross pieces by means of wood screws, a small hole being drilled in the centre of each support and a countersunk screw being passed through. There are several ways of arranging for the frame aerial to



The new 40-1 reduction J.B. condensers referred to. They simplify tuning the "Century"

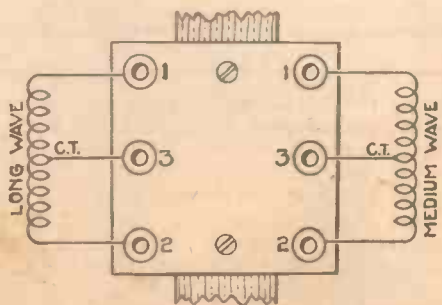
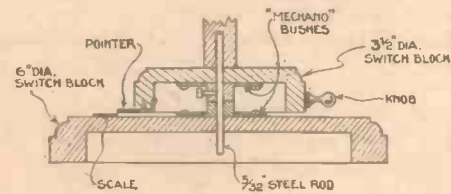
pivot round as is necessary in order to get the windings in the same plane as the transmission.

A practical idea is that shown by the accompanying sketch, where it will be seen that a simple small base is made up. All the necessary details are shown. It is, of course, possible merely to fit the steel spindle to the end of the frame shaft as shown and to pivot this in a bush on the top of the cabinet. Where it is not convenient to have the frame on the cabinet top, though, the special base must be used. It is not very important how this mounting is carried out, provided that the frame can easily be swung into any direction and that the base or support is solid enough to prevent the frame overturning.

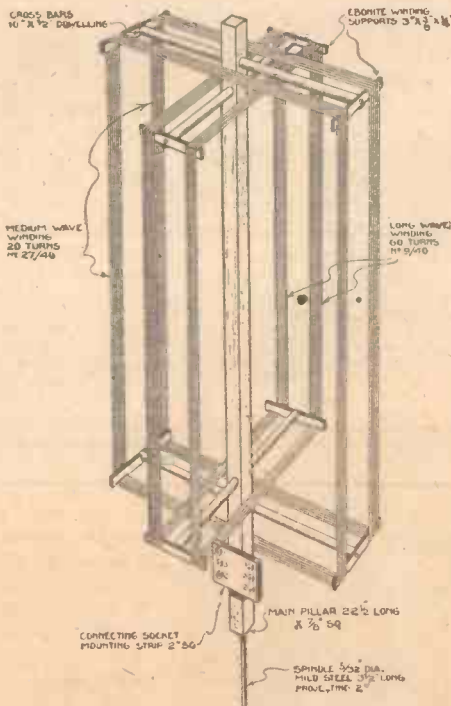
At the base of the main pillar is fixed a small socket contact strip which should be about 2 in. square, and should, of course, be ebonite. Eight holes must be drilled in this, six for the sockets and two for the fixing screws.

You will see that in this frame aerial the medium- and long-wave windings are entirely separate and are, of course, at right angles. No wave-change switch is incorporated, the three leads being plugged into the sockets 1, 2 and 3 on either the medium or long-wave side of the frame contact strip as required. A three-pole double-throw switch could be fitted, of course, but would complicate the winding.

The job of winding the frame is an easy one but it is advisable to use the special stranded frame aerial wire. No. 27/40 wire should be used for the medium-wave
(Continued on page 850)



(Left above) Details of a simple base to hold the aerial. (Left below) The connections of the terminal block on the frame, and (right) the complete frame, showing various constructional details



GIVING COLOUR to YOUR RADIO MUSIC

An article of interest to all set-users anxious to get the best reproduction, by ALAN HUNTER



(Marconiphone photo)

TALKING the other day to an American friend, I was specially struck by one of his remarks. "Radios, like most other products, are sold on slogans in the States. And one of the most successful radio-set slogans this year has been built around tone colour." Which is all very typical of America.

How many of us ever worry about, even if we understand the meaning of, the phrase tone colour? Precious few; neither the manufacturer nor the amateur in this country seems to demand more of a set than volume control.

Are we, perhaps, a little too easily pleased with our loud-speaker output—too ready to accustom ourselves to a tone that may instinctively offend our musical sense? I personally think we might take a cue from America and pay a little more attention to colouring our loud-speaker tone in addition to controlling its volume output.

Here is a chance for the keen manufacturers to outdo their immediate rivals by

the low notes are cut off the effect is high pitched. These alterations to the tone of the output should be obtained without altering the overall volume.

The changes of tone obtained by suppression of high or low notes are, of course, artificial. For when the reproduction is made to sound low pitched by cutting out

nected directly in the anode circuit of the power valve of the set. The tone control consists of a fixed condenser and a variable resistance in series across the loud-speaker terminals. This device, therefore, has the advantage of being readily added without alteration to the interior of the set.

One might term this type of tone control a high note by-passer. If the impedance of the fixed condenser is low enough the high notes that would normally pass through the winding of the loud-speaker will be by-passed through the condenser. In practice a value of .25 microfarad will be found to provide a good variation in the high note by-passing.

To obtain this variation we use a variable resistance in series with the fixed condenser. Its value is not critical, but a maximum of 50,000 ohms is suitable. As the value of the resistance is lowered, so will be the impedance of the tone filter; consequently a decrease in the variable resistance means an increase in the high note by-passing and,

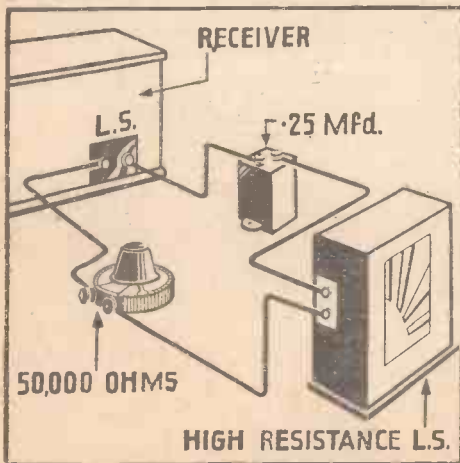


Fig. 1. Simple high-note suppressor

next Show Time. But the amateur, lucky man, need not wait for Shows to get on with the job of loud-speaker tone colouring. There are several ways and means of adding a little light and shade to the reproduction—simple and cheap enough for all to try.

Here it is as well to distinguish quite clearly between tone control and volume control. When volume is controlled the relative output of high and low notes should remain unaltered. But when tone is controlled by simple means a portion of either the high or low notes is suppressed. When the high notes are cut off the reproduction assumes a low pitch, whereas when

the high notes, the low-note reproduction is not actually increased at all. Similarly, when the tone is made to sound high pitched by cutting out the low notes, there is no real increase in the output of high notes. I mention this because there are more complicated methods whereby the reproduction of high and low notes can be accentuated.

Those interested in a few simple experiments in tone control should certainly try the arrangement shown by Fig. 1. Here we have a high-resistance loud-speaker con-

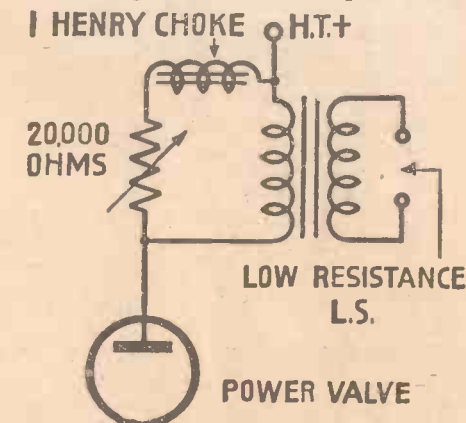


Fig. 4. Low-note suppressor for output-transformer circuit

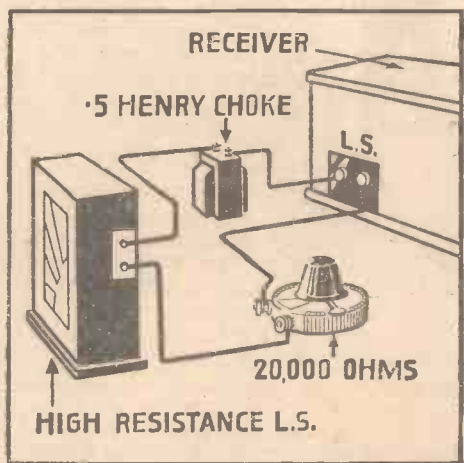
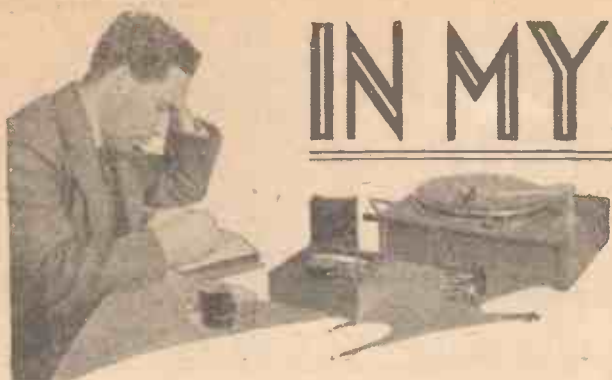


Fig. 3. Simple low-note suppressor circuit

therefore, a lowering of the loud-speaker tone.

In many modern sets there is a transformer between the output valve and the loud-speaker, especially when the impedance of the loud-speaker is radically different from that of the power valve. For example, a 2,000-ohm power valve is often coupled to a low-resistance moving-coil loud-speaker by means of a step-down transformer. Under such conditions the tone filter arrangement of Fig. 1 cannot be applied externally, but must be fitted across the primary of the output transformer (see Fig. 2).

(Continued on next page)



IN MY WIRELESS DEN

WEEKLY TIPS—
CONSTRUCTIONAL AND THEORETICAL

By W. JAMES.

L.F. Transformer Facts

SMALL low-frequency transformers are satisfactory in many sets and may, as a matter of fact, help to correct the tone. This is to be traced in many instances to a rising characteristic.

The transformer is so constructed and used that the higher notes are emphasised. In some sets the higher notes are materially weakened by the tuner and detector, and the transformer helps to correct the results. It is possible, however, that a high-pitched whistle may be produced by the transformer stage.

This may be removed by connecting a grid leak of 5 megohm or a little less across the secondary winding. The whistle may not be noticed with certain valves, but others of greater efficiency may well cause the stage to oscillate.

Sometimes the addition of a by-pass condenser will have the same effect, and it is possible that reversing the connections to the primary or secondary windings will stop the whistle. These small transformers are often satisfactory when properly used, but there is always the chance of poor results being obtained through failure to connect the right way and to use the best valves.

Use Sufficient Grid Bias

The practice of using a 9-volt grid-bias battery is probably responsible for the overrunning of many high-tension batteries.

Quite a small power valve, such as the PM2 is rated to take a bias of negative 10.5 volts when the anode voltage is 125. If only 9 volts is used the anode current will be, of course, a little greater and is of no value.

Many other instances could be given, which all goes to show that a 9-volt battery is hardly large enough for many purposes. This is a point which you should look into rather carefully. You will often find that the bias can be increased a little above the value suggested without spoiling the tone. As the high-tension current is reduced by increasing the bias it is clear that an economy is to be effected in many instances.

With too much grid bias the signals are bound to be distorted, but practical test very soon shows when one has gone far enough. When using a mains unit great care must be taken of the last stage.

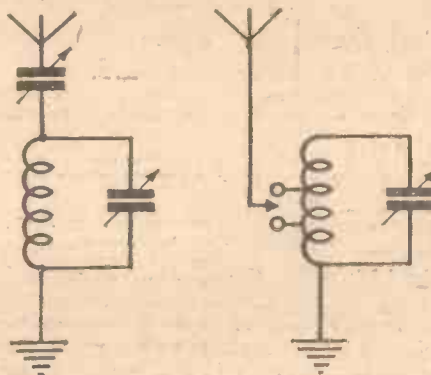
A choke-condenser output might often well be fitted and the bias must be carefully adjusted, if possible, with a milliammeter in the anode circuit. An old grid battery is likely to be a source of trouble, especially when more than one grid circuit is connected to it.

These Series Condensers

The method of improving selectivity by connecting in the aerial circuit a pre-set condenser and setting it to a low value has the disadvantage in many instances of reducing the signal strength.

It depends, of course, upon the capacity of the condenser when it is set to the value found by experiment as being right from the point of view of selectivity. In many instances the signal strength is reduced and distant stations cannot be heard.

The alternative scheme shown in the figure should then be tried. It consists in tapping the aerial coil. The aerial is connected to a tap instead of to the top of the coil through a pre-set condenser. As the



Two methods of getting better selectivity—
the series condenser, and the tapped coil

aerial is taken towards the earth end of the coil, the selectivity increases and at the same time there may be an improvement in the signal strength.

If the aerial is connected to a point on the coil too near the earth end the strength will decrease, but it is quite possible that the selectivity may be improved by a worth while amount without much affecting the strength.

In many sets it is fairly easy to reach the coil for the purpose of tapping it. The wire should be gently lifted and then have the insulation removed for about a quarter of an inch. To this portion a wire can be fastened. Try first a tap about the centre point of the coil, and then another nearer the earth end, taking care not to break the wire.

What H.T. is Needed ?

It is fairly safe to state that the higher the magnification factor of the valve used for detection, the greater must be the anode voltage for good results.

In this connection it is important to

remember that a grid-leak detector does at least two things. First, it rectifies the signals applied to it in the grid circuit.

Grid current is necessary for this, and so the circuit is arranged to pass grid current. Usually the grid leak is taken to the positive side of the filament circuit, for then the grid bias of the valve is made suitable for rectification. If it is joined to the negative side the amount of the grid current may not be sufficient for good detection.

The rectified signals are magnified by the valve in the usual way and for this reason the high tension must be sufficient or distortion will result.

It is amplitude distortion that must be avoided and with plenty of high tension this is not at all likely to happen. With a battery set it would be silly to apply 120 volts to the circuit with a low-impedance detector. The current would probably be 5 or 6 milliamperes and the valve would be capable of handling signals which would overload the power stage.

"GIVING COLOUR TO YOUR RADIO MUSIC"

(Continued from preceding page)

A smaller value for the fixed condenser may be advisable. Keeping a 50,000-ohm variable resistance, a good variation in high-note suppression will be obtained with a .1-microfarad fixed condenser.

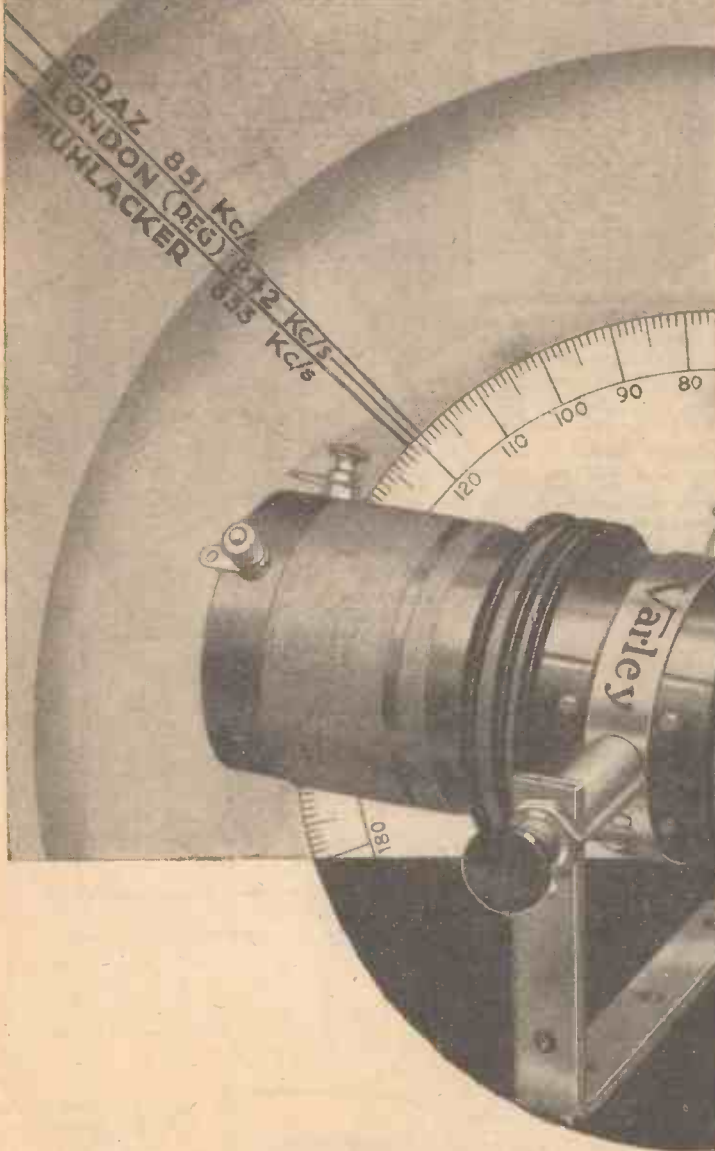
The tone filter just described is very suitable for use with loud-speakers inclined to sound harsh owing to the absence of real bass notes in the reproduction. Sometimes the opposite effect is obtained, namely, a certain "woolliness," due to the absence of high notes; this sort of trouble can be to some extent overcome by the Fig. 3 arrangement. It will be seen that instead of a fixed condenser in series with a resistance we use a low-impedance choke.

The choke will offer considerable impedance to the high notes but, with a certain value, which can be determined by the setting of the variable resistance, the lower notes will be by-passed, thus giving the effect of a raising in loud-speaker tone.

To apply this form of tone control to a set with an output transformer, one must, as shown at Fig. 4, connect the arrangement across the primary of the transformer. The value of the choke should be between .5 and 1 henry.

