

LIST OF SHORT-WAVE STATIONS

Amateur Wireless

Every Thursday 3^d
And Electrics

Vol. XI. No. 285

Saturday, Nov. 26, 1927

THREE-CONTINENT THREE

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on the Short Waves**



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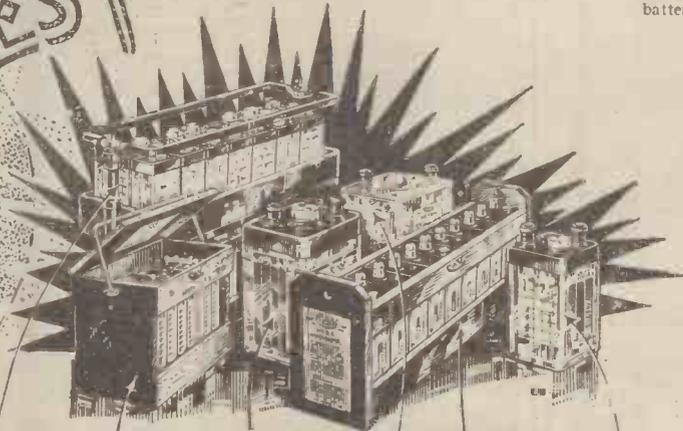
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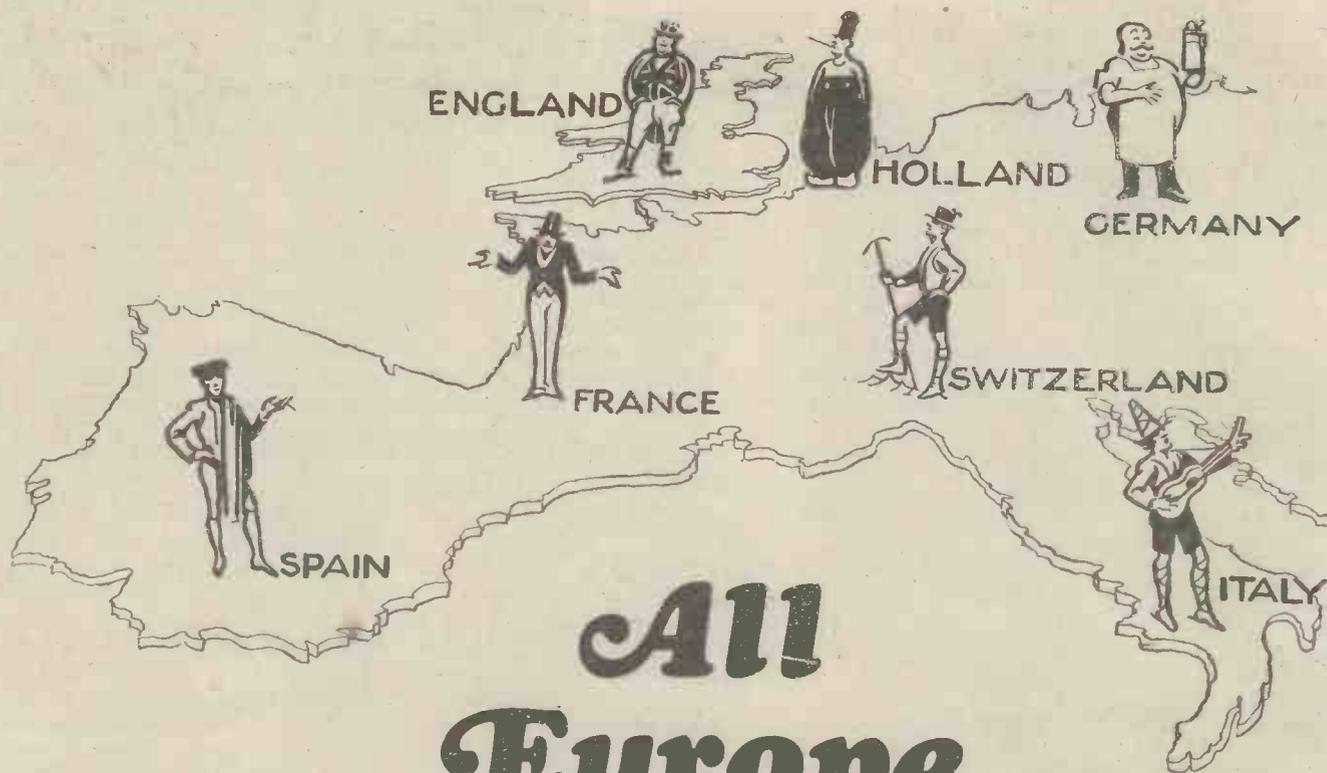
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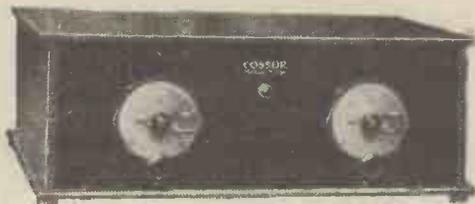
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Amateur Wireless

and Electrics

The Leading Radio Weekly for the Constructor, Listener and Experimenter

Vol. XI. No. 285

Edited by BERNARD E. JONES
Technical Editor: J. H. REYNER, B.Sc.(Hons.), A.M.I.E.E.

November 26, 1927

A "Standard Component" Set—One N.W.W. Blessing—Not a DX Getter!— A New Oscillator Wanted—A "W.M." Receiver—Do Not Judge!

This Week's Sets

TWO interesting receivers are described and illustrated this week in our constructional pages. The more important of these is the "Three-continent Three," designed and described by our Technical Editor, Mr. J. H. Reyner, B.Sc. (Hons.), A.M.I.E.E. Incorporating an entirely new system of short-wave H.F. amplification, this three-valver represents a great advance on all other short-wave sets, and, judging by the results which have been obtained, it certainly seems to solve the problem of stable short-wave reception. The AMATEUR WIRELESS Technical Staff give full details of the "General-purpose Two"—a "straight" set produced in response to requests from a great number of readers.

A Good Three-valver Coming

DESIGNED to enable constructors to utilise existing components in an up-to-date receiver, the "Standard Component" Three, which will be fully described by the AMATEUR WIRELESS Technical Staff next week, will meet a long-felt want. Simplicity has been combined with efficiency in such a way that the "Standard Component" Three will appeal to a large section of our constructionally-inclined readers.

During the N.W.W.

THE slogan of the National Wireless Week, "Let your friends listen," really does seem to have done some good. Our local oscillator actually curtailed his experiments a little to let his friends listen!

Even the Beams

THE recent severe winds and gales have taken their usual toll of wireless outdoor equipment. Daventry recently suffered a minor breakdown, and even the august official beam services were interrupted owing to land-line troubles caused by the gales.

USING THE MAINS

Before any attempt to make use of the mains for wireless purposes one should do everything possible to find out all about the nature of the supply it is proposed to use. This will greatly reduce the risk of accidental "shocks" and will certainly avoid a lot of unnecessary trouble later on.

First, the voltage should be ascertained and the nature of the supply—whether it is D.C. or A.C.—and in the case of A.C., the frequency. All this information will be found inscribed on the meter. Further than this, if the supply is D.C., it should be found out whether either of the mains is earthed and, if so, which. The polarity of the mains must also be determined.

The above data is so obviously important that it might be thought no one would need this reminder, but, as a matter of fact, quite a number of readers have been trying to make the "Simpler Wireless" Special Three work on A.C. mains under the impression that their supplies were D.C.

the lift attendant at the Savoy Hotel, who listens-in in his little office at the top of the building—right next to 2LO! It is not true that he has found a wavetrapp that enables him to cut out the local station!

Do Not Judge—

"DO not judge the B.B.C. by the 'Children's Hour' or variety entertainments. I know they are dreadful . . . there are occasions when I cannot get across the room quick enough to turn the set off." So saith Sir John Reith. It is just as well to be frank, it is true; but for the Director-General to say it—! Surely a word in someone's ear—?

A New Kind of Oscillator Required!

ONE of our correspondents has been doing some thinking. "What," he asks, "is the good of the B.B.C. generating ether waves if they can't generate brain waves?" It certainly seems that of the two the latter is the harder to do!

In the Emerald Isle

ACCORDING to one Irish journal, the Dublin station is not maintaining a good programme service, and the wireless trade in consequence is suffering. On those rare occasions when we have tuned in to 2RN, however, we have heard some very good material being "put out."

A "Five" That Beats the Band!

ONE-DIAL tuning—both wavelength bands without coil changing—five valves! Sounds almost too good to be true, doesn't it? But that is what Mr. J. H. Reyner, B.Sc., A.M.I.E.E., has accomplished in a new set—the "Phoenix Five"—of which full details are given in the December Number of the *Wireless Magazine*, on sale to-day. Designed by the same brains that produced the "Solodyne," the "Phoenix" is a great set.

The World for a Field

WE hear that a record for South Africa in wireless reception has been made by a Mr. S. Pleas. In search of a little entertainment, Mr. Pleas first listened-in to Australia. Tiring of that, he changed over to 5SW (Chelmsford), and then, wanting some excitement, listened to a description of a football match between Pennsylvania and Harvard. This proving, perhaps, too exciting, he finally tuned in Johannesburg.

Not a DX Listener!

BUT we hear so much of long-distance work that it is a pleasant change to hear of the nearest listener. This must be

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For the Newcomer to Wireless: What the Batteries Do

I DON'T quite understand how a battery makes electricity. Can you explain?

Well, the first thing to be said is that it *doesn't*! You cannot create or destroy electricity any more than you can create or destroy matter. Electricity is present everywhere and in everything; in your body and in mine, for example. But it cannot produce any effect, such as heating or lighting, unless it is set in motion.

A Water Analogy

Can you give me another water analogy? They make it so easy to follow explanations.

You cannot obtain power from the water in a pond so long as it remains at rest; but, supposing that you pump it up into a high tank and then allow a jet to spurt out, you can cause it to turn a water-wheel or a turbine.

Then is the battery a pump?

Yes, that's exactly what it is. When it is standing idle nothing happens, but as soon as a circuit is made by connecting the terminals of the battery to a conducting path the pumping action begins and current, in the form of a stream of electrons, is driven through the circuit.

What is the difference between a dry battery and an accumulator?

The dry battery is of what is known as the primary type, depending entirely on chemical action. The accumulator is of the secondary or storage type. It must be charged up by being connected for a period to a source of current before it can work as a battery.

How do they act as pumps?

In the dry battery, such as that so often used for providing the plate current in the wireless set, there are two elements, the positive, which is of carbon, and the negative, which consists of zinc. It is customary to regard the positive as the high-pressure element, or, if you like, you may look upon it as a tank raised aloft whilst the negative element is at a low level. Actually, however, current does not flow through a circuit from positive to negative, but in the opposite direction.

Just what happens?

The Electrolyte

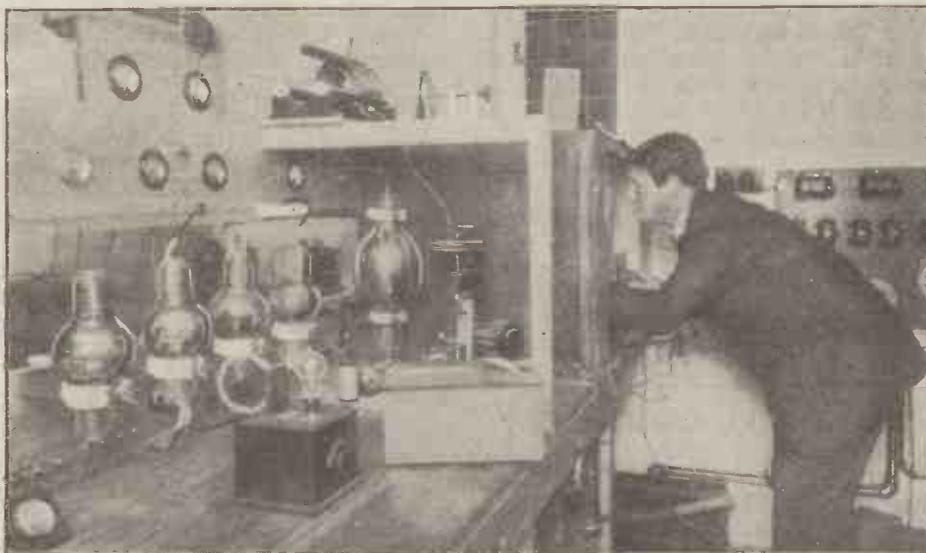
Besides the two elements, there is what is known as the electrolyte. In the dry battery, which is not *really* dry, it takes the form of a paste containing sal ammoniac, which has a peculiar effect upon zinc when the circuit is made. A chemical action then starts, the electrolyte dissolving the zinc. But each atom removed

from the zinc by the action of the electrolyte leaves one or more electrons behind. The result is that the zinc soon has too many electrons or becomes negatively charged. These surplus electrons escape through the circuit back to the positive element, and so a flow of current takes place.

—and the Accumulator

I think I've got that, but how about the accumulator?

Here the pumping action is rather different. You have positive and negative elements as before and an electrolyte. To render the battery active, however, it must be charged by having current from the mains passed through it. This current causes certain chemical changes to take place in the plates. The plates remain in their changed condition so long as the battery is not connected to a circuit. When, however, a path from positive to negative is provided by means of a circuit another chemical change occurs, the plates slowly returning to their original condition. This chemical change is again accomplished by the passage of electrons from the negative to the positive plate, and so once more there is a pumping action and current flows.



MR. MARCUSE'S SUCCESSFUL RELAY OF THE ARMISTICE REMEMBRANCE FESTIVAL

A cable from Bombay to Mr. Gerald Marcuse, the well-known wireless amateur, states that his relaying of the Armistice Remembrance Festival from the Albert Hall, on the night of November 11, was not only successful, but appreciated. Mr. Marcuse relayed the programme on a wavelength of 32 metres, with a power of approximately 1 kilowatt.

The cable states, "Transmission received, not strong, fading badly, but nevertheless very enjoyable. Nobody Bombay succeeded getting Chelmsford."

Considering that the time during which the relay took place, between 8 and 10 p.m., is regarded as particularly unsuitable for long-distance transmission, together with the fact that the B.B.C. station at Chelmsford is using many times more power than Mr. Marcuse, the success is all the more praiseworthy. In this connection the B.B.C. issued the following statement, through the new experimental short-wave station, 5SW, at 1 p.m., on November 11:

"It is unfortunate that recent experiments provide little hope that the relay to-night from London will be heard in Australasia. For some still obscure reason, the period from 7 p.m. to 3 a.m., G.M.T., seems to be particularly unfavourable for the reception of short-wave transmissions in Australia and New Zealand. We shall naturally endeavour to ensure the success of to-night's transmission, but, lest it be a partial failure, we take this opportunity of sending a message of greeting to listeners in the British Dominions on the other side of the world."

The photograph shows Mr. Marcuse with his transmitter, using Osram valves, during the actual relaying.

Auto-Transformers

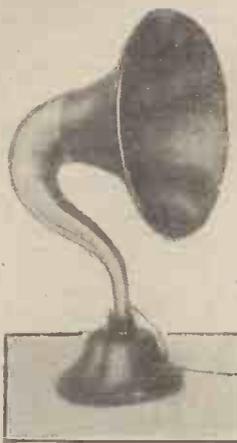
FOR all practical purposes the auto-transformer is the exact equivalent of a two-coil transformer, so far as the step-up or step-down effect is concerned. It has an advantage in flexibility, however, if the tapping point can be varied, because the transformation ratio will be altered accordingly.

On the other hand, there is a direct metallic connection between any two circuits coupled through an auto-transformer, whereas a two-coil coupling affords a complete separation between the two so far as voltages or potential is concerned, a point that is sometimes of importance when it is necessary to keep the plate voltage of one valve stage off the grid of the next. Finally, it may be of interest to note that those windings of an auto-transformer coil which are common to the two coupled circuits only carry a current equal to the difference between the primary and secondary currents, since these flow in opposite directions.

M. A. L.

The Kedroff Quartet of unaccompanied Russian singers will appear before the 2LO microphone on December 6.

THE GENERAL-PURPOSE TWO



REINARTZ-TYPE REACTION
AND TRANSFORMER-COUPLED L.F.

Designed and Built by the "A.W." Technical Staff



A CAREFUL analysis of our correspondence and Information Bureau queries has proved that there is quite a considerable number of AMATEUR WIRELESS readers who require details of a two-valve transformer-coupled receiver with capacity-controlled magnetic reaction.

It is to meet this demand that the AMATEUR WIRELESS Technical Staff are now presenting full constructional particulars of the "General-purpose Two." The various photographic views and diagrams should enable the constructor to visualise the complete receiver. The "frame work" of the receiver consists of a 14 in. by 7 in. ebonite panel screwed at right angles to a 14 in. by 8 in. baseboard.

On the panel are mounted a .0005 variable condenser for tuning, a .0003 variable condenser for reaction, a filament on-off switch, and loud-speaker, aerial and earth terminals. On the baseboard are two valve-holders, two single-coil mounts, an L.F. transformer, an H.F. choke, a .0002 fixed series condenser, a grid-leak and condenser and a two-way Lorientostat filament control. Seven battery terminals are mounted, in the order shown in the blueprint, on a 7 in. by 2 in. terminal strip screwed centrally to the back of the baseboard.

It will be agreed that the number of components is not great. In many cases most of them will already be in the possession of the reader. It will be of interest to explain the why and wherefore of

the circuit embodied in the receiver.

Readers are referred to the theoretical circuit diagram accompanying this description. Starting with the aerial, it will be seen that there are two aerial terminals, A1 and A2. The aerial lead can be connected direct to the top of the tuning coil by the use of A2, or if greater selectivity is required the terminal A1 gives a series fixed condenser connection.

Tuning is effected very simply with a plug-in coil and the .0005 variable condenser. For the broadcast band with connection A2 a No. 35 or No. 40 coil will be suitable, or if the series fixed condenser is utilised a No. 60 coil will serve. A No. 50 reaction coil should give good results in both cases.

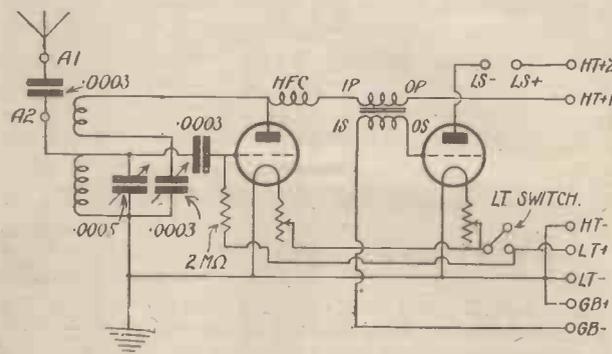
Reaction

The system of applying reaction is properly known as capacity-controlled magnetic reaction. A second plug-in coil is arranged so that it is closely coupled to the tuning plug-in coil. The amount of energy flowing through this closely-coupled reaction coil is regulated by the .0003 variable reaction condenser. By connecting the moving vanes of the reaction condenser to earth, undesirable hand-capacity effects are practically eliminated. It will be noticed that an H.F. choke is wired between the anode of the detector and the primary of the L.F. transformer. The purpose of the choke is to divert the H.F. component of the rectified current through the reaction coil and condenser.

As the number of valves is limited to two, it was thought advisable to utilise the most sensitive system of valve rectification. For this purpose a .0003 fixed condenser and 2-megohm grid leak are required, the grid leak being connected between the grid of the

detector valve and L.T. + in order to apply a positive bias to the grid.

A suitable L.F. transformer couples the detector valve to the L.F. amplifying valve in the manner shown. Negative grid bias is applied to the L.F. valve from a 9-volt G.B. battery via the secondary of the L.F. transformer. The filament supply is controlled by means of a 2-way Lorientostat, which consists of two small solenoids of resistance wire with sliders arranged so that the resistance of each can be varied independently. The great simplicity of Lorientostat control has to be

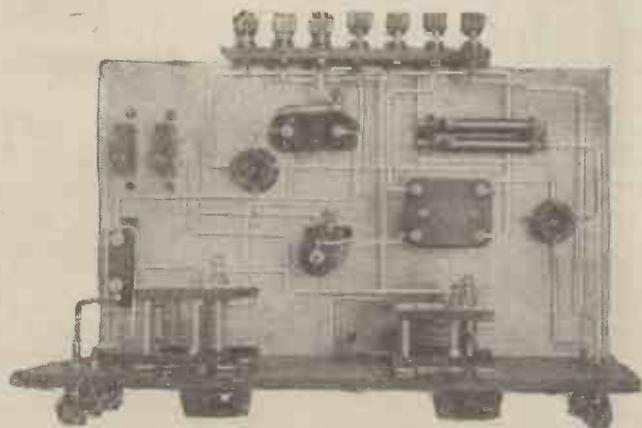


The Circuit Diagram

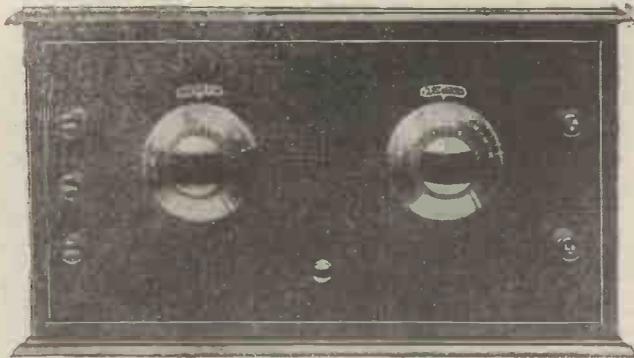
tried to be appreciated. But since this control is mounted on the baseboard, it is convenient to have an "on-off" on the panel. In the diagram we are considering this switch is shown in the L.T. + lead.

Two separate H.T. + tappings are indicated, one for the detector valve and the other for the L.F. amplifier. Some readers are in the habit of "commoning" these two tappings and then varying the common H.T. voltage until best results are obtained. This practice is not recommended, because the best value of H.T. for efficient rectification is almost invariably lower than the H.T. value required for greatest L.F. amplification. With most recommended valves an H.T. voltage in the neighbourhood of 60 volts gives good rectification, whereas 100-120 volts is necessary, with suitable grid-bias, for the L.F. valve.

So much for the circuit considerations. Readers who would like to duplicate the original model of the "General-purpose Two" will need the following components:—



A Plan View of the "General-purpose Two"



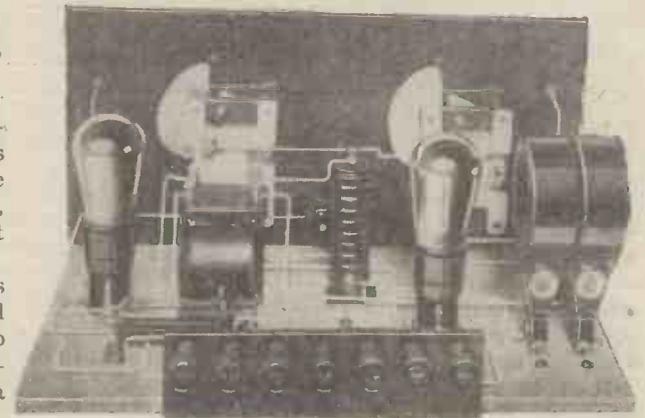
components. This receiver and all future AMATEUR WIRELESS receivers incorporate a standard-size panel, and it will save readers trouble if they also use standard panels, because all the cabinet manufacturers make up their cabinets to take these standard panels.

to-point connections. Our constructional department used Glazite for wiring, although there is no objection in this particular receiver to the use of bare tinned-copper wire, such as Junit. Both these proprietary brands can be recommended.

Note that the lead from the IS connection of the L.F. transformer is taken under the Loriostat simply for convenience in adjusting the resistors.