Experiments are now in progress for the development of more ambitious forms of tone control, but the simple arrangements detailed in this article should serve as a good start for amateurs interested in this refinement.

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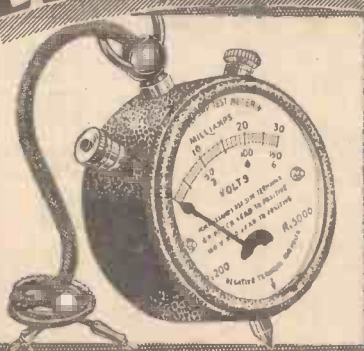
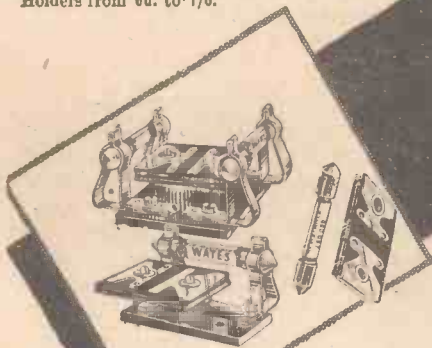
It is essential to use a non-inductive coupling condenser (.04 mfd.) THE DUBILIER CONDENSER CO. (1925) LTD., are manufacturing a special condenser, type 9200, for use with this coil.

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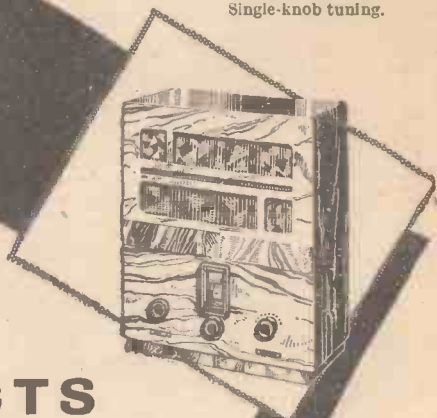
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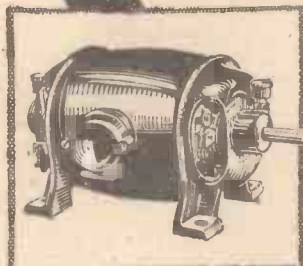


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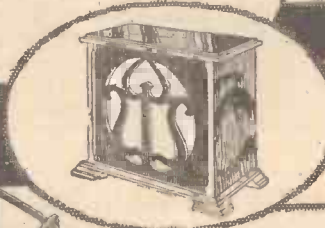
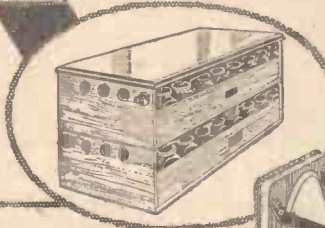


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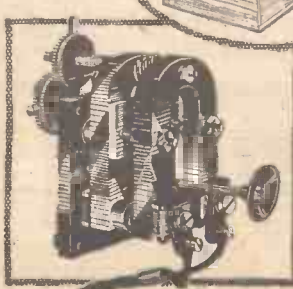


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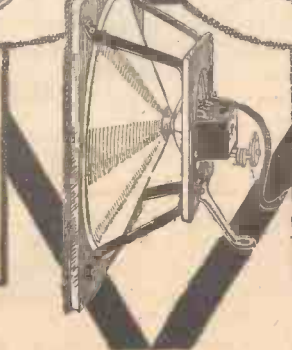


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On Your Wavelength!

IT'S EASY!

WITH the greatest interest I read that Professor A. M. Low has been conducting an investigation into the effects upon health brought about by noises of various kinds. It is stated that he sought to discover what kind of noise made people feel ill. To do this he tuned in the B.B.C.'s tuning note and superimposed upon it one of lower pitch. This appears to have had the desired (?) effect. Now I, too, have been experimenting, and though my natural modesty makes me hesitate to mention my own efforts in the same breath or, at any rate, in the same paragraph, as those of the professor, I feel that I must stifle my better feelings for the moment and give you the results of my own labours. For I have found a far, far simpler way of filling the house with noise that makes people sick. No superimposing is required.

All that you have to do is to tune in, neat and undiluted, one of the B.B.C.'s ultra-modern concerts. Believe me, it works every time.

OTHER QUEER NOISES

THE effects of other strange noises pushed into the ether by the B.B.C. are almost equally interesting. As a result of the most careful investigations, I have found that whenever there emanates from the loud-speaker a noise rather like that produced by a badly dented trombone accompanied by the words "The . . . ah . . . subject of . . . mai . . . ah . . . leetle tauk this . . . ah . . . evening is . . . ah . . . the psychology of . . . ah . . . tadpoles," those who are listening immediately begin to yawn. And a still more curious reflex action is to be observed when they have been under the influence of the noise for periods varying from ten to thirty seconds. The subjects rise, move rapidly across the room, fumble for the switch, and turn it to the "off" position. Wishing on one occasion to observe what would happen if the subject were prevented from carrying out this reflex action, I tied a friend (at least, he was then a friend) into a chair, switched on one of these talks, and carefully watched him. The yawning reflex was duly followed by an effort to rise. This being frustrated by his bonds, the efforts of the patient to escape became more and more violent. Realising at length that he could not leave his chair, he rapidly removed his right boot and flung it at the speaker!

A PROBLEM

TYPISTS play queer pranks at times, and the results can be distinctly amusing. This morning I had a letter from an eminent firm of wireless manufacturers who did me the honour of asking my advice.

"We believe," they wrote, "that we make the best earth contact that there is, but the trouble is that many people appear to have a strong objection to digging the necessary hole. We would appreciate any suggestion from you as to the best means

of doing this job with a minimum of comfort."

The missing "dis", how much it means! I expect that most of us could answer that question pretty easily. It always happens, somehow, that the only occasion when you have the time to spare to dig that wonderful hole for the earth connection that you have been meaning for so long to make is one when Dame Nature automatically ensures the minimum of comfort. She has been waiting for you. By a period of drought she has made the ground so hard that it takes you all your time to make the slightest impression upon it. Pleasantly cool days have preceded that upon which you labour and cool ones will follow it. But the day of days is scorching hot with never a breath of wind. You begin by tackling your task with a will, but by the time that you have got down six inches the cooling of your ardour is directly proportionate to the rise in your general bodily temperature.

LET US BE SERIOUS

SERIOUSLY, though, it is jolly well worth while to use a first-rate earth contact and to dig the deepest hole that you can to contain it. Time and time again have I come across instances of poor reception which could be traced directly to an earth contact that was not all that it looked. The most astonishing instance I can remember concerned a brand-new set of excellent make which could produce no more than a faint bleat from the local main station at a range of but twenty miles. The set was quite obviously right up to the mark and the aerial was all that an aerial should be. Inquiries about the earth, which was, of course, not then visible, seemed to show that it was a good one, but when we came to investigate with the aid of a spade we found that it was buried in gravelly soil. Deepening the hole by a foot brought us down to clay, and directly the earth plate was inserted into this reception at full loud-speaker strength was obtained.

It is surprising, too, to find what a difference a good earth makes to summer-time reception. The man whose earth is not up to the mark may obtain in winter time results almost or even quite as good as those of the fellow with a first-rate connection. But the bad-earth man begins to complain of an all-round falling off in signal strength, whilst the other fellow is still able to pull in stations all-round his dials.

STILL GOING STRONG

THOUGH we are now well into summer, the number of foreign stations receivable is astonishingly large and, as I ventured to predict, signal strength is not declining generally to anything like the same extent as in previous years. There are, I think, two causes for this. First of all, sunspots are becoming less and less in number and in size, and, secondly, we have

now so many super-power stations operating within the limits of the broadcast band. It is quite remarkable that so many of them come in well in broad daylight. Brussels No. 1 and Brussels No. 2, for example, I can receive at any time of the day when they are working. Hilversum is nearly as good, and there are many other stations one often finds coming through with very respectable strength long before lighting-up time. Even with a set of quite moderate size—that is, only one screen-grid stage—I find that I can bring in on any evening at least a score of stations whose transmissions come through so well that they are of real entertainment value.

NEXT YEAR IN EUROPE

I HAVE mentioned in these notes that we are in for a lively time on the broadcast band within the next twelve months, and almost every week fresh reports of great new schemes come in. Russia, as you know, will have about forty stations rated at from 50 to 500 kilowatts working on the broadcast band. Russia is a long way off, but Germany is a very near neighbour of ours. Germany has now only two stations of 75 kilowatts, but by the end of this year the number will be increased to seven and within twelve months it will have risen to nearly three times as many. Italy is not going to be left behind, France has a big building programme, Belgium is quite likely to add a few supers, and the medium-wave Hilversum may go much beyond his present 8.5 kilowatts. Poland, Sweden, Czechoslovakia, and several other countries have also big programmes.

MORE WAVELENGTHS?

EVEN if we make our receiving sets selective enough to effect a clean-cut separation between stations 9 kilocycles apart, there will most certainly not be room on the broadcast band for all the big stations of the near future. As no country seems willing to agree to restrictions in the matter of the number of these stations or as regards their output power, the only possible way out seems to be to allot more wavelengths to broadcasting. The most desirable of all wavelengths for broadcasting purposes fall into two bands. The first of these extends from about 300 to 700 metres; the second from 1,000 to 2,000 metres. At present there is no band that belongs exclusively to broadcasting, since shipping and commercial stations have wavelengths within the limits of both the medium-wave and long-wave bands.

There is a suggestion that strong efforts shall be made at the next International Conference to obtain a fresh allocation of commercial and broadcast wavelengths. Those between 200 and 300 metres, for example, are not ideal for broadcasting, though they might be used by morse stations. The disappearance of the spark transmitter, which by international agreement will shortly be accomplished, makes easier the path of those who have to deal

On Your Wavelength! (continued)

with the allocation of wavelengths. As most of us know by bitter experience, a spark transmitter cannot be sharply tuned. This has meant in the past that a pretty wide band had to be allotted to commercial and shipping transmissions. With the change over to tonic train and C.W., sharp tuning becomes the order of the day and narrower commercial wavebands should suffice. It is not, therefore, beyond the bounds of possibility that the broadcast band may in time extend from 300 to 650 or 700 metres and the long waveband from 1,000 to 2,000 metres, each band being entirely free from commercial interruption.

THE ONE SNAG

There is, though, one rather serious problem which will have to have a great deal of attention at no distant date. This is concerned with the terrible crop of harmonics produced by many commercial transmitters and not a few broadcasting stations. A surprising amount of the heterodyning and of the general mess-up that you hear in places below 300 metres is due to the second harmonics of stations with wavelengths between 400 and 550 metres. Vienna, for example, who works on a wavelength of 517 metres, has a nasty second harmonic on 258.5 metres, which interferes at times with both Leipzig and Hörby. And the long-wave stations are in some cases very bad producers of harmonics. Our own 5XX was at one time an offender in this way. I used to be able to obtain full loud-speaker reception of his fifth harmonic in broad daylight, and with a very sensitive set I once collected most of them up to the thirteenth. Much is done in the modern transmitters to prevent the production of harmonics, but the problem that they present is one which still calls for a full solution.

COMMERCIAL STATIONS

Many of the commercial stations are still great offenders in the matter of harmonics. If you run over the broadcast band with a sensitive set you will find a good many patches where mush is greatly in evidence. This is largely a product of long-wave commercial harmonics and its effects upon reception can be very serious. Some stations, too, have powerful "direct" harmonics as opposed to mere mush. These are in some instances so strong that their signals are read just as easily on the harmonic as on the fundamental wavelength. Clearly, with the ether as crowded as it is, we cannot allow one station to occupy anything up to half a dozen wavelengths, and the business of harmonic suppression is exceedingly important.

WORTH TRYING

Luckily, we seldom suffer really badly from atmospheric in this country. You may hear Smith telling Robinson that atmospheric were appalling on the previous night; but Brown, who has lived in the tropics, merely smiles and remarks that those who live in England don't know what atmospheric are. Be that as it may, the tearing and crashing noises that they

produce on occasion can be most annoying and sometimes quite bad enough to ruin one's pleasure in the programmes even of the local station. Here is an interesting point. Atmospheric consist of trains of heavily damped waves, usually of irregular form. The more efficient the aerial system, the worse are the effects that they produce by shock-excitation, and therefore the louder are the noises that you hear. A moment's thought will show that if you reduce the efficiency of your aerial tuning system you are likely to experience much less trouble through atmospheric interference. Here is a tip which I have found useful. Try it yourself and see how it works. The local station usually comes in so powerfully that you have more strength than you require; in other words, you have something to play with. You can therefore introduce damping deliberately into the aerial system without reducing your signal strength too much. There are two useful ways of doing this, both of which are worth trying if there is a good programme going and atmospheric interference is rather annoying.

TWO USEFUL TIPS

The first method consists in using a much smaller aerial coil with, of course, a larger amount of capacity to tune it. If your set contains, as it probably does, a high-frequency transformer with aperiodic aerial tuning, this simply means using a transformer with much fewer turns on the secondary. Now, suppose that your local station comes in in the ordinary way with the tuning condenser so set that the parallel capacity is about .0003, what you need to do is to evolve a transformer which will bring in the same station with about three times the capacity in parallel. Wind one with fewer secondary turns and wire, say, a .0002-microfarad fixed condenser across it. You then tune in the station by means of the variable, and you will probably be surprised to find how great-

EASY CONSTRUCTION

Never use more wires than absolutely necessary in the construction of a set. Very often by careful placing of the parts you can cut out a number of leads. For instance, the coupling con-



denser shown here is placed directly by means of its soldering tags between the two holders, and no wires are needed. Small fixed condensers and grid leaks in clips can often be mounted in this way.

ly atmospheric interference has diminished. This method introduces damping by parallel capacity. Another way is to use a parallel resistance. Connect an ordinary resistance holder between the aerial and earth terminals of the set and try resistances of various values until you find one which cuts down atmospheric interference whilst still giving you adequate signal strength.

A MATTER OF VOLTS

I had a most extraordinary example the other day of the effect of the small increase in anode voltage on the power output. Theoretically, of course, the power output is proportional to the $5/2$ th power of the anode voltage, which is a mathematical expression meaning that the power increases a little more rapidly than the square but not as rapidly as the cube. If it obeyed a square law, then if the anode voltage were doubled the output would go up four times, whereas actually, according to the formula, it goes up 5.7 times.

What is not always realised is that this effect applies even for small increases of voltage. If the voltage is increased 10 per cent. the power output is increased 27 per cent., assuming that the grid bias has automatically been increased to compensate for the additional anode voltage, and that the input has also been increased up to the limit of the new value of grid bias. Now, a 27 per cent. increase in power is distinctly audible, but, of course, in the majority of sets an increase in anode voltage is not automatically accompanied by an increase in grid bias, this latter having to be adjusted independently.

TRYING A D.C. SET

It so happened the other day that I was playing about with a D.C. mains receiver in which the majority of the voltage was dropped on a breaking down resistance, and this voltage drop was used for high-tension purposes. A small voltage was dropped on the filaments of the valves, and a somewhat larger portion (about 25 volts) was used for grid bias. Now, this particular receiver had been designed for 200 volts, and there was actually 175 volts on the anode, 6 volts on the valve, and 19 volts grid bias. The power output was reasonably good, and I was quite satisfied with the results, but I wanted to modify this set to suit a friend of mine whose voltage was 240.

Accordingly a small extra resistance was wound up dropping 35 extra volts; while the grid bias resistance was slightly increased to give a bias of 24 volts instead of 19. I may say that I made these alterations principally with the idea of preventing the valve filament from being overrun, because, of course, the values of the resistances were so proportioned to pass the exact current (actually a quarter of an amp.) through the valve filament. When I connected everything up, however, I was amazed to find that the set was distinctly more lively and was giving, appreciably greater punch. This was due to the increase in the anode voltage to 210 volts.

THERMION.

WORKING THE "B.B.C. SELECTIVE TWO"

Some useful information on getting the best results from the simple and ultra-selective two-



valve receiver, constructional particulars of which were given in last week's issue

A GREAT point about the "B.B.C. Selective Two" is that it incorporates a "tuning sharpener" of a type recommended by the B.B.C. for getting the utmost selectivity with ordinary coils.

The special three-valve described elsewhere in this issue is, of course, an entirely different proposition for the man who is building a slightly larger set and wants to get the very best results in the way of tuning, purity (because of the bandpass arrangement), and sensitivity.

The filter circuit included in the B.B.C. recommended two-valver, though, is a novel means of using an additional coupled circuit to increase the natural selectivity of the Talisman dual-range coil used in the set.

It will be seen that the filter circuit is screened off from the main portion of the set and in order to get the best working of the filter it is essential that there should be no mutual coupling between the filter coil and the main tuning coil.

This is prevented in the set partly by the screening and partly by the fact that the axes of the two coils are such that mutual

coupling is practically impossible.

In last week's issue recommended valves and battery values were given. It is worth noting that as an ordinary detector and power valve are needed in this set, there is no need to have anything very elaborate but if you are buying new valves then you should adhere to the recommended types in order to get the best results.

It is worth while spending a preliminary half-hour or so in getting the filter properly adjusted. Once the best values have been found then tuning is every bit as simple as that of a straightforward set and the selectivity is really amazing.

When setting

pre-set condensers on the small side of the screen and then set the main variable condenser on the filter side to about the half-way position.

With the other condenser then tune in a station which normally forms a good reception guide. With the condensers at this setting there will probably be some interference. Bring the filter circuit main condenser into tune and readjust both condensers until the station is as loud as possible.

Now slack off the coupling condenser, but not beyond a point when volume drops off.

Additional selectivity can be obtained when necessary by slacking off the knob of the pre-set condenser connected to the

COMPONENTS REQUIRED FOR THE "B.B.C. SELECTIVE TWO"

Ebonite panel, 14 in. by 7 in. (Becol, Trelleborg, Peto-Scott).

Baseboard, 14 in. by 9 in. (Cameco, Clarion).

Two .0005-mfd. variable condensers (Lotus, J.B., Cyldon, Read-Rad, Lissen, Ormond).

Dual-range tuning coil (Wearite "Talisman").

.0003-mfd. differential reaction condenser (Telsen, Lissen, Read-Rad, J.B.).

Neutralising condenser (J.B., Peto-Scott).

Single coil holder (Lissen, Lotus).

.0003-max. pre-set condenser (Sovereign, Formo, R.I., Ormond, Leweos).

Partition screen, 9 in. by 6 in. (Read-Rad, Parex, Peto-Scott).

Two valve holders (Telsen, Junit, W.B., Benjamin, Wearite, Burton).

.0003-mfd. fixed condenser (Lissen, Dubilier, T.C.C., Graham-Farish, Sovereign).

2-megohm grid leak (Lissen, Dubilier, Telsen, Graham-Farish, Sovereign).

Grid-leak holder (Lissen, Wearite, Bulgin, Dubilier).

High-frequency choke (Leweos, Telsen, Varley, Wearite, R.I., Burton, Watmel, Sovereign).

Low-frequency transformer (Ferranti type A.F.8: Telsen, Lissen, Varley, Leweos, R.I., Burton, Volltron).

Two terminal blocks (Junit, Sovereign, Lissen, Belling-Lee).

Filament switch (Read-Rad, Junit, Bulgin, Lissen, Benjamin, W.B.).

Two slow-motion dials (Astra, Lissen, Ormond, Brownie, Lotus, Formo).

Four terminals marked Aerial, Earth, L.S.+, L.S.— (Clix, Eelex, Burton, Belling-Lee).

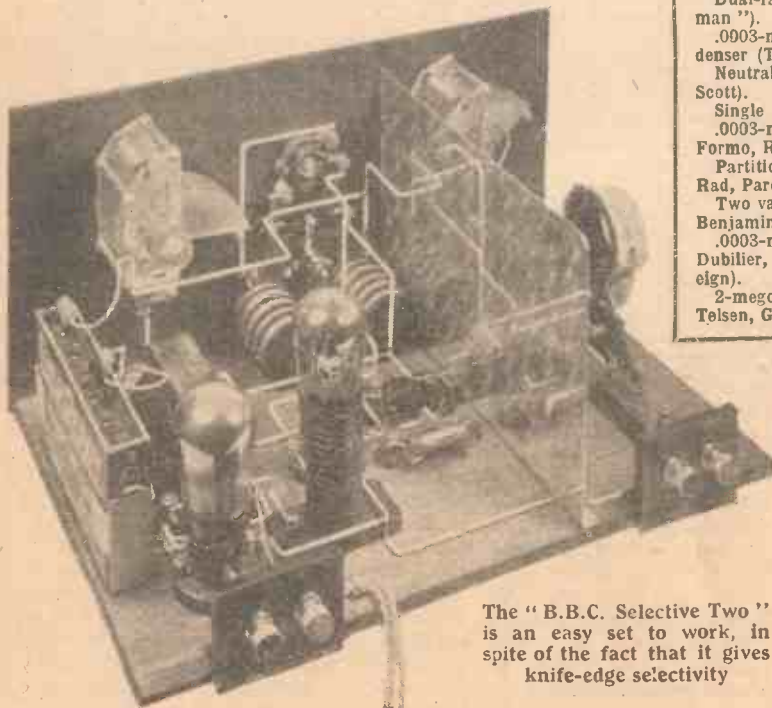
Five wander plugs marked H.T.—, H.T.+1, H.T.+2, G.B.+, G.B.— (Clix, Belling-Lee, Eelex).

Two spade terminals marked L.T.+, L.T.— (Clix, Belling-Lee, Eelex).

Connecting wire (Glazite).

Grid-bias battery clips (Bulgin).

Three yards of thin flex (Leweosflex).



The "B.B.C. Selective Two" is an easy set to work, in spite of the fact that it gives knife-edge selectivity

up the filter in the first instance, make a note of these points. Having put a No. 50 or 60 plug-in coil in the single socket as explained last week, screw in the knobs of the coupling and

aerial terminal, but it must be pointed out that alteration of this value will probably upset the relationship between the dial readings of the filter and main tuning condensers.

Radio Normandie at Fécamp is collecting funds with a view to erecting a 25-kilowatt (aerial) broadcasting station at Bréauté-Beuzeville. It is stated that such a transmitter would give an adequate broadcast service to Normandy, Brittany and the adjoining provinces.

THE HOW AND WHY OF RADIO—XXXVIII

MORE ABOUT HOW THE VALVE WORKS

Written specially for beginners who want simple and practical explanations of the underlying principles of radio

BEFORE beginners can hope to understand the many interesting facts regarding valves in the different parts of a modern set, it is essential to be able to distinguish quite clearly between the three main valve circuits.

Fig. 1 shows a normal three-electrode valve, consisting of a filament, grid, and anode, dissected at A, B, and C into its three constituent circuits.

At A is the filament circuit. This comprises a low-voltage battery across the two filament connections. It can be a 2-, 4-, or 6-volt battery, according to the voltage rating of the filament. The connection of the battery to the filament causes current to flow through the filament, thus heating it to the point where electrons—minute negative electricity charges—are thrown off into the space inside the valve bulb.

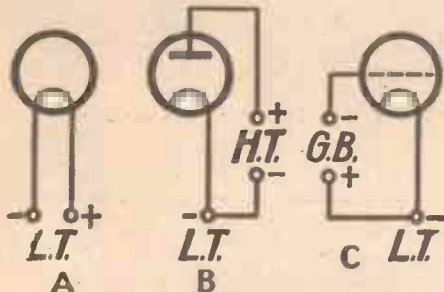


Fig. 1.—Diagrams showing the operating circuits of a valve

The amount of filament current that flows depends upon the resistance of the filament wire. With a 2-volt valve having a filament of 20 ohms resistance the filament passes .1 ampere. This can easily be worked out from Ohms Law. (See article No. 15 in this series.)

At Fig. 1B is shown the simple outline of a valve's anode circuit—a little more complicated than the filament circuit. It would be quite correct to trace the anode circuit thus: from the negative side of the filament, across the valve to the anode, through the high-tension battery from the positive to negative end and so back to the negative side of the filament.

Such a route indicates the real direction of electron movement, but it contradicts the convention that has become accepted to the effect that current flows from a point of high potential to a point of lower potential. So we had better consider the anode circuit as starting at the positive end of the high-tension battery, going through the valve to the filament and so back again to the anode, via the high-tension battery.

Just now we saw that the filament current is limited by the resistance of the filament; in much the same way the anode current is limited by the resistance of the valve. Perhaps it is not easy to see how a valve can have this sort of resistance, when there is no apparent connection between the electrodes. Actually there is a connection, namely the flow of electrons forming a conduction current from the filament to the anode.

The size of the electrodes and their distance apart, together with other constructional details of the valve, decides the resistance of the valve. We find that a low-resistance valve takes a large anode current. For example, a small power valve with a resistance of 5,000 ohms might take 10 milliamperes. As the valve resistance is increased, so the anode current is decreased; thus a 20,000-ohm valve might take only 1 milliamperes anode current.

At Fig. 1C is shown the outline of a valve's grid-circuit. Here the grid is biased negatively but sometimes, as in a popular form of detection, the grid is biased positively. The important point is that current will flow in the external grid to filament circuit unless the grid is sufficiently negatively biased.

Since all the anode current depends on the electrons emitted from the filament, it follows that all electrons going to form a grid current must do so at the expense of the anode current.

The main function of the grid is to control the anode current flow, by helping or hindering the flow of electrons from filament to anode. The grid does this work by becoming alternatively positive and

negative as the incoming signal is applied to it. For this controlling function, it does not matter whether the grid is at zero potential or at some negative potential. If the grid is made permanently negative by a bias battery as at Fig. 1C the incoming alternating voltage will simply add or subtract from whatever potential is on the grid and this will vary the flow of electrons just as if the grid were at zero potential.

From this it will be understood that we can make the grid as negative as is necessary to stop any positive signal voltage from making the grid actually positive. When the grid is prevented from becoming at all positive, grid current is also prevented, although the controlling action of the grid is still maintained.

A simple means of seeing how grid voltage

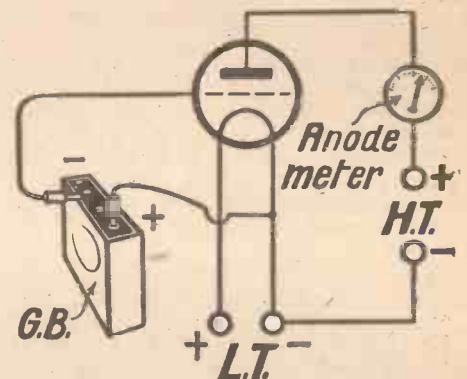


Fig. 2.—How the grid voltage affects the current flow in the anode circuit

affects anode current can be readily fixed up by the reader in accordance with Fig. 2. Here we have a valve with appropriate high- and low-tension batteries, arranged so that there is a milliammeter in the anode circuit and a grid-bias battery in the grid circuit. If a fairly low-impedance valve is used quite appreciable changes will be noted in the anode current as the amount of negative grid bias is varied.

HOTSPOT.

MAKING A FRAME FOR THE "CENTURY SUPER"

(Continued from page 842)

winding and No. 9/40 should be used for the long-wave winding.

For the medium-wave winding, for example, leave about 8 in. of wire to connect up to terminal 1 on one side of the connecting socket, put on ten turns on one side of one former, make a loop to connect up with the centre terminal 3, complete the winding by putting on ten turns on the other side of the former and connect up to terminal 2. This makes a total of twenty turns for the medium-wave winding.

The long-wave winding should be put on in exactly the same way, there being a total of sixty turns. Thirty turns should be put on each half of the winding and the centre tapping should be taken out to terminal No. 3.

The ends of the winding 1 and 2 connect with terminals 1 and 2 on the set, and centre tapping terminal 3 is similarly connected. It is advisable to make a note of which side of the connecting strip holds the sockets for the medium and long waves; otherwise there will be difficulty when the frame aerial is first tested in getting windings in the right direction for any station.

If this frame is made up exactly as

described it will be found to tune very sharply and the aerial tuning condenser must be turned very slowly indeed as should be done with the oscillator condenser.

Condensers which have a large gearing reduction are a help in fine tuning, and in this connection it is interesting to note that Messrs. Jackson Bros. have produced for the "Century Super" a special condenser which has a gearing ratio of 1 to 40. These condensers, which are otherwise the same as those originally specified for the "Century," cost 10s. 6d. each, and there is no doubt but that this large gearing reduction makes for easy tuning.

A Weekly Programme Criticism—By SYDNEY A. MOSELEY.

Without Fear or Favour



JACK PAYNE

THE COMMAND PERFORMANCE

"WHAT do you think of the Rumba?" Jack Payne asked me as I watched his boys in No. 7 studio.

"I'll buy it," I replied.

It seems that the Rumba is a new kind of tango-tied rhythm. Jack doesn't care for it much; nor do I.

That is why, I suppose, he played "The Peanut Vendor."

"The money you're making now," I said to him, "means you will retire soon."

"How would you spend your time?" somebody asked.

"Why not take up music?" I said to Jack.

He laughed.

"A palpable hit," he said.

I like Jack better than I like his music. Some of the comedy stuff is good. But many of the newer numbers, alas, are cheapish; and I haven't hesitated to tell him so.

One of the best things the B.B.C. achieved in its early days was in selecting the right sort of announcers. There has been a sad falling away. Announcers come and announcers go, but none reach the level of Uncles Arthur, Rex, and Caractacus.

I prefer the latter's announcing to his plays.

The opera question is going to be a big one. We are paying heavily for transmissions; but a good many are not very suitable for transmissions. The *Rose Cavalier*, for instance, must have been well-nigh unintelligible to listeners.

Late as it is, I must not forget to say a word or two about the transmitting of the Royal Command performance. Our friends the Buggins family started off well, but, alas, overdid it! They impinged too much and actually spoilt our hearing of the best turn of the evening. Mark you, I think the Command show altogether is always rather over-valued. Certainly, as far as broadcasting is concerned, the average vaudeville programme from the studio is better.

I suppose it is the general atmosphere that enhances its value. Marie Burke's was one of the least suitable voices for the opening "National Anthem." Her vibrato hardly commends itself on normal occasions. Max Miller is a matter of taste. I saw him a few nights later at the Holborn and thought him vulgar. (So were many of the other turns.) The motoring sketch with Douglas Wakefield needed seeing.

The only turn that came over well was the comedy piano and vocal act, and the opening of that was, as I said, spoilt by the Buggins' talk on fish and chips. Pity!

"Chinese Moon Party" aimed high and needed concentration, which, alas, I was unable to give that night, owing to "company." As a change from variety, however, I listened to Olive Bloom, the pianist, playing with the B.B.C. Orchestra the symphonic variations by Caesar Franck! As a change, I say. And a darned good one.



An Impression of Rupert Hazel

OPERA TRANSMISSIONS

"THE FOREST"

The *Magic Flute* has such an absurd story that I wonder why Mozart troubled to put his scintillating music to it. Here again, unless the listener was quite conversant with the story, the broadcast of the second act from Covent Garden must have been lost on him.

Tristan and Isolde has endearing music to "carry it." The story is the ordinary triangle with a faithless friend who informs the king of his wife's amour. The love-music is the greatest in the world.

On Friday I counted seven talks. Counted, I said. I certainly didn't listen.

The Forest, by John Galsworthy, is a play that appeals to me. I read it before listening—a course I commend to those listeners who can borrow or buy the book. Anything, of course, that Galsworthy wrote is worth listening to, and Dulcima Glasby, who adapted, and Howard Rose, who produced, did their work well. I should very much like to hear it again.

Broadcasts from the Moscow Trades' Unions studio are simultaneously transmitted on 1.304 and 50 metres. Plans for the development of the Soviet radio system call for eleven 100-kilowatt and thirty-eight 10-kilowatt transmitters to be in operation by the end of 1936. It is proposed to use the 500-kilowatt transmitter now in course of erection at Noginsk (near Moscow) solely for International propaganda. A new 75-kilowatt station is nearing completion at Kolpino.

Some remark is being occasioned in Scotland, as elsewhere, by the varying nature of the penalties imposed on wireless "pirates" in different parts of the country.

It is argued by some Scottish critics that the chief engineer of the B.B.C. has confessed, in his recent talk, that the B.B.C. has no intention of attempting to provide any service for the Highlands and Islands of Scotland. They also contend that no real service is proposed for Scotland north of Oban and Montrose. The allocation of wavelengths for the existing Scottish stations is made another matter for complaint.

THE use of the mixed-coupled band-pass filter was discussed in last week's issue. By the judicious mixture of magnetic and capacity coupling a band-pass tuner can be arranged in which the selectivity is substantially constant over the whole wavelength scale. The new Varley coil is the first commercial coil to be produced on these lines and it has been incorporated in a simple three-valve set which is described herewith.

The conditions in the ether to-day are as good as they were some years ago and are approaching one of the regular cycles of good reception. Consequently comparatively simple receivers will pull in a number of stations if the tuning arrangements are sufficiently selective. In the present instance, therefore, a three-valve set has been employed using a screen-grid H.F. valve, a detector, and L.F. stage in which a pentode may be used if the reader wishes. Such a set will bring in a good selection of programmes, although, of course, the use of reaction is necessary, particularly on the more distant ones.

Remarkable Selectivity

Where the present set scores is in the remarkable selectivity. On any ordinary three-valve set at Elstree there is little hope of receiving anything but London. Even though the tuning circuits may be reasonably good, cross modulation is produced in the H.F. valve, and reception of any foreign stations is practically impossible if one uses a normal full-sized aerial. With this receiver both the London stations tune in and out in a matter of ten degrees even with a full aerial on, and in a final run over the dials I picked up twenty-five other stations without a trace of interference from Brookmans Park. I have no doubt this figure will be exceeded by many readers.

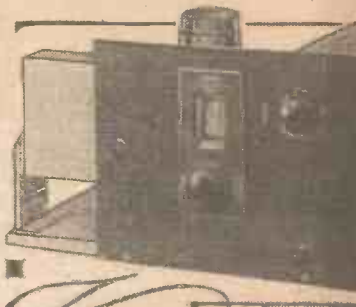
Perhaps a little more care in tuning may be required, for we are using a circuit which accepts only a very narrow band of frequencies, and the set is remarkably quiet unless it is actually tuned to a station. I have, however, spent some time on this particular set with the object of making it as simple as possible in operation, and I do not think that any serious difficulty will be experienced if the layout is followed.

As a matter of fact when the set was first constructed it did not behave at all nicely, and after I had looked into the matter I realised that this new coil requires to be treated with more respect than the average tuning coil. We are accustomed, for example, to place a tuner fairly close to a metal screen without worrying very much as to the possible loss of efficiency which may result from the eddy currents set up in the screen. In the case of this coil we cannot be so light-hearted, and particularly if we place the screen at one end of the coil only we shall throw it out of balance and the results will be very disappointing. Therefore, you will notice that the coil has been placed in a vertical position well away from any metal work. There is no copper foil on the baseboard and this must not be used, as you will find that bringing any sheet-metal within 1/2 in. of the end of the coil will cause a marked reduction in the signal strength. In order to mount the coil in this way and still operate the wave-change switch from the panel, I found it necessary to remove the metal back from one of the chassis-mount condensers. This is quite a simple operation.