(Continued on page 801)

Two Photographs of the "General-purpose Two"



Components Required

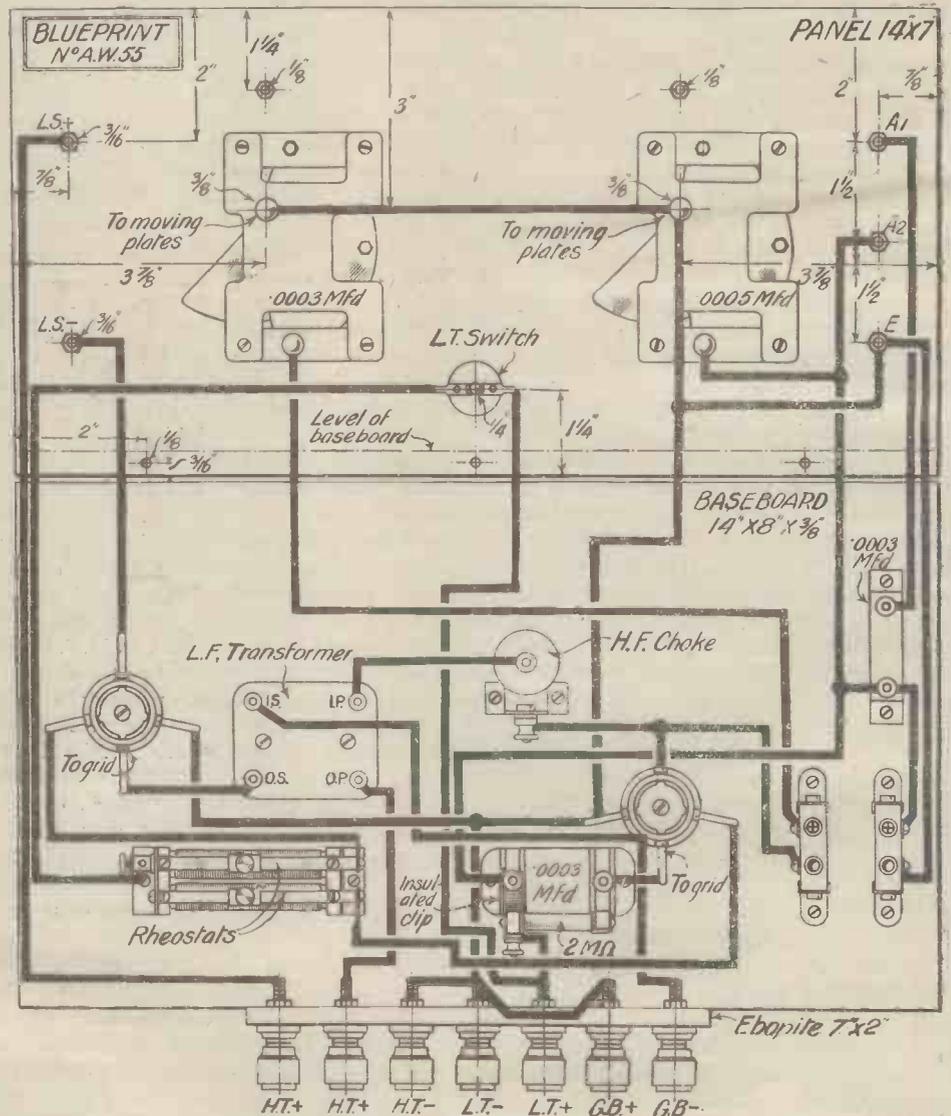
- Ebonite panel 14 in. by 7 in. by 1/4 in. (Ebonart, Raymond or Becol).
- Cabinet, Raymond.
- Baseboard, 14 in. by 8 in. by 3/8 in. (Carrington or Raymond).
- .0005 variable condenser with 3 in. dial (Ormond, Jackson, Centroid, or Burton).
- .0003 variable condenser with 3 in. dial (Ormond, Jackson, Centroid, or Burton).
- L.F. transformer (Powquip, R.I. and Varley, or Lissen).
- Two valve-holders (Lissen or Benjamin).
- H.F. choke (Trix, R.I. and Varley, Lissen, or C.D.M.).
- Two-way Loriostat.
- Two single-coil mounts (Lotus or Lissen).
- .0003 grid condenser with series clip (Dubilier, Lissen, or C.D.M.).
- Two-megohm grid-leak (Lissen, Dubilier, or Melhuish).
- .0002 fixed condenser (Dubilier, Lissen, or C.D.M.).
- Twelve engraved terminals marked as follows: A1, A2, E, L.S.+, L.S.-, H.T.+1, H.T.+2, H.T.-, L.T.+, L.T.-, G.B.+, G.B.-. Wire (Glazite or Junit).

With these available, the constructor can start assembling the receiver. The panel and terminal strip are drilled first, in accordance with the instructions shown on the reduced reproduction of the blueprint. A good deal of trouble can be saved in this operation by obtaining the full-size blueprint (1s.) since this can be used as a template for the panel components. Simply place the blueprint fair and square on the panel and prick through the holes marked on the blueprint. This procedure is only practicable, of course, where the first specified components are used. If no blueprint is used the constructor should carefully measure and mark the distances apart of the various components before attempting the actual drilling.

When the panel and terminal strip have been drilled and the variable condensers and dials, filament switch and terminals fitted in position, the panel and strip are screwed to the baseboard. The available baseboard space then left can be utilised for the remaining components to the best advantage. If similar components to those specified are used and reference is made to the blueprint or its reduced reproduction, it will be found that there is ample space for disposing the baseboard

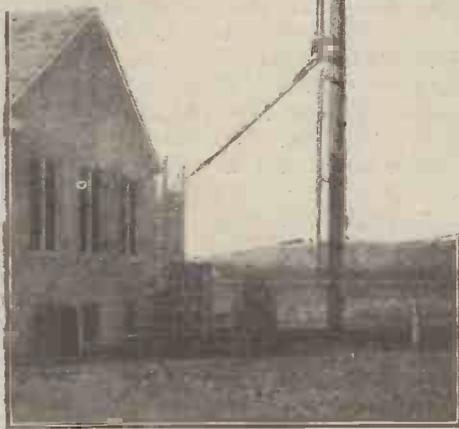
The use of the new Dubilier grid condenser with one insulated grid-leak clip saves the cost and baseboard space of a separate grid-leak holder, besides saving a small amount of wiring.

In wiring the components together, the inexperienced constructor could not do better than to obtain the full-size blueprint, as this gives a very clear idea of the point-



The Wiring Diagram (Blueprint available, price 1/-)

*A List for
the Assistance
of the
Short-wave
Enthusiast*



The Transmitting Aerial of an American Short-wave Station

THE WORLD'S SHORT-WAVE STATIONS

By H. de A. DONISTHORPE

chart below, taking London at 11 p.m., will be of use for this work, this being a good hour for short-wave work. This chart shows the equivalent time at the various places given with the difference in hours, so that by a simple calculation the time at these towns for any time in London can be ascertained.

Time Chart

Place.	Time.	Difference in Time.
London ...	11 p.m.	—
New York City ...	6 "	-5 hours
Buenos Aires ...	7 "	-4 "
Rome ...	Midnight	+1 "
	following day	
Petrograd ...	1 a.m.	+2 "
Bombay ...	4 "	+5 "
Calcutta ...	5 "	+6 "
Melbourne ...	8.30 a.m.	+9½ "
Sydney ...	9 "	+10 "

TO-DAY more and more radio listeners are turning to the thrills of short-wave reception, which permits of long-distance radio stations being easily picked up in this country. There is a wonderful fascination about this type of reception, which grows on the listener, as greater skill is required in tuning.

There is little doubt that the knowledge gained in this particular direction of radio work has been added to considerably by the efforts of the radio amateur, whose attention has been restricted to this particular portion of the waveband by Government legislation. It is also more than likely that the government departments of the various nations did not realise at the time, when these short waves were given to the amateurs, that so much success could be achieved with so little power.

To-day, as a result of this success, more and more commercial and government stations are employing these ultra-short waves, and it will repay any experimenter to construct a short-wave receiver, as there are many stations transmitting that can easily be intercepted. These transmitting stations are springing up all over the world, and include both telegraph and broadcasting stations.

Whilst short waves may be said to be space eliminators, there is one difficulty to be encountered, and that is the difference in time between here in England and the far-distant transmitting stations. For example, the American short-wave broadcasts from 2XAF and 2XAD commence at 6 p.m. New York time, which is 11 p.m. here in London. This makes the listening to these programmes a late night. The time

There is undoubtedly much to discover about the behaviour of these short waves, as they possess different properties from those of the longer waves. There is no necessity for long aerials suspended from enormous masts for these transmissions, which is one of the interesting properties about short-wave work. A glance at the photograph above of the aerial system of one of the American short-wave broadcasting stations will illustrate this statement.

The aerial at the receiving end also need not be of large dimensions, as these waves can easily be picked up on a small piece of wire stretched from the picture-rail to the receiver. Perpendicular receiving aerials, however, give the most satisfactory results.

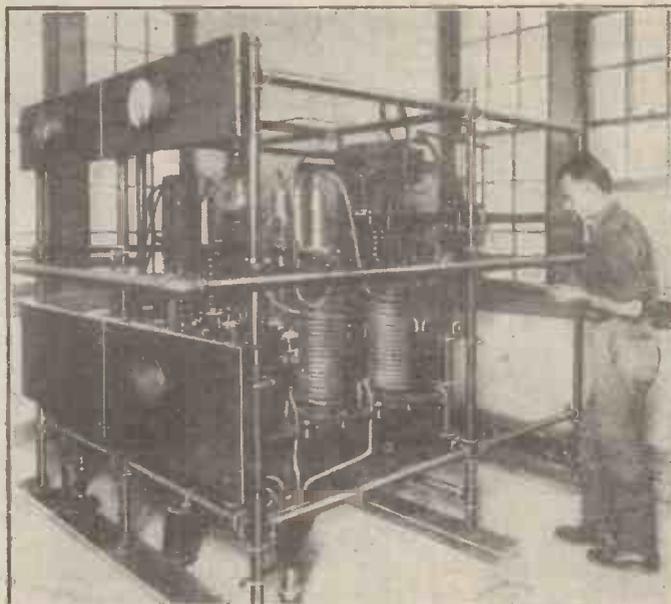
A list of the available stations likely to be heard is herewith appended.

The usual outside L-type aerial is, of course, also quite suitable providing the wire is kept taut so that it cannot sway about and thus alter the tuning. The same remarks apply to the lead-in.

Short-wave Stations

(B) indicates "Beam" Station.
(v) indicates wave liable to vary.
(T) indicates "Broadcasting Station."

Call Sign.	Wave-length.	Location.
AGA	14.95	Nauen, Germany.
AGB	26.3	Nauen, Germany.
AGC	17.2	Nauen, Germany.
AGK	20.0	Nauen, Germany.
AND	28.5	Java, East Indies.
AIN	51.0	Casablanca.
AQE Ship	33.5	Sir J. C. Ross,
BYB	35.0	Whitehall, London.
B82	25.5	Brussels.
B82	15.3	Brussels.
CG (B)	16.5	Drummondville, Canada.
CG (B)	32.3	Drummondville, Canada.
CJ (B)	24.6	Drummondville, Canada.
CRHB	18.0	Cape Verde Island.
CRHC	18.1	Loanda, West Africa.
FL	32.0	Eiffel Tower, France.
FW	24.3	St. Assise, France.
FY	22.3	France.
GBH (B)	25.8	Grimsby, England.
GBJ (B)	34.1	Bodmin, England.
GBJ (B)	16.15	Bodmin, England.
GBK (B)	32.5	Bodmin, England.
GBK (B)	16.3	Bodmin, England.
GBM (v)	23.4	Leafield, England.
GLH (B)	21.7	Dorchester, England.
GLQ (B)	24.5	Ongar, England.
GLS	21.8	Ongar, England.
GLW (B)	15.7	Dorchester, England.
GFR (v)	20.0	R.F.A., Flowerdown, Eng.



The Transmitting Apparatus of an American Short-wave Transmitter

GLSQ Ship	20.0	s.s. Olympic.
HJG	21.8	Bogata, Colombia.
HVA	32.0	Hanoi, French Indo-China.
HZA	25.0	Saigon, French Indo-China.
IDO	33.4	Rome, Italy.
JOC	43.0	Otchishi, Japan.
KEL	29.3	California, U.S.A.

(Concluded on page 792)

Electrons Instead of Wheels!

An Article Describing how Professor Dieckmann hopes to Solve the Television Problem

By WILLIAM J. BRITTAIN

CRITICS there are—thoughtful men, and versed in science—who say television is impossible. They say that any mechanism would be too clumsy to attain the dizzy speeds and the desperate fineness necessary.