Valve Mounting

The H.F. valve is mounted horizontally, and is pushed through a partition screen which separates the H.F. grid circuits from the anode circuits. This screen, by the way, must not be allowed to touch the framework of the chassis-mount condensers, since it is actually at a slightly different potential, and if the two are allowed to touch it will short-circuit

"Where the present set scores is in the remarkable selectivity ... both the London stations tune in and out in a matter of ten degrees (at Elstree) even with a full aerial ... in a final run over the dials I picked up



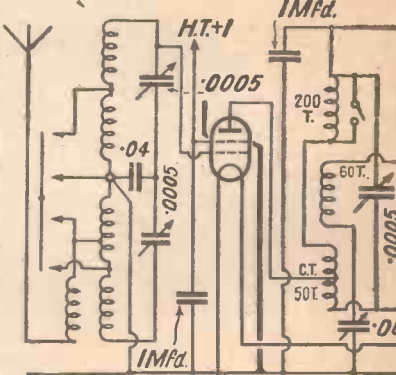
The SQUARE

**A NOVEL SET, DESIGNED BY J. H. REY
 USING THE NEW SQUARE-PEAK COIL WHICH
 IT IS FINE FOR DISTANCE-GETTING,
 FROM THE LOCAL**

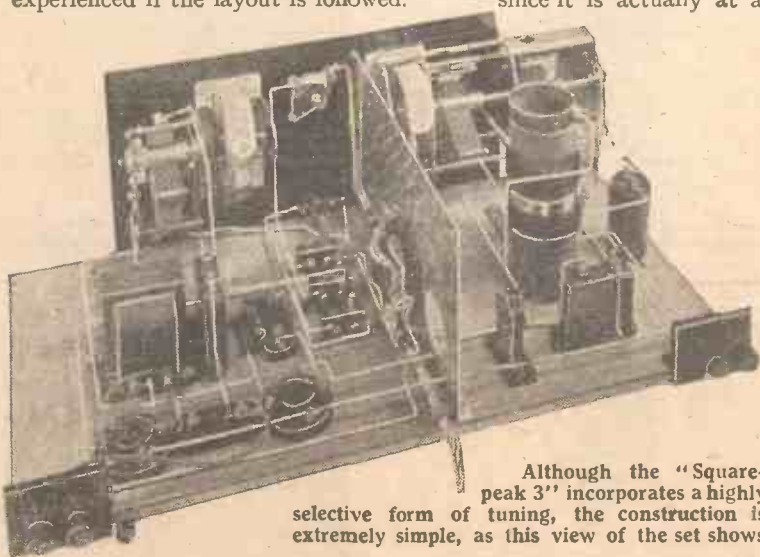
the .04 microfarad coupling condenser in the band-pass tuner.

Plug-in coils are used in the anode circuit. This was done in the interests of simplicity and also efficiency, for I found that without going to a certain amount of trouble

I was unable to obtain as good results with a dual-range coil. Incidentally, this is rather surprising and suggests that there is something seriously wrong with the design of present-day dual-range coils. A simple push-pull switch serves to short out the long-wave coil when not in use.



The circuit of the "Square Peak"



Although the "Square-peak 3" incorporates a highly selective form of tuning, the construction is extremely simple, as this view of the set shows

COMPONENTS REQUIRED FOR

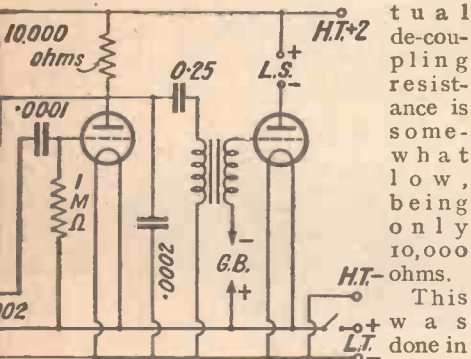
- Ebonite panel, 14 in. by 7 in. (Beccol, Trelleborg, Potter).
- Baseboard, 21 in. by 10 in. (Clarion, Camco).
- Two-stage .0005-mfd. gang condenser with drum drive (J.B. "Chassimount," Lotus, Polar).
- .0005-mfd. variable condenser with drum-dial (J.B. "Universal Log" and drum, Lotus, Polar).
- .0003-mfd. reaction condenser (Readi-Rad, Bulgin, Telsen, J.B., Formo, Burton).
- Filament switch (Bulgin, Wearite, Readi-Rad, Lissen, Junit, W.B.).
- Wave-change switch (Readi-Rad, Wearite, Bulgin, Lissen, Junit, W.B.).
- Horizontal mounting S.G. valve holder (Parex, Junit, H. & B., Wearite).
- Two 4-pin valve holders (Wearite, Telsen, Lotus, Benjamin, Junit).
- Varley Constant Square-peak coil.
- 1-meg. grid leak (Lissen, Graham-Farish).
- Three single coil holders.
- .0001-mfd. fixed condenser (Dubilier, T.C.C., Telsen, L.).
- .0002-mfd. fixed condenser, Lissen, Formo).
- Special .04-mfd. fixed condenser (LDA).
- Two 1-mfd. fixed condenser (Lissen, Formo).
- .25-mfd. fixed condenser (Low-frequency transformer, Lissen, Varley, Burton, Voltron).
- 10,000-ohms spaghetti resistor (Tunewell, Sovereign).
- Partition screen, 10 by 10 in.

twenty-five other stations without a trace of interference from Brookman's Park... I have spent time on this set with the object of making it as simple as possible in operation."

SQUARE-PEAK "3"

DESIGNED BY G. W. B. BAKER, B.Sc., A.M.I.E.E., INCORPORATED IN THE PATENT OFFICE WHICH GIVES AMAZING SELECTIVITY. AND THERE IS NO INTERFERENCE WITH NEARBY LOCAL STATIONS

The detector and L.F. circuits require no comment except to point out that a parallel feed system is used for the L.F. transformer to act as a partial decoupling and to avoid the passage of heavy current through the primary winding of the transformer.



Square-peak Three "

to maintain a high voltage on the detector and so minimise the risk of overloading.

A pleasing layout has been adopted. It was possible to bunch the controls together in the centre of the panel, and therefore the

space will not tempt anyone to endeavour to reduce the size, because as I said before this new coil requires handling with respect and there is some danger that the results will fall short of the expectations unless the layout and spacing shown are adhered to.

The actual decoupling resistance is somewhat low, being only 10,000 ohms. This was done in order to maintain a high voltage on the detector and so minimise the risk of overloading. A pleasing layout has been adopted. It was possible to bunch the controls together in the centre of the panel, and therefore the

space will not tempt anyone to endeavour to reduce the size, because as I said before this new coil requires handling with respect and there is some danger that the results will fall short of the expectations unless the layout and spacing shown are adhered to.

FOR THE "SQUARE-PEAK 3"

Dubilier, Telsen, Watmel, Lotus, Lissen, Wearite), user, with series clips (Lissen, Formo), Teiler (Dubilier, T.C.C., Teiler), Condenser (Dubilier, type), sers (T.C.C., Dubilier, T.C.C., Dubilier, Lissen), mer (Telsen "Radio- Lewcos, Ferranti, R.I., sistance (Lewcos, Bulgin, 6, with hole for S.G.

valve (Parex, Wearite, Peto-Scott, Read-Rad, H. & B.), Two terminal blocks (Junit, Lissen, Belling-Lee), Five-way battery cord (Bulgin, Lewcos, Belling-Lee), Four terminals marked: Aerial, Earth, L.S.+, L.S.— (Belling-Lee, Elex, Clix), Connecting wire (Glazite), RECOMMENDED ACCESSORIES Three plug-in coils: 50 "centre-tapped," 60 and 200 (Tunewell, Lewcos, Atlas), 120-volt H.T. battery (Ever-Ready, Lissen, Pertrix, Drydex, Fuller), 9-volt G.B. battery (Ever-Ready, Lissen, Pertrix, Drydex, Fuller), 2-volt accumulator (C.A.V., Fuller, Exide, Ever-Ready), Loud-speaker (B.T.H., Amplion, Mullard, Blue Spot).

panel is only 14 in. long, whereas the baseboard is 21 in.

Construction is easy, particularly if you take advantage of the full-size blueprint which is available, price 1s., post free, from the Blueprint Department, AMATEUR WIRELESS, 58-61 Fetter Lane, London, E.C.4. You can, of course, work with the small reproduction of the full-size blueprint given here, which shows all the connections, but the novice will find it very handy to have the full-size chart, which can be used as a drilling and mounting template.

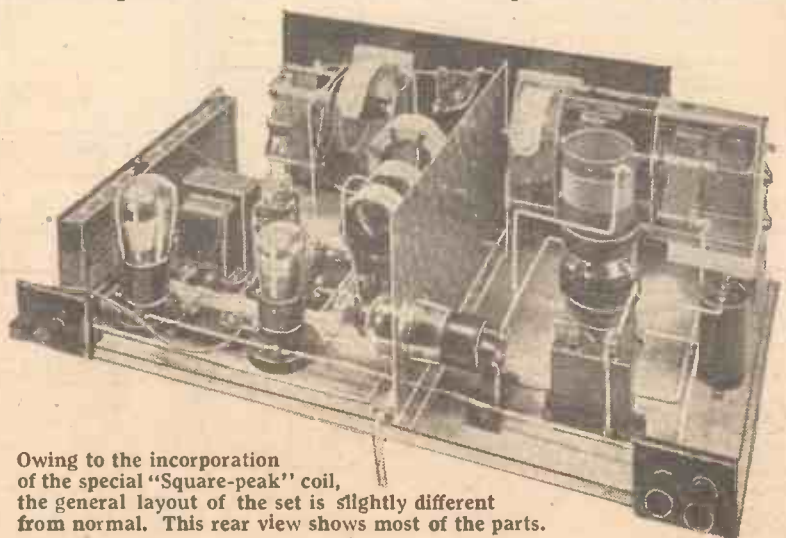
I hope that the apparent spare

evenly laid out with regard to operating. In marking out the panel, first of all drill the holes necessary for the drum dials. These are situated 3 in. on each side of the centre line of the panel, and two holes are drilled on this line, one coinciding with the top of the escutcheon plate and the other with the bottom. Two screws may now be inserted temporarily in order to bolt the back plates on to the panel. The square hole can then be marked out by scribing through on to the panel, or if desired the hole may be cut to shape with the back plate still in position. The best way to do this is to drill a number of holes about 1/8-in. diameter as close together as possible all round the rectangular portion to be cut out. The necks in between the holes can then be cut through with a hand saw and this will remove the whole of the centre portion. A file will then smooth up the rough edges until a neat rectangular hole is the result.

Panel Mounting

One more hole will be required at the bottom for the operating spindle of the condensers. The only other holes required on the panel are those for the switches and the reaction condenser which can quite easily be placed in position as shown. Be careful to get the hole for the extension rod of the band-pass coil switch at the correct height.

The right-hand condenser is mounted directly on the panel as also are the reaction condenser and the push-pull switch immediately underneath it and the on-off switch at the right hand of the panel. The chassis-mount condenser is supported on brackets from the baseboard. These brackets are provided with a number of holes, and the bottom pair on each bracket were used in the present instance. Having mounted the brackets on the end of the condenser, with the feet turned inwards, the condenser should be allowed to stand in position on the baseboard with the spindle projecting through the hole in the front panel, which has already been cut to receive it. The exact position of the two holes may then be marked and the screws may be inserted. If necessary, having marked out the positions, the condenser

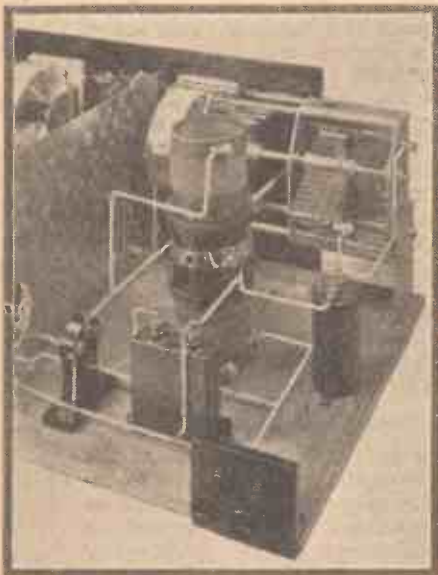


Owing to the incorporation of the special "Square-peak" coil, the general layout of the set is slightly different from normal. This rear view shows most of the parts.

THE "SQUARE-PEAK 3" (Continued from preceding page)

may be removed and gimlet holes made in the baseboard first.

The next operation is the mounting of the bracket for the coil. This must be very carefully centred to coincide with the hole



Here is the "square-peak" coil mounted in the set

drilled in the panel through which the switch rod has been pushed. The bracket may then be screwed down in such a position that the coil, when mounted, occupies a position in about the middle of the baseboard as shown. An extension rod for the switch is provided with the coil, one end of this containing a small length of threading. It will be necessary to cut about half an inch off and then to screw the extension piece on to the end of the normal switch by means of the coupling collar provided. It is advisable to do this, and to link up the switch rod to the coil before finally screwing down the bracket.

Preliminary Testing

The remaining portion of the construction requires no comment. Details as to how to get the best results from the receiver will be given next week.

A few remarks may be made for the benefit of those who have finished the receiver before next week's article appears. The high-tension voltage should be 120 or more. This voltage is applied to all the valves, the detector voltage being broken down by virtue of the 10,000-ohm resistance so that there is 70 to 80 volts actually on the anode of the valve. I used a Cossor detector valve in this position, as I found that it gave me the best reaction and the loudest signals. Any valve having L- or HL characteristics will be suitable in this position, however, the valve being preferable on account of the fact that it will handle more grid swing without overloading.

A signal of 3 volts or so can safely be handled by a detector valve operating under the conditions provided in this receiver, and unless one is living very close to a broadcast station, the voltage is not likely to exceed this value.

The disadvantage of using an L valve in the detector stage with the average set is that the L.F. transformer following the detector tends to saturate. This, of course, is obviated in this present set by the use of a parallel-feed system, so that there need be no fear in this direction.

The screen-grid valve receives the full high-tension voltage, while the screen-grid itself is fed with a separate H.T. tap. This may be adjusted to the value recommended by the maker, and if necessary altered by trial when the set is being tested out. Alternatively, the screen-grid voltage may be fed from the full H.T. through a variable resistance such as a Volostat, which enables the best operating point to be obtained.

Volume Control

I found when using the receiver, however, I was able to obtain quite a satisfactory volume control by mistuning the detector.

The very sharp band-pass characteristic of the aerial tuner does not permit any interfering stations to come through, even if the detector is mistuned slightly, so that it gives quite a satisfactory volume control and avoids any liability to cross modulation, which is always present if one varies the sensitivity of the H.F. stage by reducing the screen-grid voltage.

In the output stage use a good power valve or a pentode. While a pentode will give louder signals on the distant stations, there is more likelihood of its being overloaded on powerful local signals.

The detector, as we have seen, will carry 3 volts H.F. and this delivers a voltage of 20 or more to the output valve. This, of course, only applies when the detector is

fully loaded, but it will be understood that under such conditions a pentode will overload very seriously. The best valve to use, therefore, is a good super-power valve capable of taking a grid swing of 15 to 18 volts and which will handle a large input and will be more generally satisfactory.

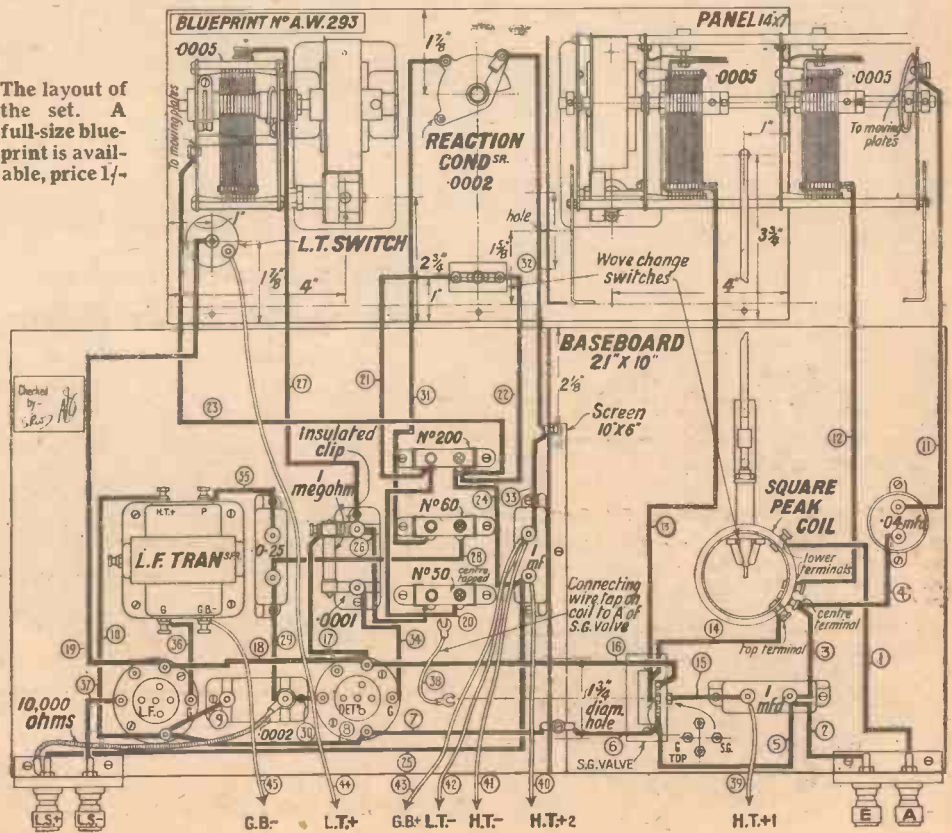
I found that the loud signals in this set were not confined to the local stations, as many foreigners came in at considerable volume and indeed with such clearness and freedom from mush that I had a certain amount of difficulty in deciding whether they were foreigners or local stations!