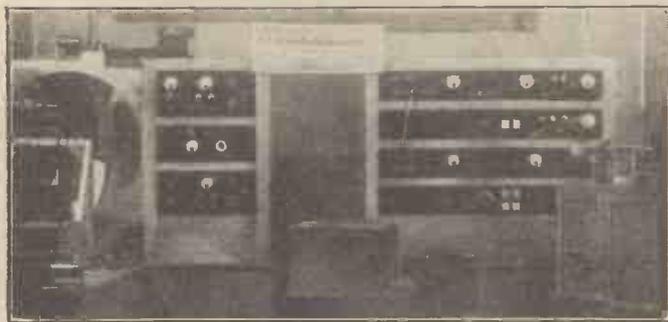
You who have read as much as has caught your eye of television know by now the dread numbers which make even the optimistic investigator a little hopeless. There is the familiar ten centimetres by ten centimetres of the proposed picture. If you divide each side of the square by a hundred you have the picture in 10,000 smaller squares. And squares of a millimetre do not make up a very fine picture.

Each one of these squares has to be seen by the "electric eye," and to give a fair appearance of continuous movement in the picture the whole has to be transmitted and flashed on the receiving screen ten times a second.

That means 10,000 squares ten times a second—100,000 squares of light and shade to be picked out one by one in perfect order and flashed out every second. And the number, you remember, that is necessary to make a good moving picture is 300,000 points a second.

Weightless Electrons

Professor Max Dieckmann, whom I call the sunburnt scientist, refuses to do it.



The Experimental Television Apparatus in Professor Dieckmann's Laboratory.

He has scrapped his old transmitting apparatus of mirrors and wires and steel arms and is trying to make speedy, almost weightless electrons do the work.

Cathode rays Professor Dieckmann already uses in his receiving apparatus, and these he is retaining; if he can use them at both ends of his apparatus he will, he believes, have solved the problem of television.

I went to find Professor Dieckmann at his station near Munich. Down a garden path he came to greet me—a man dressed

in khaki cotton shorts showing a generous length of brown leg, a light khaki jacket, and a khaki open-neck shirt—and making them look distinguished. He was so brown he might have been a research worker in sunlight.

I was introduced to Mr. Rudolf Hell, who works with Professor Dieckmann in all his television experiments, and another bright young assistant, and then Professor Dieckmann took a sheet of paper and showed me how he hopes to make electrons do the work.

Electrons, of course, are particles of negative electricity which stream from the cathode to the anode in a highly exhausted tube. If a hole is made through the anode plate, the electrons pass through in a straight stream we call cathode rays. Cathode rays can be drawn aside by a magnet.

Exploring the Object

This is the property Professor Dieckmann is using to try to make cathode rays explore the object, point by point. One electro-magnet he has to draw the rays laterally and another at right angles to it to draw them vertically.

Alternating current energises one magnet twenty times as frequently as the other to make the rays zig-zag over the object just as Mihály's mirrors direct their beam of light.

In his receiver, which he is retaining, Dieckmann works on the same principle. Cathode rays, regulated according to the strength of the wireless impulse received (meaning, of course, whether light or shade is being encountered at that moment at the transmitting end) are made to zig-zag over a fluorescent screen which glows as the rays touch

it. The glowing patches correspond to the light parts of the object, and form the picture.

Dieckmann's receiver looks just as if the business part of it were a beer bottle. The round screen near the bottom looks like a circle of calico. The bottle is on its side and on its neck are the two magnets which deflect the rays. The tube producing the cathode rays joins the neck of the bottle.

I have described Professor Dieckmann's receiver in a homely way—because it

struck me like that. But that does not mean that there is anything home-made about the work of Professor Dieckmann.

In the laboratories are twenty-two assistants and technicians, and besides television experiments there are going on general wireless research and work on photo-telegraphy. On his apparatus a weather chart and a picture are being broadcast every day from the Munich radio station, and his apparatus is in many homes.

"It must be years before television in perfection is here," said Professor Dieckmann to me, "but we hope soon to improve here on the present results in America and elsewhere.

"Workers who are trying to attain television with mechanism are, in my



A Sketch of the Cathode-ray Oscillograph

opinion, limited to crude results. I used to work with mirrors, but I came to the conclusion that with them I could never reach the enormous speeds necessary for images of fine texture, and those you must have before the public will take much interest in television.

"I had promising results with my old apparatus, but they were not enough. So I scrapped my mirrors and decided to try cathode rays. Electrons seem made for television: they are light and quick. They have no practical inertia, and attain any speed we need.

"At present, as you see, I am using a small receiving screen, but you can have a screen as large as you like. You could have it as big as that"—and he pointed to the doors of a large cupboard—"but of course then the checks making up the picture would be larger.

"Distance of transmission, too, is of little account. What we must work for is fineness, in splitting up the object and building it up again on the receiving screen."

Professor Dieckmann promised to let me know in a month or two what degree of fineness he has been able to obtain with his high weightless speedy streams of electrons.

As telegraphic communication is government owned in China, the Ministry of War regards radio equipment as munitions of war, and therefore its importation is prohibited.



Valves with the Wonderful Mullard P.M. filament.

Generous valves—valves that give astounding performance, ample power and beautiful purity; valves that stand the knocks and jolts of a valve's life, because they are robust—and yet valves that are cheap in use, because they cut down current consumption and require only .075 ampere filament current—these are the valves with the wonderful Mullard P.M. Filament.

Fit them to your set, they will improve your radio reception.

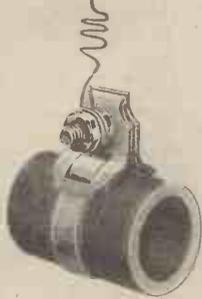
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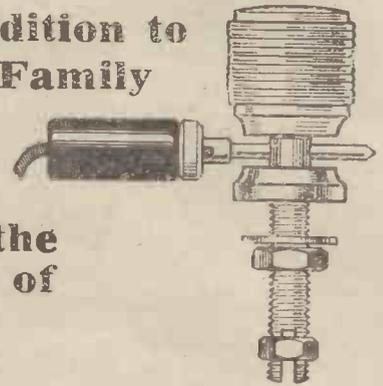
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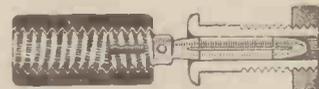
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Met-Vick Components make the most of a Set

WHETHER you are building the Met-Vick three or four Valve Sets or any other set, you cannot fail to get successful and satisfactory results if your components are Met-Vick. Most of the lines shown here are already well known amongst enthusiastic constructors and listeners; yet for those who have not yet used "Cosmos" Components, here are some details:—

A.N.P. (Astatic-Non-Parasitic) Coils.—These new "Met-Vick" products provide a clever solution of a difficult problem. They overcome, simply and efficiently, the three difficulties associated with H.F. amplification, namely: Magnetic coupling between coils, Stabilisation, and Parasitic Oscillation. List 4117/8.

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On Your Wavelength!

Fulfilled

YOUR "Thermion" has assumed more than once the prophetic mantle in these columns, and though he says it as shouldn't, he has really been rather good as a seer into the future. A good many years ago now I expressed the belief that it would one day be possible for the King or the Prince of Wales to speak to the Empire by means of wireless. On Armistice Day this prophecy was in a great measure fulfilled, for the Prince's speech at the Albert Hall was heard in many parts of our wide possessions. In Canada almost perfect reception was obtained and conditions were good in some parts of the great African Continent. Reception in the Antipodes was unfortunately marred by atmospherics, and these pernicious things also interfered with listeners in India and other parts of the East. Still, not only the Prince's words, but also the singing at the Albert Hall, reached thousands of British folk in odd corners of the earth, bringing them a very welcome message from the Old Country. Empire broadcasting is only just beginning, for we are still in the early experimental stages. That so much has been accomplished in so short a time is a fine augury for the future. There are big difficulties, but they will be surmounted.

The Wrong End of the Stick

Much as I admire Captain Eckersley, I cannot feel that he has struck quite the right chord in his many pronouncements upon Empire broadcasting. For some reason that I do not quite understand, he maintains that no Empire service can be of any value whatever unless it is capable of being re-broadcast by local stations in far-away countries. Whilst I quite admit that an occasional relay from the Mother Country would be welcome to dwellers in the Dominions and Colonies, I do not believe that to make this possible is the main function of Empire broadcasting. Reception upon the short waves is no longer, as some would have us believe, the prerogative of experts; nor does it need apparatus that can be used for no other purpose. The set that is capable of being used upon wavelengths below 50 metres makes a splendid receiver for the local station if you provide it with suitable coils, for there are few better all-round circuits than the Reinartz, some form of which is used in 99 per cent. of short-wave receivers.

Nor is there any difficulty about operating a short-wave set, so far, at any rate, as the reception of 25-kilowatt stations is concerned, however distant they may be. There are already untold thousands of British subjects all over the world who possess short-wave receiving sets and use them regularly. To be able to receive the

Mother Country direct is what they want, and now that they are able to do so a new joy has come into their lives. Once 5SW gets into his stride and provides as good a service as 2XAF, 2XAD, PCJJ, or Radio Malabar they will be more than content. It is a splendid thing, too, that the Empire has begun to respond by transmitting to the Mother Country. Already we can hear Australia. Let us hope that before long India, Africa, Canada, and others will broadcast to us on the short waves.

A Revelation

I wonder how many readers have ever heard a coil-driven loud-speaker operating in conjunction with a receiving set designed for quality? To those who do so for the first time the extraordinary faithfulness of the reproduction comes as a revelation. It is not too much to say that music, whether produced by brass, wood-wind, strings, or percussion, comes through with such absolute faithfulness that at a little distance it is practically impossible to tell whether one is listening to the real thing or to a reproduction by wireless. Even such difficult transmissions as the playing of an organ or a full orchestra come through with absolute perfection.

Many people imagine that that the coil-driven loud-speaker must necessarily produce a large volume of sound, and that it is therefore unsuitable for average-sized rooms. This is quite erroneous, for the instrument will give excellent results even when the volume is quite small. The only real drawbacks to the coil-driven loud-speaker are, first of all, the size of the baffle that must be used and, secondly, the fact that a magnetising current is required. Ideally the baffle should be four feet or so square, but good results are obtainable with something a good deal smaller than this. If you have a bookcase or a cupboard available, you may make this house the loud-speaker quite conveniently. Where there is electric light in the house the problem of obtaining the magnetising current is a simple one. But even those who are not so fortunate need not imagine that a coil-driven loud-speaker is beyond their reach. It can be worked perfectly well from a 6-volt accumulator, the necessary current being from .75 to 2 amperes, according to the design. I have myself no supply from the mains available, and am therefore compelled to use an accumulator.

So Simple!

Another point that deters many from installing moving-coil loud-speakers is the fear that they may be very expensive to build. Several firms are now turning out complete sets of parts, including ready-wound magnets. With the help of these

the business of constructing this best-of-all reproducing instruments is so simple that anyone of average handiness can undertake it with every prospect of complete success. And the cost? Well, my instrument ran me into very little over £3, all told; and nobody can say that this is excessive for any kind of loud-speaker!

Washington Difficulties

I hear that the amateur has met unexpected difficulties at the Washington Conference in the shape of a proposal by the British delegation that the British amateur should be content with a series of wavebands each confined to 100 kilocycles in width. When it is realised that, in the event of ratification of the proposals, the amateur transmitters of the whole world will be confined to six wavebands of this width, some idea of the consternation which prevails in amateur circles can be imagined. It is not yet too late for this proposal to be altered, however, and I hear that Messrs. Warner and Maxim, who are attending the conference on behalf of the International Amateur Union, are exerting every effort to guide the deliberations into more satisfactory channels.

It is interesting to note that the British Government has always been most reluctant to give away much to the amateur experimenter, whilst in the United States the reverse is the case. The result is that radio in that country has progressed to a greater extent and the industry has benefited considerably. One feels inclined to ask why the British Government should be so tardy in its recognition of the British amateur, when almost every other country is comparatively liberal in its allocation of wavebands for the use of the amateur.

A Strange Broadcast

During the week November 6 to 12 most of the Russian broadcasting stations were brought into action to celebrate the tenth anniversary of the Union of Soviets. Many readers of AMATEUR WIRELESS appear to have heard the relay, effected by the 1,450-metre high-power station, of the great festival which took place at the Academy Theatre in the capital, both on Sunday, November 6, and on the following day. On Monday, November 7, the celebrations started at the very early hour of 7 a.m. with a reception of the Communist leaders in the famous Red Square. The special concerts of what was advertised as revolutionary music were literally broadcast from the house-tops, for, as a matter of fact, loud-speakers were installed in all the public parks and squares.

A specially staged blood-curdling drama was relayed to the transmitters from a Moscow house of amusement, styled the

:: :: *On Your Wavelength!* (continued) :: ::

Theatre of the Revolution, on Thursday, November 10, and on the following evening the Radioperedacha studio, through the great Komintern station, broadcast a novel entertainment, widely advertised, namely, an "anti-religious musical burlesque."

There is little doubt, from the reports received, that some of these transmissions were clearly heard by many readers, but the broadcasts must have puzzled them, for in some instances listeners were not able to differentiate them from (1) a bull-fight, (2) the relay of motor-cycle races, (3) a boxing match, and (4) a rowdy creditors' meeting. In every case, however, both time and wavelength definitely pointed to Moscow!

[Readers are reminded that the service of the Information Bureau is at their disposal in cases of difficulty of identifying foreign stations.—ED.]

A New System of Modulation

I wonder whether we shall hear a great deal about this new system of modulation which has been making its appearance in America. Judging by reports, it appears that all manner of delightful advantages are to be experienced when this latest method is adopted. We are told that the waveband occupied by a station is a mere fraction of what it is at the present time, so that our circuits can be made very much more sharply tuned without any danger of distortion. It is said, I believe, that oscillation will become unknown, although I am not quite sure about this. Whether it means that an oscillating receiver does not interfere with the neighbours or that such a condition of affairs will produce so terrifying a noise in the set of the offender that he immediately ceases to oscillate, I cannot say; but no doubt we shall hear more about it.

The difficulty, of course, is that the alteration has to be made at the transmitting end and at the receiving end as well. The system is virtually a completely new one. The power necessary for the transmitter is very much smaller than is required at the present time, while it is also claimed that, up to a point, the strength of reception definitely increases as the distance away from the station is increased, after which there is a gradual fall-off again. The net result apparently is that at a given fairly large distance from the station the strength is much greater than with the present system, while the "wipe-out" effect close by a powerful transmitter is unknown.

What the System Is

The essence of the system appears to be that the frequency is modulated in some way rather than the amplitude, so that the

frequency of the carrier wave is continually changing within small limits. I believe a French station has been carrying out experiments on this system for some time, but the peculiar quality, or lack of it, has passed unnoticed because there is such interference on many of the weaker stations in Europe to-day that this particular station did not appear to be anything out of the ordinary. Mr. Reyner tells me that he is writing an article on the system, which is to appear very shortly.

The Voice of 5GB

I have just been making a short stay in the country at a place about eighty miles from Daventry. My own station is only about half this distance away from his aerial, and one therefore finds it rather difficult to appreciate variations in signal strength, which is always pretty considerable. With me there is little, if any, difference in the volume obtainable from 5XX and 5GB, both of them being just a little more powerful than 2JO, who is a good deal nearer. At the more distant place the difference in signal strength between 5XX and 5GB was remarkable. I learnt that when Daventry Junior first came into operation he was quite as strong as his elder brother, but since that time there has been a considerable falling off. At present 5XX gives certainly 50 per cent more volume with an equal number of valves.

The newer station is, of course, still undergoing alterations and has not yet worked at anything like full power. When the new aerial is rigged up and more power used, I fully expect that 5GB will give louder signals than 5XX at most places, for greater power seems to be required to drive long-wave transmissions over a distance.

Two Good Newcomers

Those who have sets, and most people have nowadays, capable of covering the higher wavelength band, will probably have discovered for themselves two excellent Continental stations that are now at work. These are Kalundborg, the 7-kilowatt Danish station, which works on 1,153.8 metres, and Huizen, the new Dutch station, rated at 4 kilowatts, whose wavelength is 1,840 metres until 7 p.m. and 1,950 from then until closing-down time. Until Kalundborg got to work, Denmark was rather badly heard in the South of England, for Copenhagen was difficult to pick up unless he was working at a time when other stations were not, and Ryyang, on 1,150 metres, has only a 1-kilowatt plant.

Kalundborg appears to be well heard everywhere, and one has now, therefore, a chance of tuning in the excellent Danish programmes. Kalundborg, as a matter of fact, does not confine himself to relaying Copenhagen, but sometimes also re-trans-

mits the programmes of other Scandinavian stations. From some quarters reception of Huizen is described as a little disappointing, though in most places the volume and quality are excellent. It is certainly a station that you should try for. If your receiver is not very selective, you will probably find him best after 7 p.m., for his wavelength is then further removed from those of 5XX and Radio-Paris.

Inconsiderate

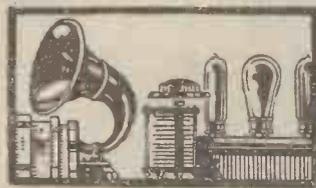
Listeners to 5XX, unless they live in places within a comparatively short distance of Daventry, have been worried for some little time now by a persistent continuous-wave signal which causes a good deal of interference with the broadcast transmission. I must say that I regard this kind of thing as most unfair, and I really cannot for the life of me see why it should take place. The authorities at the station responsible must know that they are using the broadcasting wavelength, and surely a shift of a few metres could be made in order to avoid causing interference. One finds the same sort of thing happening not infrequently upon the very short waves. So much interference, for example, was caused with 2XAD's transmissions that he was compelled to change his wavelength from 22.02 to 21.96 metres. Not once, but many times, I have found amateurs—seldom British, I am glad to say—right on top of stations such as 2XAF, WLW, or KDKA. A few weeks ago, when PCJJ was running one of his twenty-four-hour tests, a tonic-train transmitter kept up his raucous dots and dashes for long periods on a wavelength so close to that of the Dutch station that the interference could not be eliminated.

On the short waves, anyhow, there is plenty of room, and there is no reason whatever why this sort of thing should occur if only a little consideration is shown. I must say that I do wish that the authorities in all countries would combine to forbid the use of T.T. or of raw A.C. by those who transmit upon the very short waves.

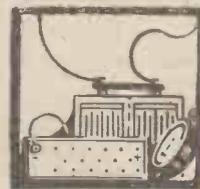
Screened Valves and Short Waves

Readers who dabble in short-wave work may not be aware that one of the advantages of the screened valve is that it will amplify to quite a reasonable extent at short waves. Capt. Round, I believe, states that the amplification is of the order of seven at these very high-frequencies, so that this suggests another solution to the short-wave problem. All told, the short-wave outlook appears promising and there are now so many programmes to choose from, that one can spend quite a happy time chasing broadcast programmes many thousands of miles distant.

THERMION.



PRACTICAL ODDS & ENDS



Improving Set Appearance

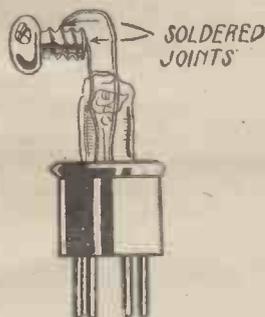
WHEN holes are drilled in cabinets, wood panels, or baseboards, the edges are often left rough. The appearance of the set is greatly improved if shoe eyelets—such as can be obtained at any leather shop—are inserted into the holes.

No. 18 eyelet is suitable for holes made with a $\frac{1}{16}$ -in. drill and No. 20 when a $\frac{3}{32}$ -in. drill is used. With these sizes and reasonable care a good fit is made.

Brown eyelets suit some woods, but the black ones suit all. E. W.

A Handy Tester

OLD and broken components should never be thrown away. Of the many uses broken valves can be put to the following is perhaps the most valuable to the constructor.



A Handy Tester

A flash-lamp bulb is obtained and soldered on to the broken filament leads of the valve. Then, if when trying out a hook-up, the tester is placed in every holder before the valve, any error in wiring will be found at the expense of the tester and not of a valve. Many other uses of the tester will occur to the reader. H. O.

Keeping the Bit Clean

HERE are three methods of cleaning and tinning the soldering bit:—

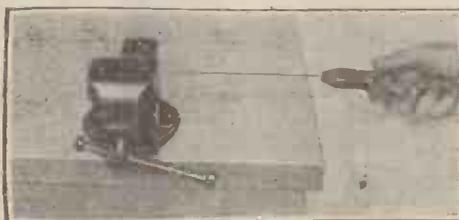
(1) After heating the iron and filing it clean, dip it in a little pure tin; this can be obtained from most ironmongers, and is known as "block" tin. The bit will now take the solder easily.

(2) Melt a little solder in a tin-lid and cover it with Fluxite. Passing the bit through the Fluxite to the solder will clean and tin it at the same time.

(3) Heat the bit and rub it in sal-ammoniac. It will then tin easily.

A Useful Tip

A LITTLE tip, of which some readers may be ignorant, consists of stretching the wire thoroughly before beginning the wiring of a set. This makes the wire straight and stiff—besides increasing its length. Care must be taken not to hold



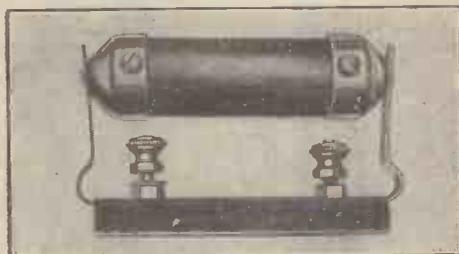
Stretching the Wire

the covering of the wire in either the vice or the pliers. The wire should be stretched in two or three-yard lengths. P. I.

Fixed Resistors

THIS is the "age of fixed resistors," but not every amateur knows how to calculate the right resistance values of these handy little gadgets to meet his own particular requirements.

A simple example is given, and substitution of the values chosen for those actually involved, will help to clear up any difficulty. Suppose we have a 6-volt accumulator and wish to run a valve at 5.5 volts. The difference between what we



A Fixed Resistor

want (5.5 volts) and what we've got (6 volts) is $6 - 5.5 = .5$ volt.

Assuming that the valve passes .1 amp., as most 6-volters do, then a resistance is required which will develop .5 volt across it when .1 amp. is flowing through it.

Ohm's law comes to our aid in the form, $R = \frac{E}{I}$, i.e., resistance in ohms equals differ-

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ence of potential in volts divided by the current, in amperes, flowing.

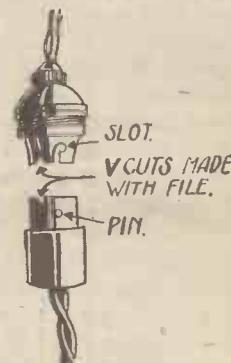
Substituting our figures we get $R = \frac{.5}{.1}$ ohms = 5 ohms. Thus a suitable resistance value for a fixed resistor in this case would be 5 ohms.

In full, the formula reads: Resistance required in ohms equals the difference between the voltage of the accumulator and the working voltage of the valve, divided by the normal current rating of the valve.

Our illustration shows a Cyldon fixed resistor, this being one of a large range of resistors available in all values. J. B.

An Adaptor and Socket Hint

THERE is always the possibility when a battery eliminator is being coupled to the mains through an adaptor and lamp socket of the current being applied the



An Adaptor and Socket Hint

wrong way round. With most eliminators the adaptor is the only switch provided, and so some means whereby one can be sure of connecting it correctly is required. This can be done in the following way.

Disconnect the adaptor and flex from the eliminator and set, and then file a V notch against one plate of the adaptor and lamp socket as shown in the sketch above. Plug the adaptor into the socket with the notches corresponding, and find the polarity of the wires coming from the adaptor.

This can easily be done by dipping them into a tumbler of water. The wire on which most bubbles collect is the negative lead. While doing this care should be taken to keep the wires well apart, and the water should contain a dash of vinegar.

With the polarity of the wires found they can be permanently connected to the eliminator, seeing that the notches of the adaptor and socket correspond, being one's only care in the future. R. B.

LETTERS TO THE EDITOR



The Editor does not necessarily agree with the views expressed by correspondents.

Correspondence should be brief and to the point and written on one side of the paper.

Morse and the Daventry Programmes

SIR,—I should like to endorse what H. P. (Hove) writes *re* the morse nuisance. Surely the B.B.C. has been in existence long enough to do something in the matter; but they appear perfectly helpless, though one is inclined to think that if London was affected by it something would be done quickly.

The only English station we can use is Daventry, and the programmes from there are awful, night after night nothing but serious talks, lectures, poems, and symphony concerts.

Granted that it must be a soul-less mind that does not appreciate some good music, the same thing applies to something clever and amusing.

Cannot something be done to get these Daventry programmes made more popular? Writing to the B.B.C. appears useless.—2HF (Worthing).