London readers should note that the "Square-peak 3" is on view in the Radio Department windows of Messrs. Selfridge & Co., Ltd., Oxford Street, London, W.1.

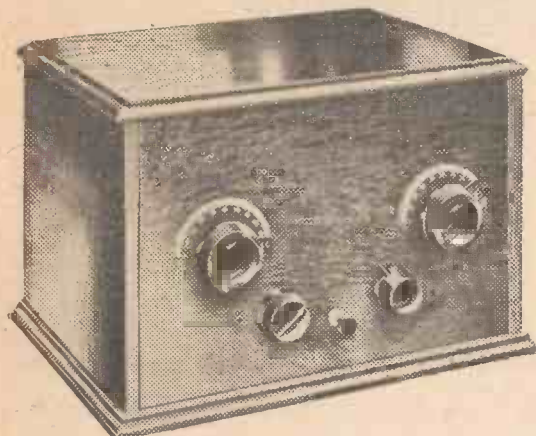
REACHING OUT

THOSE enthusiastic amateurs on the other side of the "Herring Pond," Eric H. Palmer and Junior, are getting fine results from 5SW, and according to their reports this station is getting good reception now despite the longer daylight hours. Just recently Eric senior, enjoyed a Jack Payne programme and then got through to a British amateur, G2VQ, and told him how much he appreciated it. "Just been listening to Jack Payne," said Palmer. "So was I. Pretty lively, eh?" said G2VQ from London across the Atlantic. "It's a fine moonlight night here, how's the weather over there?" Palmer sent back the message that it was a nice bright day in America! It's really wonderful what these amateur transmitters do on the short waves.

The layout of the set. A full-size blueprint is available, price 1/-

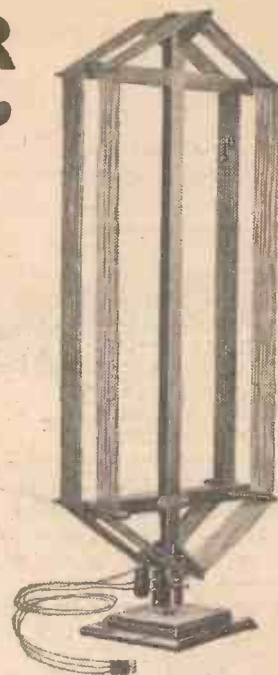


SEND TO READY RADIO FOR YOUR "CENTURY SUPER"



You are cordially invited to call for a free demonstration of the "Century Super" at our Showrooms at 159 Borough High Street, London Bridge, S.E.1. Come and hear it!

THE CENTURY SUPER
Completely assembled with valves, cabinet and wound frame aerial, ready for use and **£14:10:0**
aerial tested ... Price
or 12 monthly payments of 26/6



Can be obtained from your local dealer.

"THE SQUARE PEAK THREE"

	£	s.	d.
1 Ebonite Panel, 14 in. by 7 in. by 3/8 in., drilled to specification	4	6	
1 Baseboard, 21 in. by 10 in.	1	5	
1 Jackson D.2 Chassimount .0005-mfd. condenser	1	6	6
1 Jackson .0005-mfd. Universal Log Condenser, with junior drum drive	16	6	
1 Read-Rad .0003-mfd. Brookmans Condenser	3	6	
1 Read-Rad Filament Switch	10		
1 Read-Rad 3-point Wavechange Switch	1	6	
1 Junitt S.G. Valve Holder	1	9	
2 Telsen 4-pin Valve Holders	2	0	
1 Varley Constant Square Peak Coll	15	0	
1 Read-Rad 1-megohm Grid Leak	10		
3 Read-Rad Single Coil Holders	2	6	
1 Dubilier .0001-mfd. Fixed Condenser, with series clip	2	2	
1 Read-Rad .0002-mfd. Fixed Condenser	10		
1 Dubilier .04-mfd. Fixed Condenser, type 9200	2	0	
2 T.C.C. 1-mfd. Fixed Condensers	5	8	
1 T.C.C. .25-mfd. Fixed Condenser	2	3	
1 Telsen "Radio-grand" L.F. Transformer	12	6	
1 Read-Rad 10,000-ohm Link Resistance	1	0	
1 Read-Rad Screen, 10 in. by 6 in., with S.G. hole	2	6	
2 Read-Rad Terminal Blocks	6		
4 Belling-Lee "R" Terminals: A, E, L.S., +, and L.S.—	1	0	
1 Bulgin 5-way Battery cord, B.C.3	1	9	
3 Lewcos Coils, 50 C.T., 60 and 200	13	6	
1 Packet Read-Rad "Jillinx" for wiring	2	6	
TOTAL (including all necessary Coils)	£6:5:0		

KIT A - - - - - **£6:5:0**
Or 12 equal monthly instalments of ... **11/6**

KIT A

(Less Valves and Cabinet, but including Wound Frame Aerial.) **£6:18:6**
or 12 equal monthly instalments of **12/8**

KIT B

(Including Valves, Wound Frame Aerial, but less Cabinet.) **£10:14:6**
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2 Fuller 60-v. "Super" capacity H.T. Batteries	1	7	0
1 Fuller 9-v. grid bias battery	1	6	
1 Fuller (S.W.X.9) 2-v. 40/80 amp. L.T. accumulator	12	9	
1 Celestion D.10 loud-speaker	3	0	0
or 1 Amphon cone loud-speaker AC.21	1	19	6

Components can be supplied separately

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READY RADIO DUAL RANGE FRAME AERIAL

Centre tapped. Wound to "Amateur Wireless" specification. Price complete **£1:0:0**

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1 Cabinet complete with wooden panel 12" by 6" and baseboard 12" by 10"	15	0	0
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1 Colvern 50,000 ohm potentiometer	5	6	
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1 Set Wearite or Lewcos Super Heterodyne coils	2	10	0
6 Telsen 4-pin valve holders	6	0	
1 Triple coil base	2	9	
5 T.C.C. 1 mfd. fixed condensers	14	2	
2 Telsen .001 mfd. fixed condensers	2	0	
1 Formo .0002 mfd. "Mikadenser"	2	6	
1 Read-Rad 1-megohm grid leak and holder	1	4	
1 Telsen "Ace" L.F. transformer	8	6	
1 Terminal strip fitted 3 G.B.A. terminals	8	6	
1 Read-Rad 15,000 ohm link resistance	1	3	
1 Read-Rad 20,000 ohm link resistance	1	3	
1 Read-Rad fuse and holder	1	3	
8 Belling-Lee wander plugs	1	4	
2 Spade terminals, red and black	3		
1 Packet Read-Rad "Jillinx" for wiring	2	6	
6 Valves to specification, 2 S.G., 2 H.F., L.F. and Power	3	16	0
5 Yards thin flex, screws, etc.	1	1	
Total (including Valves, Cabinet and Wound Frame Aerial)	£11:9:6		

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HIRE PURCHASE ORDER. Please despatch my Hire Purchase order for the goods specified for which I enclose first deposit of **£**

Cross out whichever does not apply.

Name

Address

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Your goods are despatched Post Free or Carriage Paid,

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All your goods are very carefully packed for export, and insured, all charges forward.

KIT REQUIRED

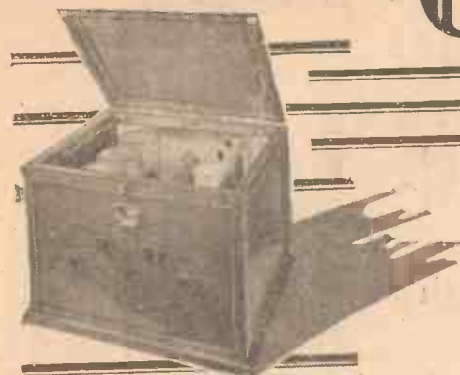
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SETS OF DISTINCTION

COSSOR COMMANDER FOUR VALVER

Makers: A. C. COSSOR LTD. Price: £14: 14: 0



AMONG factory-built sets there is a very marked absence of four- and five-valvers for battery operation. The average set maker seems content to stop short at the three-valver, comprising the ever-popular though by no means final combination of high-frequency amplifier, detector and power output. One or two firms have shown more initiative in producing sets with two high-frequency-amplifying stages.

Such firms are, undoubtedly, to be thanked for thus providing sets that can effectively cope with modern selectivity problems. Of course, multi-valve sets are available in plenty for mains operation, but unfortunately the majority of listeners have no mains supply and must, therefore, put up with battery sets.

An Efficient Circuit

One of the exceptions that prove the rule among battery sets is the Cossor Commander, with a four-valve circuit consisting of two screen-grid high-frequency amplifiers, a detector and a transformer-coupled power valve. One of the arguments advanced against multi-valve battery sets is that with more than three valves the anode-current consumption is so excessive that battery costs are prohibitive. But the increase in anode-current consumption noted when an extra stage of high-frequency amplification is added to a standard three-valver is quite negligible, being usually only one or two milliamperes.

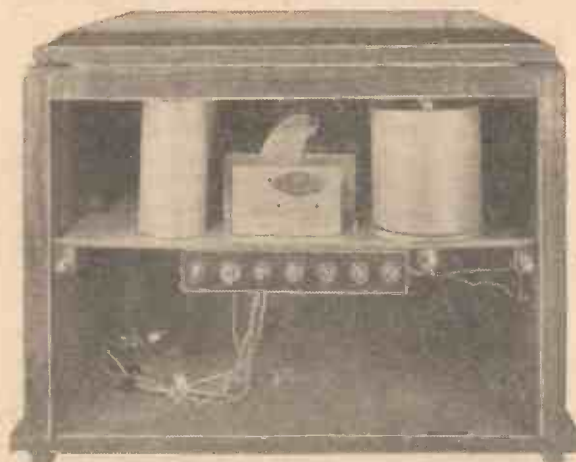
I think it is obvious that all but the simplest two-valvers need double- or treble-capacity batteries. As the Cossor Commander employs a P2 type of power valve, giving ample undistorted output, the total anode-current consumption of the four valves is naturally too much for a standard battery. I found it was 14 milliamperes.

One of the advantages of using two high-frequency amplifying stages is increased selectivity without loss of quality. For the two high-frequency valves are used to couple together three tuned circuits. While each tuning circuit can be designed to avoid high-note loss, by making each one only moderately selective, the overall selectivity obtained from the series of three tuned circuits is most marked, unless the high-frequency valves are giving excessive amplification.

Some of my test readings will indicate the measure of selectivity obtainable from the Cossor Commander. London National was tuned in at its maximum at 22 degrees and was entirely cut out at 17 and 27 degrees. There was thus a spread of only 10 degrees for a very powerful station.

Readers who compare the readings given in these test reports may sometimes wonder why a set with three tuned circuits appears to be no more selective than a set with one or two tuned circuits. The point is that the selectivity obtained with the three tuned circuits is accompanied by much better quality than can possibly be achieved with more simple sets.

London Regional was eliminated just as easily as the National. It was at its maximum at 53 degrees and was cut out at 46 and 56 degrees, again indicating a spread of only 10 degrees. From these readings it will be seen that there is a 19-degrees "zone of silence" between the



A rear view of the Cossor Commander: note the ample battery space and efficient screening

limits of audibility of the National and Regional transmissions. I was able to get seven stations at good strength between the two London stations and quite free from interference.

When tuned to the long waves the Cossor Commander brought in Radio Paris and Eiffel Tower perfectly free from Daventry 5XX. But I was unable to get Zeesum clear of interference.

Some idea of the disposition of foreign stations around the 100 degree tuning dial can be gained from the following extracts from my log. Brussels No. 1 came in at 88 degrees, North Regional, 82 degrees; Langenberg, 80 degrees; Midland Regional, 64 degrees; London, 53 degrees; Hilversum, 35 degrees; and London National, 20 degrees. These and many other stations were received at excellent loud-speaker strength and unusually good quality.

One of the best features of the set is the strength with which long-wave stations are brought in. Huizen at 93 degrees and Kalundborg at 40 degrees were received at better strength than usual.

It was quite a treat to hear such good quality on a battery-operated set. No doubt, the three tuned circuits contribute to this good feature although we must not forget that a Cossor P2 power valve is used in the output stage.

Controls are notable for their straightforward layout. Single-knob tuning is the big feature—obtained by a robust three-gang condenser. One knob simultaneously tunes the three separate tuned circuits as well as the tuning dial, which is engraved in degrees from 0 to 100.

Near the knob for tuning is a knob for reaction. This provides a surprising amount of increased strength when tuning foreign stations. On the extreme left is the wave-change switch knob. This has an exceptionally precise action, due to the ganging of three separate tumbler switches underneath the chassis. Another very good control is the knob on the extreme right for volume.

This is a low-frequency control and reduces the volume of even the strongest signal—to inaudibility if desired. There is still another control knob, mounted on the left-hand side of the cabinet. This controls the variable condenser in the aerial lead and I found it especially useful in avoiding local-station swamping.

From my tests I have no hesitation in saying that the Cossor Commander is a well-designed four-valve battery set, fully capable of coping with modern selectivity requirements and of delivering excellent quality of reproduction from innumerable home and foreign stations.

Notes from the Set-makers

Following my recent test report on the Ferranti metal console I have received a letter from the Radio Sales Manager of Ferranti Ltd., telling me of a feature just added to this excellent set.

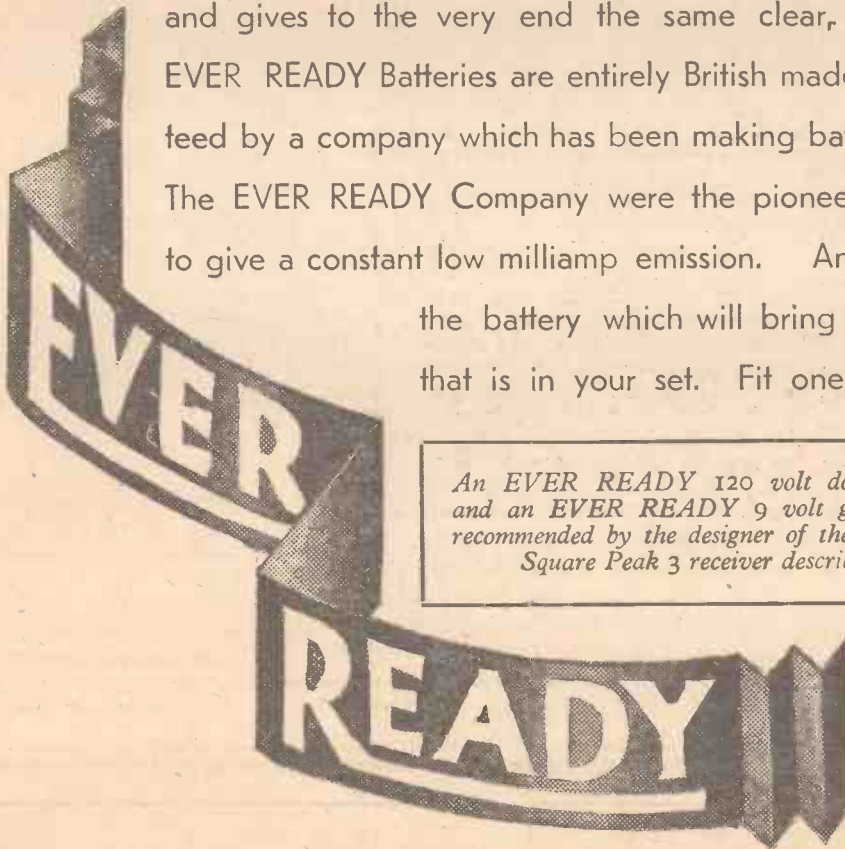
By tapping the mains on to the aerial coil, through a condenser the makers now utilise the mains as an aerial. This provision enables the set to be taken from room to room and used without any connection to the ordinary and earth system.

The mains aerial connection should prove very useful listening on this set to powerful transmissions such as Brookmans Park and Moorside Edge.

From the General Electric Co., Ltd., I have received advance information of a new Gecophone set, a six-valve super-heterodyne tuning from 13 to 720 metres.

THIS BATTERY WILL TRANSFORM YOUR SET

Experts will tell you that no set can give perfect, undistorted reproduction unless equipped with the right H.T. Battery, supplying adequate voltage and unwavering power. That is why they recommend EVER READY Batteries for all sets. For an EVER READY Battery does not vary in power. It is always reliable, always efficient. A special and exclusive process of manufacture ensures a strong, even flow of current which lasts for months and gives to the very end the same clear, undistorted tones. EVER READY Batteries are entirely British made and are guaranteed by a company which has been making batteries for 28 years. The EVER READY Company were the pioneers in dry batteries to give a constant low milliamp emission. And now they make the battery which will bring out the very best that is in your set. Fit one to-day.



An EVER READY 120 volt double-capacity battery and an EVER READY 9 volt grid bias battery are recommended by the designer of the set for use with the Square Peak 3 receiver described in this issue.

**BRITISH MADE
HIGH
TENSION
BATTERIES**

The Batteries that give unwavering power

THE EVER READY CO., LTD., HERCULES PLACE, HOLLOWAY, N.7.

To Ensure Speedy Delivery, Mention "A.W." to Advertisers



"Century Super" Success

SIR,—I have now had the "Century" going for nearly a fortnight, built up according to your description, but with a slight difference in layout. With a frame aerial the performance is wonderful, but using my old outside aerial (40 ft. high and 60 ft. long), it surpasses my most ambitious hopes.