The "Victory Three"

SIR,—I have made the "Victory Three" from the blueprint supplied by you, and have used it with a B.T.H. loud-speaker. I find the reception and tone very good. This is especially so from Newcastle and London. I have not yet been able to get any Continental stations at loud-speaker strength, but hope to be able to do so when I have more experience with the set. I have not had any previous experience of wireless.

—T. B. W. (Stockton-on-Tees).

SIR,—Just a few lines to express my appreciation of your "Victory Three" circuit. I have now had an opportunity to test it out thoroughly, and the results are truly remarkable. I tuned in London (2LO), both Daventrys, Manchester, Cork, Nottingham, Bournemouth, Langenberg, Oslo, Stuttgart, Hamburg, Hanover, Leipzig, Madrid, Toulouse, Petit Parisien, Vienna (Rosenhuegel), Milan, Rome, Brunn, and, on the long waves, Hilversum, Radio-Paris, Königswusterhausen, Radio Polskie, and Eiffel Tower; all varying from moderate to full speaker strength.

This is by no means a "freak evening" stunt, as I have been able to reproduce it any evening I wished; the purity of 5XX,

5GB, and many of the foreigners is unapproachable, and with no reaction 5XX and 5GB give twice as much volume as my cone loud-speaker can conveniently handle.

I use 160 volts H.T. on the power valve and 120 on the other valves. I find, by the way, the following a very suitable combination: Det., B8; 1st L.F., PM1LF; 2nd L.F., PM2 Power.

—J. C. G. (Birmingham).

A Fine Set

SIR,—Being a keen reader of AMATEUR WIRELESS, I made up the set "Britain's Most Popular Three-valver," described about two years ago. It is everything that can be desired. I enclose a photograph of the set. The top lid and sides are of bevelled plate glass and the back is bevelled plate mirror. The entire case is made of oak. The accumulator and high-tension battery are in the cupboard underneath. The terminals at the back are hidden from view by a sliding panel, and when disconnected the entire set can be drawn out at the front.

W. T. H. (Stourbridge).



The Set built by Mr. Hughes of Stourbridge, referred to in the accompanying letter.

The "M.C. Four"

SIR,—Apropos of "Thermion's" comments on the "M.C. Four," I should like to give you my experience of this set. I might say that at two miles from 2LO I have had better results with this set than with any other I have built. I built it from the circuit and did not use a screened coil, and was consequently not able to get constant coupling; also, I had to insert a .006 condenser in the earth to stabilise the set. However, when I found that a screened coil should have been used, I obtained a blueprint and rebuilt according to that, and I am well pleased. I have bought a new screened H.F. valve, and would like to utilise this, so could you tell me if this will mean very much alteration?

—F. A. H. (Holloway).

[The proposal to use the screened valve with this set raises an interesting point and one which cannot be answered without a little experiment. Some tests with the idea of obtaining a little information on this point will be carried out.—ED.]

A Suggestion

SIR,—May I make a suggestion to valve manufacturers, to label valves. Use rheostat, 6 ohms or 30 ohms, for 2v., 4v., 6v. accumulators, as the case may be. This I think would be useful, in the same way that the marking or coloured rings for H.F., R.C., Det., L.F. Valves has been.

—J. C. (Edgbaston).

A Lecture on "Simpler Wireless"

READERS of AMATEUR WIRELESS will be interested to hear that arrangements have been made for Mr. J. F. Johnston to lecture before the Maidstone and District Radio Society on his invention, "Simpler Wireless." This lecture will take place at the Oddfellows' Hall, King Street, Maidstone, on Tuesday, November 29, commencing at 8 p.m. The Society invites all interested in wireless, whether members or not, to be present at this lecture. The hon. secretary, Mr. H. T. Cogger, of 44 Postley Road, Maidstone, will be pleased to supply further particulars.

The new Cologne (Germany) relay station was officially opened on November 15.

BROADCASTERS OF THE MONTH



DORIS GAMBELL.—Miss Gambell, actress and singer too, noted for her solos in "Peer Gynt," appears this month also in Hauptmann's play. She is also attached to the Liverpool broadcasting station, as "Cousin Doris" in the Kiddies' Corner.



MARGARET FAIRLESS.—One of our best-known English violinists, an early student at the Guildhall School of Music, Miss Fairless has won fame all over the country, her repertoire including Elgar's Violin Concerto, which she has played at Queen's Hall.



ELSIE SUDDABY.—An early broadcast star, Miss Suddaby has won fame in concert hall and oratorio work alike. As a studio soloist, she excels by reason of a perfect diction and ease of delivery.



OLLY OAKLEY.—A virtuoso on the banjo, Mr. Oakley first became known to listeners by his collaboration with Will Van Allen. Their dual banjo act was one of the earliest of variety turns. He is touring now as soloist.



REBECCA CLARKE.—The viola is not always recognised as a solo instrument, but Miss Clarke shares honours with Lionel Tertis for showing its virtues in this capacity. She is a composer as well as a member of the Aeolian Players.



Mr. SLYDEL.—As conductor of the Royal Automobile Club Band, Mr. Slydel quickly jumped into wireless fame. Lately his own octet has been found one of the best of the miniature orchestras heard at 2LO.



WILLIAM PRIMROSE.—This violinist was a Guildhall student; he early secured notice as a soloist at Queen's Hall. He has toured all stations many times and was heard to good advantage recently in the Cesar Franck Sonata, with Mr. Berkeley Mason.



WILLIAM MACREADY.—One of the best-known Shakespearean actors, Mr. Macready was appointed dramatic producer of Birmingham station, where all the big plays were early produced. He was the first to essay such plays as "Under Two Flags."



JOHN PERRY.—One of the earliest of broadcast operatic stars, Mr. Perry made a welcome re-appearance early this month. A member of the old Carl Rosa Company, he has sung nearly every principal rôle in the standard operas.

"A.W." TESTS OF APPARATUS

Conducted by our Technical Editor, J. H. REYNER, B.Sc. (Hons.), A.M.I.E.E.

Burton Micro-log Dial

SLOW-MOTION dials of one sort or another are almost essential with modern circuits. A new addition to the range on the market is the Micro-log dial, put on the market by C. F. and H. Burton, of Progress Works, Bernard Street, Walsall. This is of the usual edge-driven disc type, the actual reduction being 12 to 1, a ratio which gives a reasonably slow motion for most ordinary purposes, while not being too slow for rapid searching.

The dial itself is housed in a bakelite moulding having a window at the top through which the dial proper can be seen. The indications are engraved from 0 to 100, reading in both directions, so that the instrument will suit all types of condenser. A celluloid window is provided through which the dial can be read, a hair line



Burton Micro-log Dial

engraved in red indicating the exact position. A portion of this window is cut away so that the call signs of various stations which tune in at the various positions can be entered on the dial itself, thereby obtaining, as the name implies, a log of the receiver with which the dial is used.

The motion was found to be smooth and sufficient to drive a heavy gang condenser without slipping.

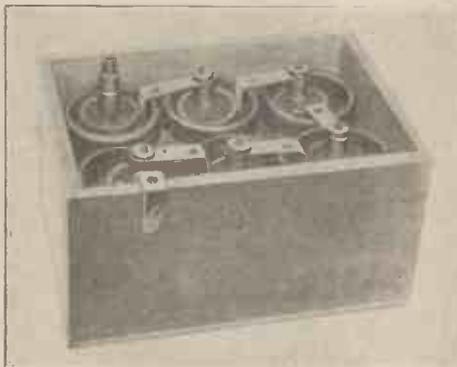
Eton High-tension Unit

ON a principle somewhat similar to the expanding bookcase, the Eton Glass Battery Company, of 46 St. Mary's Road, Leyton, E., have produced a high-tension unit in a form suitable for building up any required size of battery.

The unit in question contains six large-capacity cells, thus providing 9 volts per unit. The cells are housed in a neat wooden case, 5 $\frac{3}{4}$ in. by 4 in. by 3 in. high. The cells themselves contain a circular zinc surrounding a porous pot, which contains the carbon and depolariser elements. The tops of the cells are coated with compound to prevent creeping, and altogether the unit forms a very neat section, so that any required voltage can be built up by adding

as many sections as are required. Moreover, the battery is always complete, whatever number of sections in use.

On test, we obtained good life at heavy

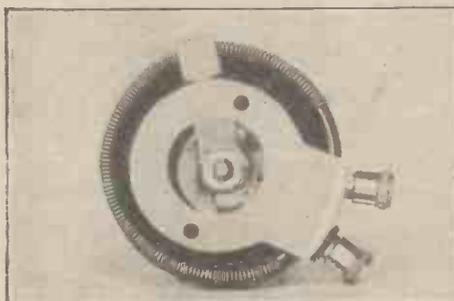


Eton Glass H.T. Battery

discharges of 20 to 25 milliamps from the battery, which undoubtedly forms an interesting contribution to the problem of the provision of high tension.

Lisenin Universal Rheostat

A RHEOSTAT of universal application should find its place in many receivers. Sometimes panel and sometimes baseboard mounting is preferable. The Universal rheostat, made by the Lisenin Wireless Co., of Connaught House, 1a Edgware Road, Marble Arch, W.2, has been designed with the object of meeting this need. It is similar in construction to the ordinary types of rheostat, a circular resistance unit being carried on a framework which serves as a bearing for the moving contact arm.



Lisenin Universal Rheostat

The bearing is arranged to give single-hole fixing if the instrument is mounted on the panel, and a neat engraved scale shows the position of the moving arm.

The other end of the framework, however, is bent round to form a foot. This is

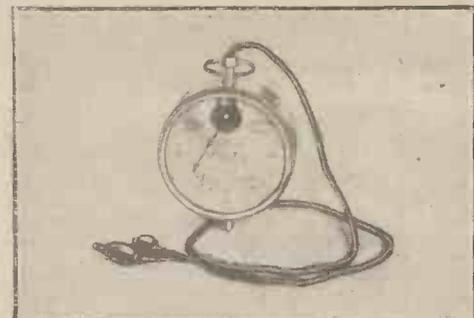
of large diameter and is provided with two holes so that it can be readily screwed down to the baseboard. Thus the rheostat can be mounted in a horizontal position if desired.

In this position the engraved scale is still retained, and can be fixed in place by screwing down the single-hole fixing nut. Access to the fixing holes when baseboard mounting is used is quite easily obtained by removing the knob and dial, while the arm is sufficiently springy to give a good firm contact without any harshness. We can without any hesitation recommend this component to readers.

Sifam Voltmeter

IT is with pleasure that we welcome a new pocket voltmeter marketed by Sifam Electrical Instrument Co., Ltd., 10a Page Street, Westminster.

It is a moving-iron instrument provided with two ranges, one reading up to 6 volts for ordinary L.T. work and the other up to 120 volts for H.T. testing. The positive terminal is common, while two leads are



Sifam Pocket Voltmeter

provided terminating in spikes with insulated grips for the two negative terminals, according to the range required. The two leads are coloured red and black respectively, corresponding to the scales on the instrument.

In considering the performance of such an instrument it is necessary to bear in mind the circumstances. A meter of this nature is intended for a rapid test, and can therefore take a fairly heavy current momentarily. Moreover, a dead-beat movement is not necessary. We found the needle came to rest quite rapidly enough for practical purposes, while the current consumption was not excessive. The full scale deflection required 30 milliamps on the high-tension range and two to three times as much on the low-tension, where, however, the consumption is of less importance. The accuracy we found good, the readings being, if anything, a trifle high.

Let "Amateur Wireless"
solve your problems

WITHOUT FEAR OR FAVOUR



A Weekly Programme Criticism by Sydney A. Moseley

I WONDERED why the Armistice Day service began at exactly 10.46 a.m. I thought they must have cut it very fine. As it was, the Bishop of Dover's address was cut short, and I am perfectly certain that before that happened lots of people were wondering whether he would be overstepping the time. On such an occasion the two minutes' silence is more impressive than any words.

As soon as Rex Palmer announced that the audience at the Queen's Hall had been asked not to applaud I said that was impossible; and, sure enough, from force of habit the audience did applaud—but once only. They restrained themselves admirably after that.

The Director-General certainly threw a bombshell into his own home by his frank criticism of the Children's Hour and variety. In regard to the latter he bears out the criticisms I have made in these columns. But as for the Children's Hour I don't think he will find everybody agreeing with him. I often listen, and believe they are very well done on the whole, considering that some new stunt has to be organised every day and sometimes twice a day. Of course, I take it that Sir John did utter these words, although if they were torn from the context, as words sometimes are, they might have meant something entirely different.

When I listened to Keith Falkner singing, I thought for a while that it was Harold Williams! He sang songs by Frank Bridges, Stanforth, Sergeant, and Blow as only a master could. Elizabeth Schumann gave delightful renderings of German songs, but I wish she had included one or two of the better known songs.

The gentleman who read the racing results on Armistice Day did so to very slow music. Whether he was endeavouring to read illegible writing I don't know, but he read as if he were tick-tacking the results to people in the country somewhere— yokels who had never heard the names of the horses before. It ought to be rather obvious that only listeners actually interested in racing want to hear the results at all, and these know the names of the horses by heart. Yet he stopped once or twice after pronouncing the names, to spell

them out, and repeated another most reverently!

Whether racing results in full should be afflicted on all listeners is open to doubt, for people sufficiently interested in racing invariably buy newspapers, and book-makers certainly don't need to be told!

The good old Roosters with their war reminiscences are certainly welcome, especially at this time of the year, and I am only sorry that they had time to give only the first part of their wonderfully realistic turn. Perhaps we will have an opportunity a little while hence of hearing the funny "crown and anchor" and "parade" episodes.

The Prince of Wales has a good wireless voice and is regarded, officially, as one of the best speakers. He must have been speaking from St. James's Palace, however, for had he been in the studio he would have had the warning before him forbidding everybody except the announcers to say "Good evening" and "Good night," a rite which I think is cold and unnecessary. I was glad H.R.H. broke it so charmingly.

I was left to expect, by friends who had heard the rehearsals, that *The Cousin from Nowhere* was good stuff, but this play—like others put over by the B.B.C.—is

good propaganda for drinking, and I hope the B.B.C. is getting royalties from Mr. Bung. Mr. Huntley Wright's gags were full of very ordinary allusions to kummel, burgundy, and beer. He apparently misunderstands the initials B.B.C., which have nothing to do with alcohol.

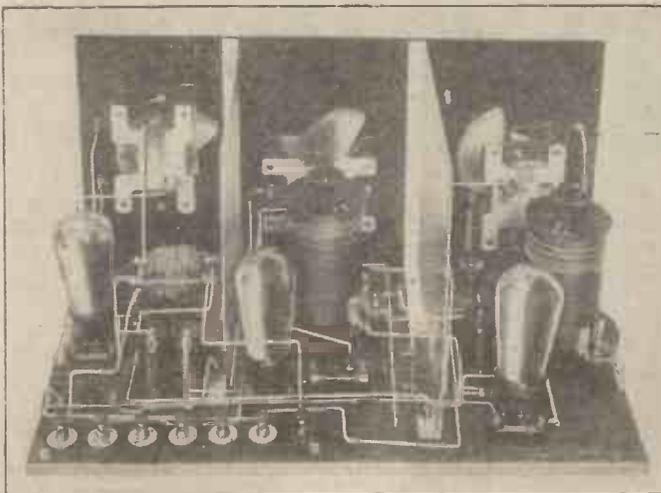
Poetry-reading, alas, ain't so popular with the populace, as mother said it should be! But those poems read by Mr. Filson Young weren't so bad, although his extemporary comments between the poems resulted in a little uncertainty of expression. Mr. Young is one of the distinguished band of official critics, so he won't mind this little well-meaning criticism from me.

Sir Walford Davies' Male Voice Choir showed fine drilling, and the choirmaster proved that he is as practical as he is a good theorist. If I may venture a criticism, however, the words were not clearly enunciated.

A definite success among the variety turns the other evening was Mr. Fred Lewis in impersonations. His "Harry Weldon" was a masterly piece of mimicry, and even deserved the applause of the *claque* in the studio. Marion and Herbert were also good, and altogether the turns were much better than usual.



ARMISTICE DAY BROADCAST FROM CANTERBURY CATHEDRAL
Troops arriving at the Cathedral for the service that was broadcast to the Empire



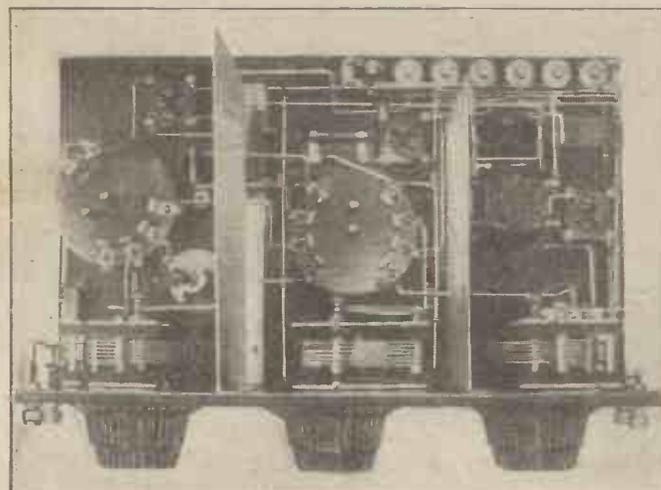
Particular Attention has been given to the Layout

THOSE readers who employ high-frequency amplification in their normal receivers (and they must be in the majority by now) will realise the difference which a high-frequency stage makes to the tuning. The reception of a particular distant station is a matter of comparative ease instead of one requiring a certain manipulative skill almost akin to juggling.

In the short-wave field our method of reception at the present time usually consists in making the detector circuit as efficient as possible and following it by one or more stages of note magnification. The reception of America or Australia is a matter of comparative ease to the expert, but one of no little difficulty to the novice, since it requires considerable skill in tuning and the adjustments are of a distinctly critical nature.

Easier Tuning

It would appear, therefore, that if high-frequency amplification could be obtained before the detector, tuning would be much simplified, even if the actual strength of signals finally obtained was not very much greater than before. Unfortunately, this



Effective Screening is Provided

has not been found possible, in general, up to the present. Circuits which are perfectly satisfactory on broadcast wavelengths will not function correctly on the very short waves owing to the very much higher frequency involved.

In an ordinary broadcast set we have leakages between the primary, neutralising and secondary windings on the transformers employed which are kept low, but which, nevertheless, exist. They do

not cause any appreciable trouble in normal working, but if we attempt to use such transformers on very short waves the leakage effect becomes very serious. Capacity couplings again can be reduced to a small value for broadcast work when they cause us no further trouble, but each individual capacity may give rise to uncontrollable reaction if the same methods are applied to short-wave work. Couplings often exist in receivers due to single-turn coils formed by the wiring itself, while there is often quite an appreciable coupling between various circuits due to direct coupling taking place through the medium of the filament.

Special Methods

All these points become of outstanding importance at very high frequencies and have all conspired to render satisfactory H.F. amplification impracticable in the past. The problem has recently been investigated thoroughly, however, by a group of engineers at the Igranic Electric Company, as a result of which they have devised some high-frequency transformers in which the leakages have been reduced to very small values. The use of these transformers coupled with suitable precautions in the actual wiring up of any receiver enables really stable and efficient high-frequency amplification to be obtained prior to the detector valve.

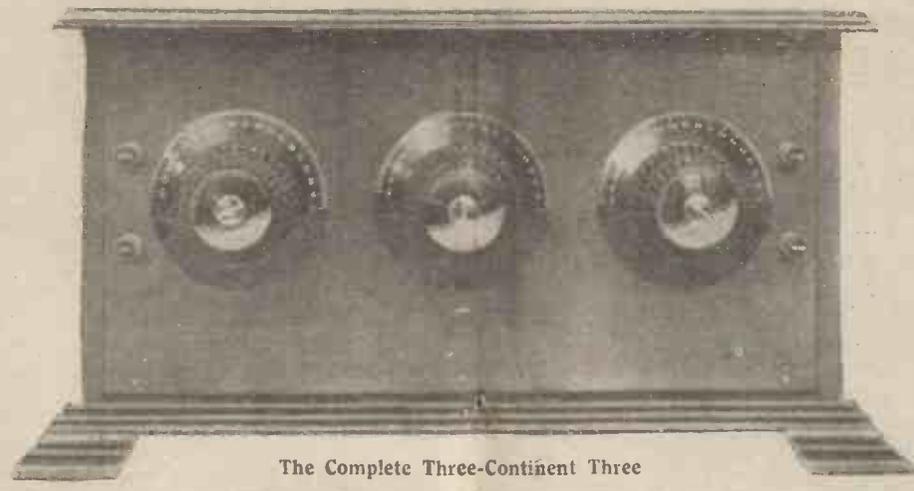
As an example of the efficiency of the system, the fact may be cited that America has been heard at clear telephone strength as early in the evening as 5.30 p.m., while Australia (2FC) can often be received on the loud-speaker with H.F. det. and one L.F.

A Short-wave Receiver Incorporating Fixed and Stable H.F. Amplification—a new and very desirable feature for Short-wave Work



THE Three-Continent Three

Designed by J. H. REYNER, B.Sc. (Hons.), A.M.I.E.E.



The Complete Three-Continent Three

The circuit of the Three-Continent Three is in many respects perfectly straightforward. There is the customary tuned-grid circuit with a loose coupled aerial. The anode circuit of this valve is connected to H.T. through a short-wave choke, the high-frequency current passing first through the primary of the H.F. transformer and then down to earth through a .001 condenser. The secondary circuit of

the transformer is tuned and the voltages are applied across the grid and filament of the detector valve through the usual condenser and leak to obtain rectification.

Neutralising

Neutralisation is effected through the medium of two neutralising windings, one coupled to the aerial coil and the other to the H.F. coil. The amount of coupling is

controlled by a neutralising condenser in series. This method of neutralising is a little unusual, but since the neutralising coils are very tightly coupled to the secondary coils, they act as tapplings on the tuned circuit, so the method is really only a variant of the original grid-to-grid neutralisation of Hazeltine.

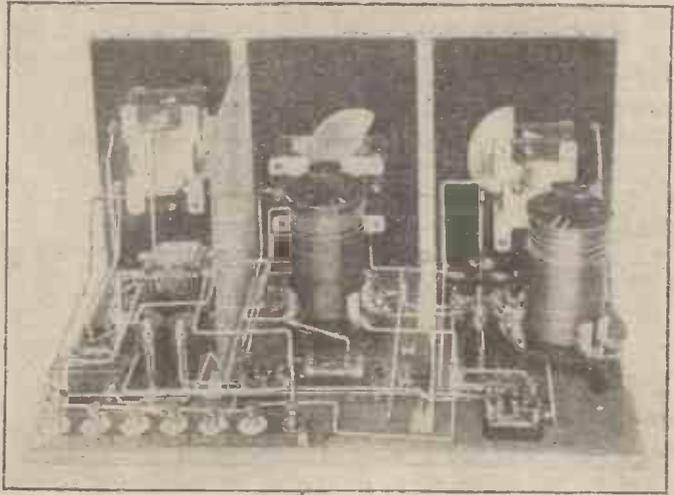
Reaction is applied through a condenser-controlled circuit coupled to the secondary of the H.F. transformer in the normal

manner, this system giving a smooth and even control over the oscillations. The current is passed from the anode of the detector valve through to the primary of an ordinary L.F. transformer, the L.F. stage being normal in every respect. Before reaching the transformer, however, the current has to pass through a double high-frequency filter which consists of two high-frequency short-wave chokes in series, with two by-pass condensers running down to the negative.

Layout

In any receiver, layout exercises an important effect upon the results obtained. In this particular instance, the question of layout is of more vital importance. The engineers of the Igranic Electric Company, who evolved this system of amplification, spent several months trying different layouts in order to overcome various practical troubles. I myself have carried out various experiments with this particular system, in the course of which a number of layouts were tried. The particular layout adopted in this receiver *should not be deviated from in any particular.*

There are two important points about the wiring up. In the first place the connections between the coils and the tuning condensers have been kept as short as possible and the two leads have been run as near together as possible. This is to avoid the formation of closed loops in the wiring. Such leakage inductance, as it is called, will upset the neutralising adjustment so that it will not hold good over the whole scale. The actual leads

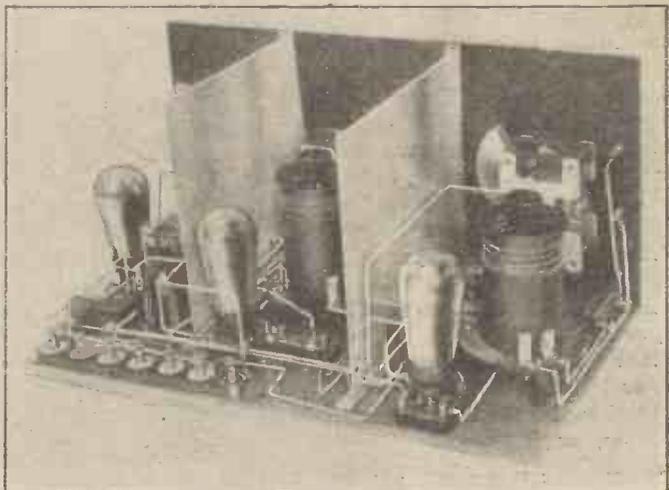


The Wiring is Straightforward

between the two circuits and the valve-holders are fairly long and are kept separated. These leads normally carry no current so that their length, within reason, is immaterial.