I have joined the two wires which used to lead to the ends of the frame to a coil holder, and inserted a two-pin coil (60 for medium, 250 for long, 9 for ultra short), the lead which used to go to the centre of the frame now goes to the centre tap on the coil, and the aerial is placed on one terminal of the coil holder.

The stations come in so strongly that I have had to fit a volume control in the output stage. The selectivity has not suffered at all. I can still separate Midland Regional from Sottens, Mühlacker from London Regional, and, more remarkable still, Hilversum from Turin—these last two have not 9 kilocycles between them. My list of stations is easily one hundred (and I have not mistaken the alternative position on the dial for another station). During daylight hours just after lunch I can put any of the stations now mentioned at good strength on the loud-speaker. Brussels No. 1, Langenberg, Rome, Toulouse, Barcelona, Mühlacker, Brussels No. 2, Strasbourg, Hilversum, Cologne, Cork, Dublin, Belfast, and Leeds, as well as the British stations. Of course, all the long-wave stations come in at full strength.

At night the foreign stations roll in at every degree on the dial. It is easily the best I have made or even heard and the quality is far above the average.

On the ultra short waves, W2XAF and W8XK are often as loud as the locals and "Amos'n Andy's" escapades are followed by us practically every night. Rome, Zeesen, PCJ, Nairobi, the Vatican, Moscow, and countless amateur stations from France, our own country, Germany, Spain, Portugal are heard at all times of the day and night.

My valves are: First detector, Triotron SD2, second detector, Triotron SD2, oscillator, Triotron TD2, screen-grid Mullard and Mazda, power-valve, Mazda P240.

In conclusion, the "Century Super" seems to have done away with the necessity of any conference as to the limitation of power and the reshuffling of wavelengths.

Many thanks to your staff, Mr. James, and the makers of the coils for combining forces and producing *The Set of the Century*.
N. M. (Sparkbrook, Birmingham).

"Hotspot" Disputed

SIR,—"Hotspot," describing the electron in a recent article, states that an electron is not matter.

If an electron is capable of being weighed, is it not matter?

Recent information tells us that science does not know the structure or the materials which go to the making of electrons and protons, but it does know their sizes, their masses, and the amount of energy associated with each of them.

From figures recently published we are told that the proton is 1,845 times heavier than the electron, although the electron is much larger in radius. It is also assumed that both particles are roughly spherical, and it has been suggested that the electron is a small kind of bubble and that the material scooped out from it went into making the proton.

It is well known that electrons and protons accumulated in a certain way will form inorganic matter, while if accumulated in some other way will form living and reproductive cells, in fact they are the bricks of which everything is built. An electron possesses a certain amount of mass or inertia and a force is necessary to increase its velocity or accelerate it. When a body is set into motion, a certain amount of energy is expended during the process and the energy is stored in the moving body. Energy in this form is known as kinetic energy and is proportional to the mass of the body and to the square of the velocity.

In the case of the valve, the energy coming from the H.T. battery is employed in accelerating the electrons emitted from the filament. By the time that the electrons reach the anode they have acquired an enormously high velocity, they collide with and are brought to rest by the anode itself, giving up their kinetic energy which is converted into heat, causing the anode to become red hot in some cases. If an electron therefore possesses radius and mass, and is capable of storing kinetic energy, is it not matter? H. B. H. (Leeds).

"Century Super" and Pick-up Wiring

SIR,—I am building the "Century Super" and wish to use a gramophone pick-up with it. Can you advise me of the necessary wiring connections to enable me to carry out the above slight alteration?

G. D. (Essex).

Mr. James does not personally recommend the use of a pick-up with the "Century Super," but for your information we give the point-to-point wiring alterations to enable you to carry out the proposed modification. Disconnect wire No. 26 in the wiring plan and then add a two-pole change-over switch to the panel. You will also need to arrange a 50,000-ohm potentiometer on the panel to act as a volume control for gramophone. Connect the grid terminal of the second detector to the lower centre arm of the switch and take the upper centre arm of the switch to the L.T. switch wire No. 43. Take the right-hand lower terminal of the switch to the grid-leak-wire No. 27, and take the left-hand lower switch terminal to the centre terminal of the volume control. The two outer terminals of the

volume control should be connected to the two terminals of the pick-up. Now disconnect wire No. 43 from the oscillator-valve holder and connect the wire to the terminal of second detector to which is connected wire No. 20. Disconnect wire No. 19 altogether and connect a further wire from the upper right-hand terminal of the switch to the terminal of the oscillator-valve holder to which wire No. 43 was originally connected. With the switch-arm over to the right, the set is switched for radio. With the switch arm over to the left, the set is switched for gramophone, and the valves not in use are switched off.—ED.

Over-running Valves in Mains Sets

SIR,—I have a home-made mains set in which I use two mains-type valves and two directly-heated power valves in push-pull. All valve heaters and filaments are supplied from a mains transformer delivering 4 amperes at 4 volts. After three weeks working my power has gone off to a mere whisper. I tried other valves and find that my first two power valves were useless. These consume a quarter of an ampere each, so I suppose I have damaged the valves in some way or other. Can you explain how this can have happened and how I can remedy the trouble.

J. D. (Croydon).

If your filament secondary to your transformer supplies 4 amperes at 4 volts and you have two mains valves and two directly-heated power valves consuming a total of 2½ amperes, then you have an excess current of 1½ amperes at 4 volts to dissipate. It is this extra power which has over-run your power valves and it must be absorbed by artificial means if you are to save further valves from early decease. You should introduce a resistance across the secondary terminals of your transformer which will absorb the excess amperage, and the method of determining a suitable resistance is to divide the voltage developed across the secondary by the excess current in amperes, in your case $4/1.5=2.66$ ohms. A variable resistance of 3 ohms maximum, capable of carrying 1½ to 2 amperes without overheating, is what you require. Reference to any standard resistance wire tables will enable you to determine a suitable gauge of wire for your needs. Eureka resistance wire should be used for the purpose.—ED.

A Noisy Portable

SIR,—My five-valve portable set, which has in the past behaved splendidly, has now developed a crackling noise which I cannot cure. I have renewed the H.T. batteries, tried an outside speaker, and gone over all connections for a fault. I have even replaced the grid-bias battery, but the crackling still persists.

S. B. (Brighton).

It appears that the primary winding of one of your L.F. transformers has become broken or fractured. We suggest you replace your L.F. transformers or have both tested through for continuity. If you have only one transformer and one R.C. coupling for your two L.F. stages, possibly the insulation of the coupling condenser in the R.C. unit may be defective.—ED.

STILL ANOTHER LIST OF AGENTS AT WHOSE SHOW ROOMS THE VOLTRON PRODUCTS MAY BE INSPECTED

DEALERS' NAMES

LONDON.—R. Grenville, 189 Shirland Road, Maida Vale, W.9.; F. W. Shearman, 221-223 Whittington Rd., Bowes Park, N.22. BOLTON.—J. N. Robinson, 359 Deane Church Lane. BURNLEY.—J. S. Ainscow, 38 Standish St.; W. Bury, 119, Westgate, Hartley Clegg, 75 Brennan St. R. Fryers, 152 St. James St. CHORLEY.—W. Wooley, 74 Market St. DAGENHAM.—C. F. Bridge, 72 Church St. FERRYHILL, CO. DURHAM.—Jones Ferryhill Village. NORTH FINCHLEY.—Radgram, Friern Watch Parade. FLEETWOOD.—R. Wright, 69 London St. GOSPORT.—E. J. Male, "Arosa," 88 Grove Road, Hardway. HARROW.—F. C. Jewell, 234 Northolt Rd. LEICESTERSHIRE.—W. Davis, Walton, Nr. Lutterworth. LIVERPOOL.—Bannetts Wireless Stores, 175 Scotland Rd. MANCHESTER.—Universal Electric Supply Co. of 4 and 5 Brown St.; 31 Shudehill; 1 Cateaton St.; 535 Ashton Old Rd.; 80 Bradshawgate, Bolton; 17 Horsemarket Street, Warrington; 76 Prince's Street, Stockport; 184 Oldham Rd.; 90 Yorkshire St., Rochdale; 20, Stanley St. Bury; Palais de Dance Buildings, Blackley; 58 Mill St., Maclessfield. MANCHESTER.—W. Woodhall, 104 Chapel St., Salford. NEWCASTLE-ON-TYNE.—The Academy of Arts, Columbia Hall, Blackett St.; R. Mallaburn, 345 Elswick Rd. PETERBOROUGH.—A. J. Robertson, 39 Broad Bridge St. PRESTON.—Peter Hall, 175 Ribbleson Lane. ROCHESTER.—R. L. Bartlett, 161 High St. SHILDON.—Fred W. Robson, 16 Station St. STALYBRIDGE.—Roland Bottomley, 9 Hamilton St. SUNDERLAND.—Blackett & Sons, Ltd., 241 High St. West; Ferry & Foster, Fawcett St. Previous lists of Voltron Stockists can be found in "Amateur Wireless," May 9, 16, 23.

WE PAY HALF THE COST OF YOUR LOUD-SPEAKER —IF YOU BUY A VOLTRON KIT-SET



It is no secret that in the summer, sales of radio apparatus tend to decrease. In spite of this, sales of Hornets are increasing to such an extent, that even an increased staff is forced to work overtime in order to meet the demand. Now, to press the advantage home, to get to a wider public, and to persuade you not to delay buying your wireless set, we introduce an offer the like of which has never been known in the radio trade. Go to your dealer to-day and buy a Hornet or a Dynaplug kit set. With it you will get available coupon worth 7/6. Send this coupon to us together with a postal order for 7/6 and we shall send you by return one of our Standard Hornet Loudspeakers as sold in the shops for 15/-. Do not delay. This is a genuine offer, open for a limited period only, and will not be repeated.

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If there is no Voltron agent in your district you can still obtain the particular Voltron product that you need. Send your order by wire—we pay the cost—the next day the goods will be delivered to your address post free, you to pay the postman. There are no extra charges. The cost of the telegram will be deducted from the Invoice. In this way, you pay no more than if you had gone to a shop, and you have the added advantage of getting what you want quickly, delivered to your door. Suppose you want a Dynaplug Kit,

THIS IS WHAT YOU DO. Address your telegram to Voltron, Queensway, Ponders End. Then give the code word NY CAB, and your name and address. The telegram should read as follows: Voltron, Queensway, Ponders End, NY CAB, J. Jones, 10 Brown Street, London.

If you wish to avail yourself of our special Loud-speaker offer, add the code word RETON to your telegram.

HORNET CONE LOUD-SPEAKER

For Punch and Purity of Tone. **15/-**

BUY



AND BUY THE BEST



The **HORNET Two-valve KIT SET**

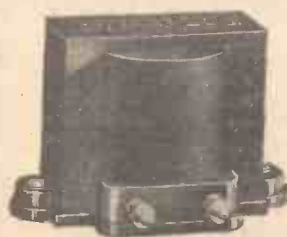
The Hornet Two-valve Kit Set has met with instantaneous success. AMATEUR WIRELESS last week were enthusiastic in its praise. Extreme selectivity, long distance capabilities and ease of assembly are the outstanding features.

Ask your dealer for free blueprint

Complete Kit of Parts including CABINET

29'6

Code: RETON



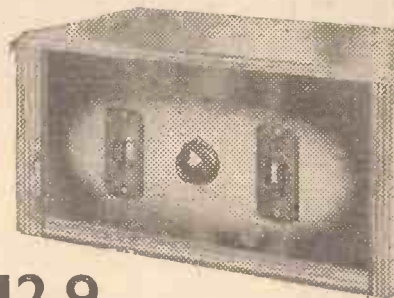
★ **DYNAPLUS TRANSFORMER**

The greatest Transformer value ever offered to the radio public **6'9**

Codes: 3 to 1, TRINA 5 to 1, FORMA

£3.12.9

Complete Kit of Parts less Valves and Cabinet. Code: DYNAC



Complete Kit of Parts including Valves and Cabinet. **£6.6.0** Code: NY CAB

Voltron Dynaplug

Screened 3 Leading technical authorities are now agreed that the Dynaplug is the most efficient screened 3 receiver available to the public.

Owing to the improved 1931 coils, selectivity has been still further increased and with no loss of sensitivity.

Its long distance capabilities are confirmed by the Daily Express Wireless expert who received 'thirty stations at full loud-speaker strength when only four miles from Brookman's Park.'

Ask your dealer for free blueprint

VOLTRON ELECTRIC LTD., Queensway, PONDERS END, Middx.

You will Help Your self and Help Us by Mentioning "A.W." to Advertisers

WE TEST FOR YOU

A weekly review of new components



and tests of apparatus.

Conducted by J. H. REYNER, B.Sc., A.M.I.E.E.

A Handy Terminal Cleaner

A NEAT little accessory which will appeal to many readers is the Coney terminal cleaner. This is exceedingly simple and yet effective. It consists of a piece of corrugated steel having a handle at one end, and a hole at the other. The terminal nut on the accumulator is removed and this cleaner is inserted so that the hole fits over the top of the terminal. A spring-washer is then placed over the top and the nut is loosely screwed on. By rotating the terminal cleaner, the edges, which are sharp, cut into the corrosion and dirt on the surface of the terminal and burnish it, leaving a clean surface which will make a good contact.

The device saves all the trouble of fiddling about with a penknife, which is not only unsatisfactory from the accumulator's point of view, but harmful to the knife!

A few turns with this simple device, which sells at 4½d. only, overcomes all the trouble.

Ediswan H.T. Battery

THE new Ediswan battery which has been received for test this week appears to be of particularly good performance. The battery itself measures 8½ in. by 3½ in. by 3 in. high, and is housed in an attractive cardboard carton, access to the tappings being attained through holes in the top. This battery, therefore, is somewhat smaller than the average, but it seems to have a performance distinctly above the usual run.

The battery was discharged through a constant resistance, the discharge commen-

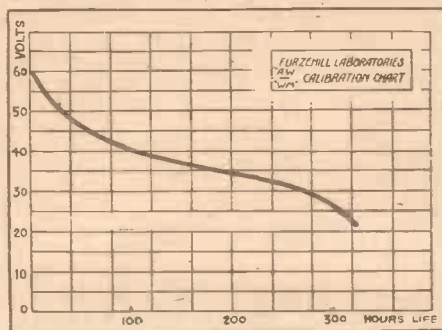


A newcomer to the ranks of H.T. batteries—the Ediswan

ing at 7 milliamps and continuing until the voltage had dropped to half. This occurred after 280 hours, which is equivalent to a milliampere-hour capacity of nearly 1,460. We have got used to finding our arbitrary figure of 1,000 milliampere hours hand-

somely exceeded, but it is not often that we find a battery which gives nearly 50 per cent. in excess of the rating.

The voltage falls somewhat rapidly for the first few hours, and then settles to a steady relatively slow falling off. This initial fall is, of course, responsible for the



The good performance curve of the Ediswan H.T. battery

somewhat longer life obtained from the battery, since the current drain was only 4 to 5 milliamperes for the greater part of the time. There is no doubt that good materials have been used in the battery and it should give long and useful life.

Wearite Earth Tube

ONE of the difficulties in obtaining a good earth arises from the trouble of making a satisfactory connection to the earth tube. For the best results the earth tube should be in a damp locality and this, unfortunately, is very conducive to corrosion, so that if one is relying on a screw joint or terminal connection of some sort there is a risk that a high-resistance fault will develop sooner or later. The best method, of course, is to solder the lead on to the earth tube, but this requires the application of large quantities of heat, particularly if any attempt is made to solder the wire on to the tube when it is in position in the ground, and as often as not results are worse than a screw joint.

Messrs. Wright & Weaire have brought out an ingenious tube which solves many of the difficulties. The general construction is similar to the ordinary form of earth tube. It consists of a copper rod perforated at intervals in order to allow free access of moisture. It is provided with an iron spear head at one end and a cap at the other, to take the blows in driving the tube in. About six inches from the upper end is a small cup, and an inch or two above this is a second smaller cup containing a ring of resin-cored solder.

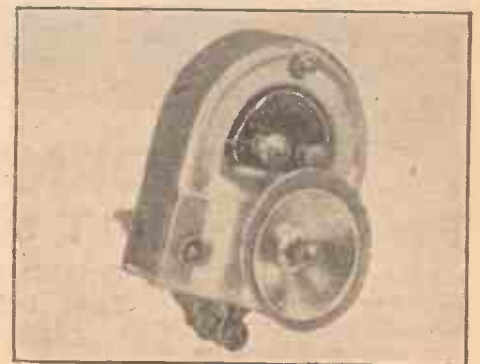
The earth tube is first driven into the ground in the required position. The end of the earth wire is then thoroughly cleaned and is wrapped around the tube and fitted into the top cup, with the ring of solder just on top of it. The bottom cup is now filled with methylated spirit, which is ignited. The heat generated by this melts the solder and so unites the end of the earth lead to the top of the tube in a thoroughly sound fashion.

We tried this device out and found that it worked admirably.

Triotron Speaker Unit

THE Triotron loud-speaker unit tested this week is a compact, well-made instrument of the four-pole balanced-armature type. The so-called multi-pole type of construction as used in many of the new loud-speaker units, is employed. An adjustment is provided at the base of the unit for tensioning the armature and thus avoiding rattle. A large magnet is employed, while the whole of the mechanism is covered in by a pressed metal shield, thus preventing buzzing due to extraneous matter such as dust, etc., getting between the pole pieces of the armature.

On test the output was fairly uniform from 3,000 to 100 cycles, resonances appearing at 2,500, 1,800, and 150 cycles. The quality was up to standard for this type of loud-speaker unit, although in comparison with our standard moving coil it appeared somewhat to lack brilliance and the sensitivity was, if anything, slightly below normal, but the unit showed no



One of the new Triotron units

signs of distress when handling over 2 watts output from the amplifier.

The impedance at 400 cycles was approximately 5,500 ohms. This is a useful figure to use when matching the loud-speaker and the output stage of the amplifier.

SELFRIDGE'S

RECOMMEND THE FAMOUS MAZDA VALVES FOR USE WITH THE "CENTURY SUPER"

THE MAZDA VALVES FOR USE WITH THIS REMARKABLE SET AS SELECTED BY THE DESIGNER ARE :

2 MAZDA S.G.215	PRICE	20/-
1 MAZDA H.210	PRICE	8/6
1 MAZDA H.L.210	PRICE	8/6
1 MAZDA L.210	PRICE	8/6
1 MAZDA P.220	PRICE	10/6

Selfridge's supply any combination of components (including Mazda valves) to the value of £3 and over on their famous "No Deposit" terms. Delivery after the usual formalities being made after the first of 6 equal monthly payments.

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MOTOR UNITS • CHASSIS • SPEAKERS



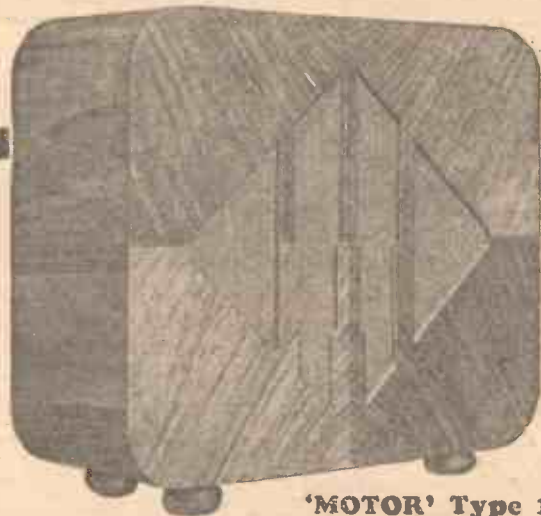
**Type S4.
Isophon - MOTOR
Super Power Unit**

A 4-pole balanced armature Super Power Unit which represents the very highest achievement in Loud-speaker perfection. The quality of reproduction and wealth of volume are exceptional. High notes are brilliantly clear, and bass notes richly emphasised. The very powerful field-magnet has a pull of approximately 10 lb., making the unit sensitive to the slightest impulse, yet capable of handling an amazing top load power without rattle or distortion. Provided with alternative resistances to suit various output valves,

PRICE 27/6

Type S5. Super Unit

An extremely efficient Unit, compact in size but generously large in power. Faithfulness and purity of reproduction are combined with a richness of tone which is equally prominent on both high and low notes. Handles an output up to 3 watts. **22/6**



**'MOTOR' Type 1
LOUD-SPEAKER 'DYNOLA'**

A handsome cabinet speaker of highly polished walnut, fitted with the new Isophon-MOTOR Super Unit, Type S5. The modern fret design is backed with figured gold silk gauze, and the performance of this desirable Speaker is in keeping with its beautiful appearance. Size of Cabinet, **45/-**
14 x 12 1/2 x 6 in.

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HARDMAN & Co. Ltd., The Baum, Yorkshire St., Rochdale;
61 Bridge St., Manchester; 25 Trinity St., Leeds; and 2a Leach
Lane, St. Annes-on-Sea.

TEKADE RADIO & ELECTRIC LTD.

29 Farringdon St., London, E.C.4. Telephone: Cent. 2482

Agent for Scotland: R. G. J. Nisbet, 132 Renfrew Street, Glasgow, C.2.

Please mention "A.W." when Corresponding with Advertisers



ON May 31 Radio Normandie, at Fécamp, will relay from the Rouen Cathedral two carillon recitals, which conclude the festivities in celebration of the fifth centenary of Joan of Arc.

The new Leipzig transmitter to be erected at Pegau will work with a power of 75 kilowatts (aerial) and will be so planned that it can be increased to 150 kilowatts if so required.

Radio Strasbourg now relays at regular intervals open-air military concerts from the Esplanade at Metz and dance music from the Municipal Kursaal at Niederbronn les-Bains.

Work on the new 75-kilowatt Königs-wusterhausen transmitter is so far forward that it is hoped to bring it in regular operation by the beginning of June. In this installation 140-kilowatt valves are being used for the first time.

According to the latest statistics, Sweden now possesses 518,026 registered wireless listeners, of which the greater number reside in the Stockholm, Malmö, and Goeteborg districts.

Strasbourg (France) is to have an alternative broadcast programme, as the 800-watt private transmitter which was formerly working in that city has again started testing on 125 metres. The wavelength has not yet been definitely fixed, but it will be below the broadcast band.

The German Reichspost is proceeding with a series of experiments in short-wave transmission. The broadcasts, with a power of from 2 to 4 kilowatts (aerial), will be carried out through the Königs-wusterhausen station on various wavelengths between 3 and 4 metres.

It is understood that a new wireless beacon is soon to be erected at Croydon aerodrome.

Experiments in short-wave telephony were recently carried out by the s.s. *Belgenland* when in Naples Harbour. Successful two-way communication was established with London and Washington.

The new Palermo (Sicily) broadcasting station is rapidly nearing completion and will be testing within the next few days on or about 200 metres.

"Alexander and Mose" will be heard by listeners to the London Regional vaudeville programme on May 29. With them in the studio will be Leslie Sarony, Thornley Dodge in "My Potted Pantomime," Dorothy McBlain, and Jack Payne.

John W. Elwood, vice-president of the National Broadcasting Company, New York, is visiting England, France, Germany and Italy to investigate the possibilities of a regular transatlantic programme exchange. Arrangements have already been made with the B.B.C. and negotiations are proceeding with companies in France and Italy, while the German company is starting a regular exchange on June 15.

A 230-mile radio beacon trail has been established between Kansas City and Wichita, Kan. The beacon transmits a beam of radio impulses, in form of dots and dashes to pilots in the air. The signal A, a dot and a dash, informs the aviator he is on the course. The signal N, a dash and then a dot, warns the flyer he has veered to one side of the correct route.

A wireless telephony medical service for the use of ships in Northern waters has been inaugurated by the Danish Government, and is worked through the Skamlebaeck Blaavand (Jutland), Thorshavn (Faroe Isles), and Julianehaab (Greenland) coastal stations, working on 31.6 metres.

The number of prosecutions undertaken during the twelve months ended March 31 last, for the use of wireless sets without licences was 1,433, and the total amount of the fines imposed was £1,110.

DON'T BE CONTENT...

No longer need you be content with a speaker having a tone claimed to be as good as a Moving Coil.

Gone for ever are the two main objections held by thousands of listeners to the purchase of a Moving Coil Speaker, namely HIGH COST AND DIFFICULTY OF OPERATION. . . .

Amplion by the introduction of their M.C.6. unit (a permanent magnet), have at last brought Moving Coil reproduction within the means of everyone.

It requires no external excitation and it is remarkably sensitive, working splendidly from the output of most standard sets.

A FEW POINTS TO NOTE ABOUT AMPLION MOVING COILS.

1. In addition to the M.C.6. unit, a larger model is also available, the M.C.9. This also is a permanent magnet but much more powerful.

2. The diaphragms of both these units are unaffected by any change in climatic conditions.

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Diameter of Cone, 6½ ins.
Overall length, 6½ ins.

M.C.6. UNIT

67/6

COMPLETE WITH TRANSFORMER & READY FOR MOUNTING

Ask your dealer for full details and prices of AMPLION MOVING COILS or write for folder W.L.58 to Graham Amplion, Ltd., 26, Savile Row, W.1.

AMPLION



The Best Transformer at half a guinea

THE **R.I.** IMPROVED G.P. TRANSFORMER
Specified for all popular modern circuits.

The Improved G.P. Transformer gives highly satisfactory results with all modern circuits and valves. Its amazingly high primary inductance is greater than that of any transformer at its price, and its robust construction ensures absolute reliability. Full technical details of the G.P. and other R.I. productions are given in the latest R.I. catalogue—obtainable from your dealer or direct.

List No. DY21
10'6

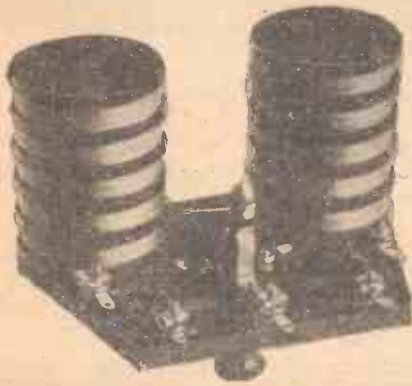
Resistance Primary D.C. 1,050 ohms.
Resistance Secondary D.C. 6,600 ohms.
Inductance Primary 35/40 henries.
Ratio 3½ : 1. Weight 1 lb. 2 ozs.
Overall dimensions 3½" x 1½" x 2½" high.

T.A.

R.I. Ltd., Madrigal Works, Purley Way, Croydon.

Telephone: Thornton Heath 3211

AS SPECIFIED IN THE B.B.C. SELECTIVE 2



TALISMAN AERIAL UNIT

(PATENT No. 333270)

Medium Wave Band 200-550 metres. Long Wave Band 1050-2100 metres .. **10/6**

Dual Range Frame Aerial .. **42/-**

Three-point Shorting Switch .. **1/6**

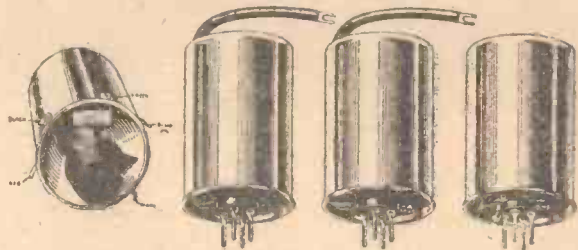
Triple Coil Base, Insulated Sockets .. **2/9**



Combined 3-coil and 5-valve Chassis with Grid Leak Clips complete (with essential wiring) **7/-**

CENTURY SUPER COILS

(PATENT PENDING)



Supplied by "Wearite," are your guarantee of perfect reception. We are the sole concessionaires of above Coils in the British Empire.

PRICE **50/-**
PER SET

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OUR LISTENING POST

By JAY COOTE

BRUSSELS, I find, may be found working every Sunday morning from 7 a.m. until about midday. The Belgians are ardent pigeon fanciers and race their "homers" on the Sabbath over long distances. From that early hour the old Radio Belgique transmitter gives out news and results of the competitions. These take place in the capital, at various provincial centres, and even at places so far away as Arras, Creil, Compiègne, and the South of France. On these occasions gramophone records are broadcast to kill time between the news bulletins.

Vienna, this year, for its annual music festival week promises a number of record programmes, including a relay of a choral concert given by 8,000 singers on June 17; in July and August the famous Salzburg open-air dramatic and operatic performances will also be transmitted.

Beromuenster, the giant Swiss National transmitter, now appears to work nightly and relays programmes according to a fixed rota from Berne, Basle, and Zurich. So far as I have been able to ascertain, the last-named studio does not contribute much to the radio entertainments. The call picked up clearly indicates from which city the broadcast emanates. Both Basle and Berne have adopted musical interval signals, but the melodies differ greatly and can be identified easily. The German language alone is used in the announcements and the station is referred to as the *Deutsch-Schweizerischer Ländessender* (national transmitter); it is seldom that Beromuenster is mentioned. Bear in mind that Berne is

pronounced *Bairn*; Basle, *Bar-zel*; and Zurich, *Tsue-rish*.

Béziers, that little private transmitter in the south of France which for the past few weeks has been vacillating between 219.3 and 240.6 metres, is still to be heard nightly, Sundays excepted. If you hear as an interval signal the shrill crowing of a somewhat noisy cockerel you will know that you have captured him. As wireless entertainments the concerts are considered of secondary importance, as publicity broadcasts boosting the wines of the district come first. It is seldom that the station can be heard after 10.15 or 10.30 p.m. B.S.T.

It is a curious point that, notwithstanding the fact that the German national anthem is played several times nightly, I still receive a number of inquiries regarding the melody heard. Previous to the war "Heil Dir im Sieger-kranz," to the tune of our "God Save the King" was the anthem used; after 1918 the Germans adopted the "Deutschlandslied" ("Deutschland über Alles"), which is played to the melody of Haydn's hymn to the Emperor ("Austria").

As we are on the subject of national anthems, let me add that from Huizen on some evenings, instead of the "Wilhelmus van Nassau" you will hear the "Internationale" as a concluding item; the latter is played when the V.A.R.A., the Labour radio association, is responsible for the entertainment. In the same way, when the Socialist organisation sponsors the programmes at Brussels No. 2 the "Red Flag" is also heard.

Readers are sometimes puzzled by the fact that they cannot identify Oslo as the source of the broadcasts during the day on 1.071 metres, namely, Hilversum's old wavelength. It is not the Norwegian station, but that of Scheveningen-Haven, a Dutch commercial transmitter working from about 6.40 a.m. until roughly 6 p.m. daily. The transmission is usually opened by chimes, a time signal, and a hooter. At various periods throughout the day stock exchange quotations, commercial reports, news bulletins, and weather forecasts are broadcast. From this station you will never hear music or any kind of wireless entertainment.

SHORT-WAVE TELEVISION IN GERMANY

THE German Post Office has always displayed a great interest in television, and it is therefore noteworthy that quite recently they should have inaugurated a new series of experimental television transmissions through the short-wave station at Dohëritz. The station lies about halfway between Nauen and Berlin.

Tele-cine apparatus is employed, as the Germans still have a great partiality for this side of the science. The transmitter is built up on normal lines, horizontal scanning being employed with a picture ratio of four horizontal by three vertical. Since the short waves are utilised—the station wavelength is actually 142.9 metres (2,100 kilocycles)—a larger sideband spread is possible. This is taken advantage of by using 48 lines per picture (3,072 picture points), while the number of images per second is 25; that is, twice that used in England. Flicker in the resultant image is, in consequence, reduced, while a greater amount of detail can be shown.

Reception tests within a small radius of the station have so far proved satisfactory, but one drawback is the weak modulation. A figure of 10 per cent. has been employed so far. The difficulties of wireless reception are greater than is the case on the medium broadcast band, but that is mainly a question of manipulation practice. The power of this station is rated at 5 kilowatts, but the transmission times are indefinite. When "on the air," however, the broadcast starts between 5 and 6 p.m., and continues till between 8 and 9 p.m., but so far there are no reports of signal reception having been undertaken in this country.

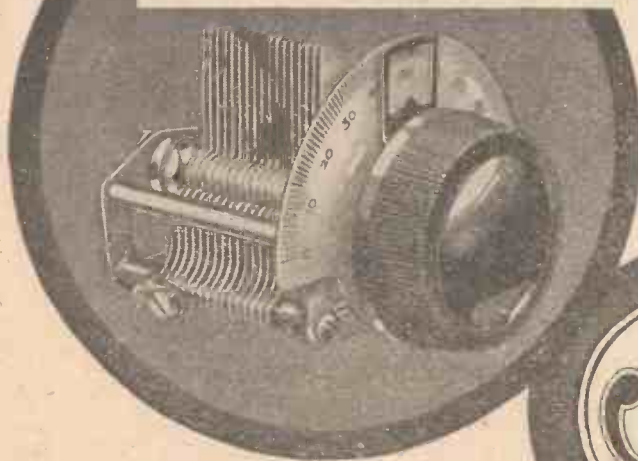
H. J. B. C.

AT COPENHAGEN

THE Chief Engineer of the B.B.C. and its Foreign Station Liaison Officer are soon to go to Copenhagen. There, the members of the International Technical Consultative Committee on radio are meeting to prepare the ground for the Madrid Conference in 1932. The importance of Copenhagen lies in the fact that the technical possibilities of wavelength extensions for broadcasting will be discussed and probably decided upon.

According to an order of the Mexican Department of the Interior, no services in Mexican churches will be broadcast. It has been ruled that the clause in the Constitution, which decrees that public worship shall be within the walls of the churches, applies to broadcasting.

SLOW MOTION IN SMALL SPACE



CHOSEN FOR THE "SQUARE PEAK THREE"

J. B. CHASSI-MOUNT Type D.2 26/6

J. B. UNIVERSAL LOG with Drum Dial - - - 20/-



USED & SPECIFIED WITH THE "CENTURY SUPER"

The extreme compactness, lightness and rigidity of the J.B. "Tiny No. 2" make it particularly useful for Portables, while its all-round efficiency entitles it to a place in any set. The slow-motion mechanism (ratio 8/1) is housed in the bottom bearing and takes no extra space. One hole fixing. Ballbearing centre spindle. Pigtail to rotor. Price, complete with knob, pointer and scale, .0005, 8/6

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recommend

DUBILIER

.04 mfd. NON-INDUCTIVE
(Inductance free)

CONDENSER

Price 2/-

for use with their

CONSTANT SQUARE PEAK COIL

The Varley Constant Square Peak Coil is one of the most revolutionary inventions in the history of radio. It increases selectivity tenfold without impairing quality.

But to get the best from this new Coil Unit you must use the recommended Dubilier Condenser. Varley and Dubilier, working in close co-operation, have proved that the Unit performs best when used in conjunction with .04-mfd. Non-Inductive Condenser. It is designed expressly for the purpose it has to serve.

Don't spoil the ship for the proverbial ha'porth of tar by substituting a cheap condenser of doubtful performance. Use the Dubilier Condenser recommended and get the utmost benefit from the new Varley Coil.

Your dealer has Coil and Condenser in stock.

DUBILIER CONDENSER CO. (1925), LTD.
Ducon Works, Victoria Road, N. Acton, London, W.3



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86P 27/6
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761721
MAJOR, 15/-
SPECIAL, 10/6

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The unit has the biggest job—it reproduces every sound it receives. There is nothing half-hearted about its performance, it never grumbles, never mutters even when loaded so heavily that other and lesser speakers would cry aloud in their agony. It is a pleasure to listen to it.

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Broadcasting Stations classified by country and in order of wavelengths. For the purpose of better comparison, the power indicated is *aerial energy*.



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- 50, Centre tapped 2/3
- 60, Standard type 1/8
- 200, Standard type 2/9

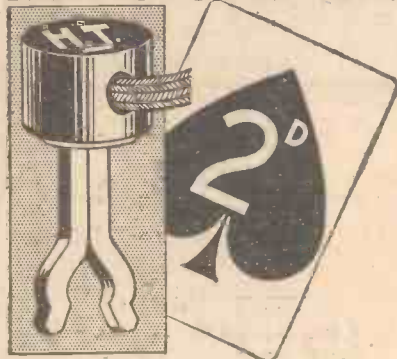
- 1.—Longer tuning range for each coil.
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- 5.—Price of whole range only a few pence more than "junk" coils.

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- 275 for 5XX each 2/6
- 200, 225 ea. 2/9 250 ea. 3/3
- 300 each 3/9 400 each 4/3
- Centre tapped 9d. extra. X type 1/- extra

TURNER & CO.,
54 Station Road, London, N.11.

THE ACE OF SPADES



Patent Nos. 329435 & 12423/30

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BELLING-LEE SPADE TERMINAL

All-British and the world's best. The new Belling-Lee Spade Terminal clips on to any terminal, grips it between powerful spring prongs and "stays put" if the terminal becomes unscrewed. Makes connecting up a one-hand job.

The neatest connection to terminals, tapped coils, accumulators, etc.—also ideal for hookups, clipped on to any screw or wire.

Handles permanently engraved. The whole flex gripped, wire, fray and rubber.

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FOR EVERY RADIO CONNECTION

Advertisement of Belling & Lee, Limited, Queensway Works, Ponders End, Middlesex.

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GREAT BRITAIN								
25.53	11,751 Chelmsford (G5SW)	15.0	317.3	945.4 Marseilles (PTT)	1.5	416	721 Radio Maroc (Rabat)	10.0
242	1,238 Belfast	1.2	327.2	917 Poste Parisien	1.2	1,250	240 Tunis Kasbah	0.6
261.3	1,148 London Nat.	68.0	328.2	914 Grenoble (PTT)	3.0	NORWAY		
283.5	1,040 Newcastle	1.2	345.2	869 Strasbourg (PTT)	15.0	235.5	1,274 Kristianssand	0.625
288.5	1,040 Swansea	0.16	370	870.5 Radio LL (Paris)	0.5	240.6	1,247 Stavanger	0.625
288.5	1,040 Plymouth	0.16	385	779 Radio Toulouse	8.0	361	824 Trondelag	1.35
288.5	1,040 Edinburgh	0.4	447	671 Paris (PTT)	2.0	368.1	815 Frederiksstad	0.7
288.5	1,040 Dundee	0.16	466	644 Lyons (PTT)	2.3	453.2	662 Porsgrund	0.8
288.5	1,040 Bournemouth	1.2	1,445.7	207.5 Eiffel Tower	15.0	493.4	668 Bergen	1.35
301	995 Aberdeen	1.2	1,725	174 Radio Paris	17.0	587.1	511 Hamar	0.8
309.9	968 Cardiff	1.2	1,725	174 (testing shortly)	85.0	1,071	280 Oslo	75.0
356.3	842 London Reg.	70.0	GERMANY					
376.4	797 Glasgow	1.2	31.38	9,560 Zeesen	15.0	POLAND		
368.9	752 Midland Reg.	38.0	217	1,382 Konigsberg	1.7	214.2	1,400 Warsaw (2)	1.9
470.2	626 North Regional	70.0	219	1,369.7 Flensburg	0.6	231	1,283 Lodz	2.2
1,554.4	193 Daventry (Nat.)	35.0	227	1,319 Cologne	1.7	312.8	959 Cracow	1.5
AUSTRIA								
218	1,373 Salzburg	0.6	227	1,319 Munster	0.0	335	896 Poznan	1.9
246	1,220 Linz	0.6	227	1,319 Aachen	0.3	369.4	812 Wilno	20.0
283	1,058 Innsbruck	0.6	232.2	1,292 Kiel	0.31	381	788 Lvov	21.0
352	851 Graz	9.5	239	1,256 Nurnberg	2.3	408	734 Katowice	10.0
453	664 Klagenfurt	0.6	246.4	1,217.2 Cassel	0.3	1,411.8	212.5 Warsaw	158.0
517	581 Vienna	20.0	253.4	1,184 Gleiwitz	5.6	PORTUGAL		
also testing on 1,249 m. from 8.0 p.m. (Mon. Wed. Sat.)								
BELGIUM								
208	1,456 Antwerp	0.4	269.8	1,112 Bremen	0.3	290.5	1,033 Lisbon (CTIAA)	2.0
216	1,391 Radio Conference Brussels	0.25	276.5	1,085 Heilsberg	75.0	ROMANIA		
244.9	1,224.8 Schaerbeek	0.5	283.6	1,058 Magdeburg	0.6	394	761 Bucharest	16.0
333.2	887 Brussels (No. 2)	20.0	283.6	1,058 Berlin (E)	0.6	RUSSIA		
509	590 Brussels (No. 1)	20.0	283.6	1,058 Stettin	0.6	427	702.5 Kharkov	4.0
BULGARIA								
318.8	941 Sofia (Rodno Radio)	1.0	318.8	941 Dresden	0.3	720	416.6 Moscow (PTT)	20.0
CZECHO-SLOVAKIA								
263	1,139 Moravska Ostrava	11.0	325	923 Breslau	1.7	800	375 Kiev	20.0
279	1,076 Bratislava	14.0	360	833 Muhlacker	75.0	824	364 Sverdlovsk	25.0
293	1,022 Kosice	2.5	372	806 Hamburg	1.7	937.5	320 Kharkov (RV20)	25.0
341.7	828 Brunn (Brno)	34.0	390	770 Frankfurt	1.7	1,000	300 Leningrad	100.0
487	617 Prague (Praha)	5.5	418	716 Berlin	1.7	1,060	283 Tiflis	15.0
487	617 Cesky Brod	75.0	452.1	662 Danzig	0.2	1,103	272 Moscow Popoff	40.0
DENMARK								
281	1,067 Copenhagen	1.0	473	635 Langenberg	17.0	1,200	250 Kharkov (RV4)	25.0
1,153	260 Kalundborg	10.0	533	563 Munich	1.7	1,304	230 Moscow (Trades Unions)	165.0
ESTONIA								
206.1	1,073 Tallinn	0.7	559.7	536 Kaiserslautern	1.0	1,380	217.5 Bakou	10.0
465.8	644 Tartu	0.5	559.7	536 Augsburg	0.3	1,481	202.5 Moscow (Kom)	20.0
FINLAND								
220.8	1,353.3 Helsinki	15.0	566	530 Hanover	0.3	SPAIN		
291	1,031 Tampere	1.0	570	527 Freiburg	0.35	259	1,153 Barcelona (EAJ15)	1.0
291	1,031 Vupuri	15.0	1,635	183.5 Zeesen	35.0	266.5	1,125.6 Valencia	8.0
1,798	167 Lahti	54.0	testing shortly on 75 kw.					
FRANCE								
222.3	1,349 Fecamp	1.0	1,635	183.5 Norddeich	10.0	349	860 Barcelona (EAJ1)	8.0
235.1	1,275 Nimes	1.0	HOLLAND					
238.5	1,258 Bordeaux	2.0	31.28	9,599 Eindhoven (PCJ)	30.0	368.9	817.7 Seville (EAJ5)	1.5
249	1,205 Juan-les-Pins	0.5	299	1,004 Radio Idzerda (The Hague)	3.0	424	707 Madrid (EAJ7)	2.0
241.4	1,242.7 Beziers	0.6	1,000	283 Scheveningen-Haven	5.0	453	662.2 San Sebastian (EAJ8)	0.6
256	1,174 Toulouse (PTT)	1.0	1,875	160 Huizen	8.5	SWEDEN		
265	1,130 Lille (PTT)	15.0	HUNGARY					
272	1,103 Rennes	1.2	550	545 Budapest	23.0	230.3	1,304 Malmö	0.75
285.4	1,051 Montpellier	2.0	ICELAND					
287.1	1,045.1 Radio Lyons	0.5	1,200	250 Reykjavik	21.0	257	1,166 Hörby	15.0
294.1	1,020 Limoges (PTT)	0.5	IRISH FREE STATE					
304	936 Bordeaux (PTT)	20.0	224.4	1,337 Cork (6CK)	1.5	304	986 Falun	0.65
314.1	955 Natan-Vitus (Paris)	0.5	413	725 Dublin (2RN)	1.5	322	932 Göteborg	15.0
LATVIA								
525 572 Riga 13.0								
LITHUANIA								
1,935 155 Kaunas 7.0								
NORTH AFRICA								
363.4 825.3 Algiers (PTT) 13.0								

A RADIO COUNTER

THE New York Department of agriculture, industry, and commerce has worked out a method of counting bees by wireless. A microphone is placed in the entrance of the hive and as the bees crawl

home, their feet scrape over the microphone, generating a current which is amplified, causing operation of a counting device. It does not sound very precise, but the officials state that very accurate counting is possible.

WHEN SUBMITTING QUERIES

Please write concisely, giving essential particulars. A Fee of One Shilling (postal order), a stamped addressed envelope, and the coupon on the last page must accompany all letters. The following points should be noted.

Not more than two questions should be sent with any one letter.

The designing of apparatus or receivers cannot be undertaken.

Modifications of a straightforward nature can be made to blueprints, but we reserve to ourselves the right to determine the extent of an alteration to come within the scope of a query. Modifications

to proprietary receivers and designs published by contemporary journals cannot be undertaken.

Readers' sets and components cannot be tested at this office. Readers desiring specific information upon any problem should not ask for it to be published in a forthcoming issue, as only queries of general interest are published and these only at our discretion. Queries cannot be answered by telephone or personally.

Readers ordering blueprints and requiring technical information in addition, should address a separate letter to the Query Department and conform with the rules.

THE SQUARE PEAK THREE

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1 .0005 variable condenser with drum drive Universal Log (Polar)	16	0	
1 .0002 reaction condenser (Formo)	2	9	
1 Filament switch (Junit)	1	3	
1 Wave change switch (Junit)	1	3	
1 Horizontal mounting S.G. valve holder H. & B.	1	6	
2 4-pin valve holders (Junit)	1	8	
1 Varley constant square peak coil	15	0	
1 1 meg. grid leak (Telsen)	1	0	
3 Single coil holders	2	0	
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1 .0002 fixed condenser (Dubilier)	2	3	
1 Special .04 fixed condenser (Dubilier type LDA)	2	0	
2 1 mfd. fixed condensers (Dubilier)	5	0	
1 .25 mfd. fixed condenser (T.C.C.)	3	0	
1 L.F. transformer (Telsen Radiogrand)	12	6	
1 10,000 ohm Spaghetti resistance (Lewcos)	1	6	
1 Partition screen 10x6 with hole for S.G. valve (H. & B.)	1	9	
2 Terminal Blocks (Junit)	1	4	
1 Five-way battery cord (H. & B.)	2	6	
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From R.I.

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Pertrix Reputation

The best thing a good H.T. battery can have is a good reputation, and Pertrix have adopted a novel idea to prove that users are thoroughly satisfied. They have just sent me a folder giving, among other things, actual copies of many unsolicited testimonials. You can get a copy of this from Pertrix, together with literature on the whole range of high-tension and grid-bias batteries. **262**

Eelex Connectors

We see so many of the new Eelex treble-duty terminals that I am sure some of us are apt to overlook the equally useful Eelex plugs and sockets. Before you fit up that new set, why not get from Eastick's a leaflet giving details of the colourings and name plates for these connectors? **263**

A Pocket Tester

Here is something useful. From the Nivex people comes useful information about a handy little pocket tester which can be used for checking over a hundred and one faults in any radio gear and which is also handy in testing the electrical system of your car. You should get this. **264**

A McMichael "M.C."

When L. McMichael, Ltd., produce some new radio gear you may be sure that it is good, and this recommendation applies to the new McMichael moving-coil speaker. If you are in search of a good new speaker of the permanent-magnet moving-coil type, then get a leaflet describing this. **265**

A Handy Chart

From Triotron comes a chart which I know you will want to have. On one side it gives a full list of Triotron valves for battery or mains working, and on the reverse side it gives a topical list of European broadcasting stations, with wavelength and power ratings. This useful chart can be obtained free through my catalogue service.
OBSERVER. **266**

With the change of the Glasgow station wavelength comes a chorus of complaint from listeners. Some declare that it is now more difficult to cut out the local station when something further afield is wanted.

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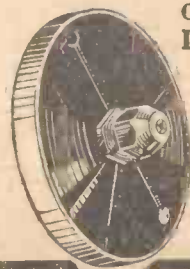
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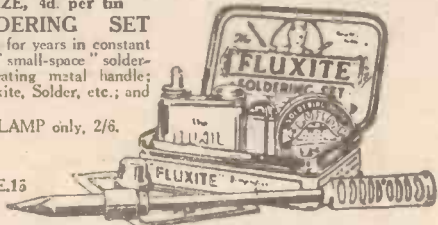
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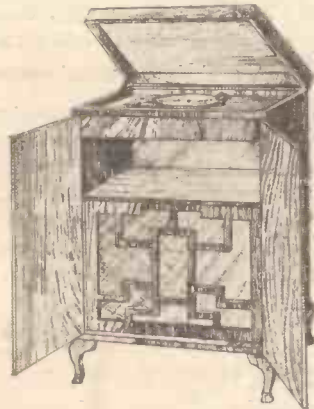
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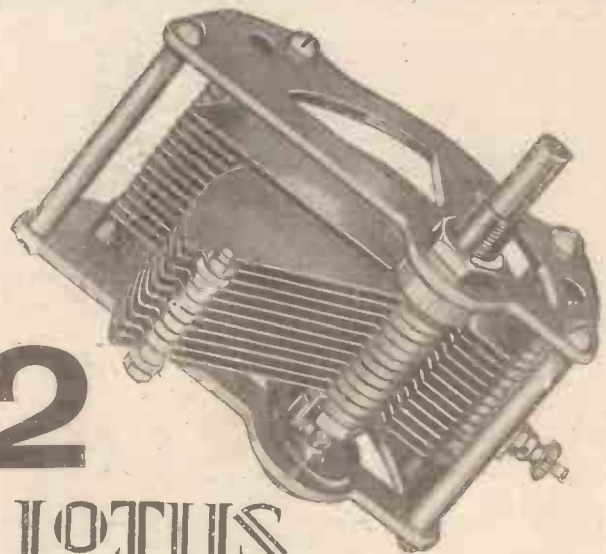
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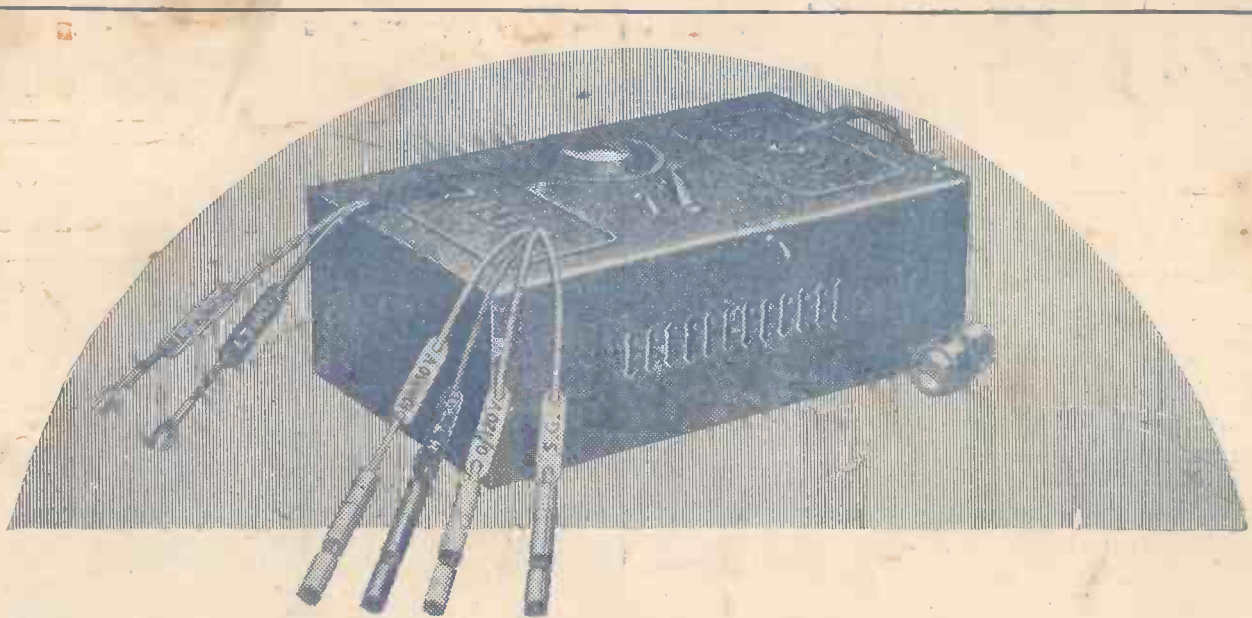
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