Secondly, all earth potential points in any one circuit have been connected as far as possible to *one point*. It is not sufficient to pick up a negative L.T. point at some convenient place, because the inductance of the leads is sufficient at the high frequencies involved, to introduce feed-back into the various circuits. It will be noticed that I have run a negative bus-bar right along the back of the set and the various earth connections of the circuit are taken to this bus-bar *as near as possible to the valve-holder concerned*, so that the possibility of feed-back due to direct coupling is avoided.

Finally, it will be observed that the moving plates of the condensers have been connected directly to the bus-bar instead of taking a somewhat shorter connection between the bus-bar and the coil. This is done to avoid hand effect so that the moving plates shall definitely be at earth



The Receiver is Neat in Appearance

potential. The importance of this will be appreciated when it is realised that the tuning coils on the short waves only contain some 10 in. or 12 in. of wire.

Screening

A capacity screen is placed in between the H.F. and the detector circuit while a

Four terminals, marked Aerial, Earth, L.S.—, L.S.+ (Belling and Lee).

One 7-way terminal strip marked H.T.+ , H.T.—, L.T.+ , L.T.—, G.B.+ , G.B.— (Aermonic).

*These components are obtainable as the Igranic Short-Wave Amplifier Kit. Extra transformers covering a range of 30 to 70 metres are obtainable if required.

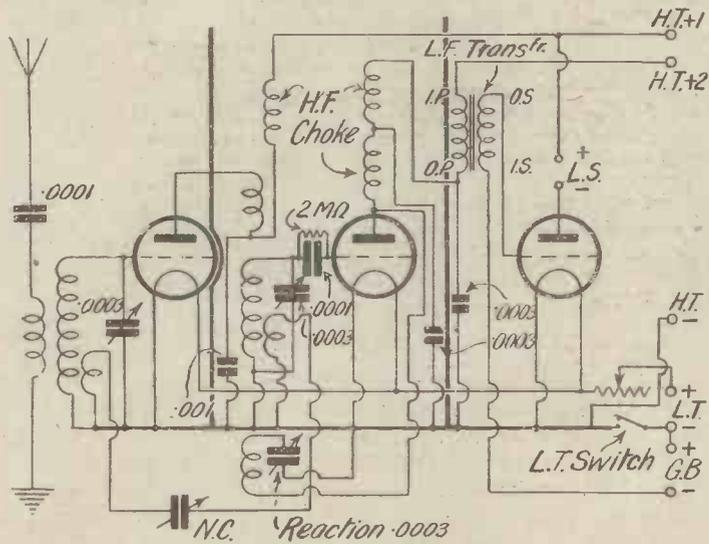
Construction

The first operation is the marking out of the panel for the three condensers. It may be remarked in passing that it is essential to use condensers which do not project too much from the back of the panel. The condensers should be mounted in the positions shown, the two pairs of terminals on each side and the on-off switch underneath. Finally, drill

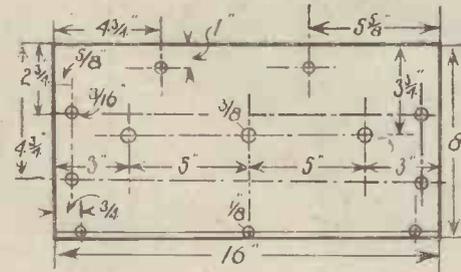
the two holes for fixing the screens in position as shown when the panel may be placed on one side. Next lay out the components on the baseboard as indicated on the photographs and diagram. The use of a full-size blueprint (price 1/-) is helpful in this respect, since the layout of the original receiver should be followed as carefully as possible

Next take one of the two screens provided, both of which are the same, and with a pair of shears or old scissors cut a strip 1 1/4 in. off the edge farthest away from the panel. Make quite sure that you cut this strip off the right end. The effect is to give 1 1/4 in. more baseboard space at the back where the terminal strip runs.

(Continued on page 796)



Circuit of "Three-Continent Three"

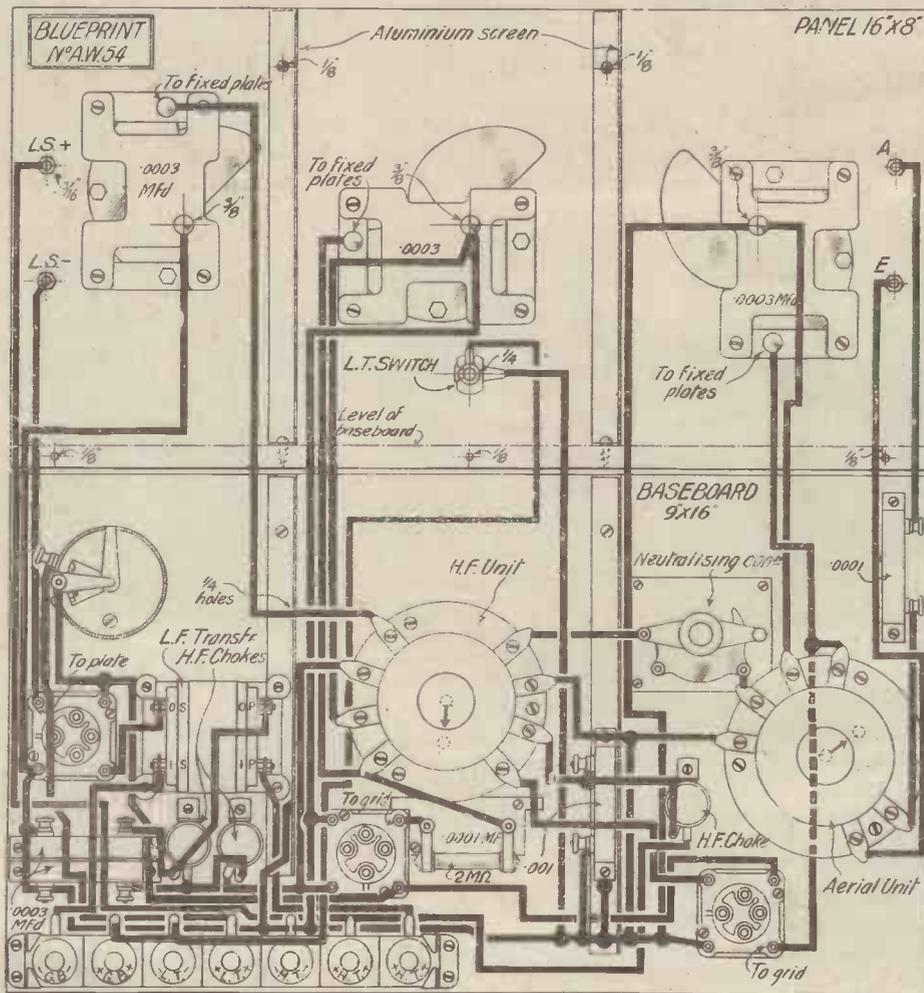


Details of Panel Drilling

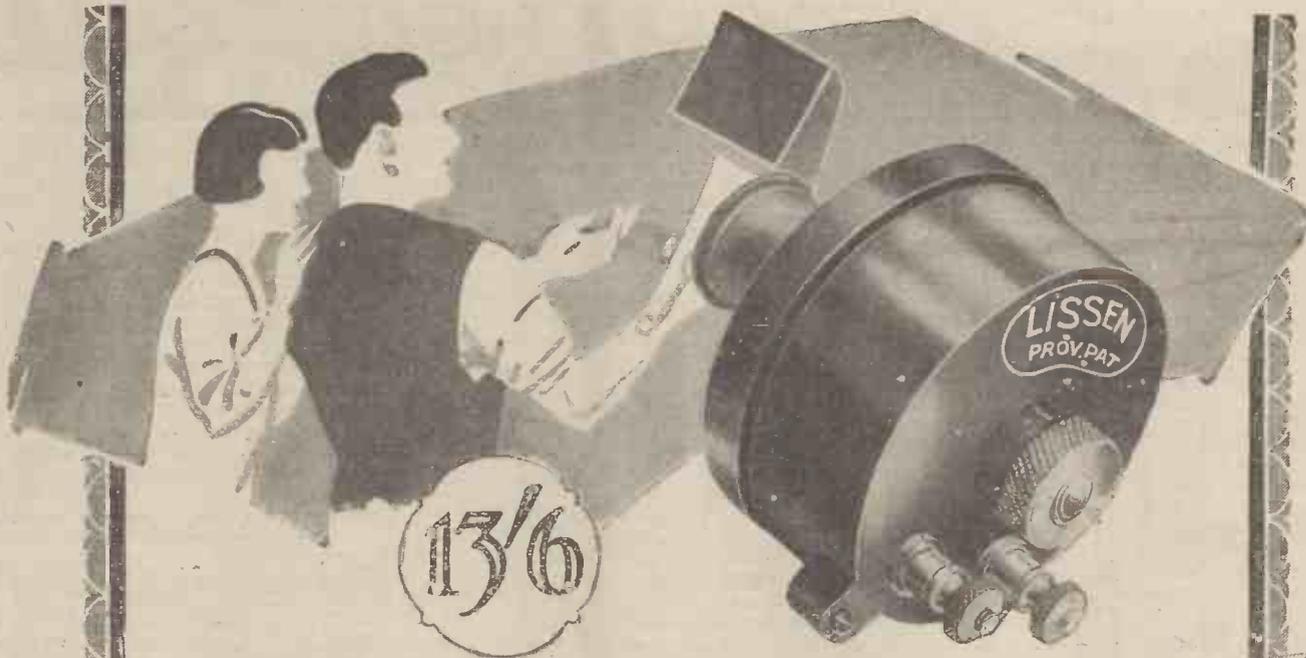
second screen is placed between the reaction condenser and the detector condenser. This is done partly to avoid H.F. getting into the L.F. stages, but also to avoid coupling between the reaction condenser and the first H.F. The single screen between H.F. and detector stage does not entirely obviate this, and the second screen is found very desirable in this case.

List of Components

- One panel 16 in. by 8 in. by 1/4 in. (Raymond, Ebonart, Becol, or Peto-Scott).
- One baseboard, 16 in. by 9 in. (Camco, or Raymond).
- Three .0003 condensers, square-law type with slow motion dial (Ormond, Jackson, Cydon, or Formo).
- *Two special short-wave H.F. transformers, 15 to 40 metres (Igranic).
- *Two mounting bases for H.F. transformers (Igranic).
- *Two aluminium screens (Igranic).
- *Three special H.F. chokes (Igranic).
- One baseboard-mounting neutralising condenser (Peto-Scott, Wearite, or Lissen).
- Three low-loss valve-holders (Bowler-Lowe, Whiteline, Lissen, or Raymond).
- Two .0001 fixed condensers (Lissen, Dubilier, or Melhuish).
- Two .0003 fixed condensers (Lissen, Dubilier, or Melhuish).
- One .001 fixed condenser (Lissen, Dubilier, or Melhuish).
- One baseboard-mounting rheostat, 6 ohms (Lissen, or Igranic).
- One on-off switch (Wearite, Trix, or Lissen).
- One L.F. transformer 4 to 1 (B.T.H., R.I. and Varley, or Powquip).



The Wiring Diagram of the "Three-Continent Three" (Blueprint available, price 1/-)



Now no home need lack a Loud Speaker

The introduction of the LISSENOLA at the amazingly low price of 13/6 created an unparalleled stir. Unbiased critics seated behind a screen and asked to distinguish between a thirteen-and-sixpenny LISSENOLA and other loud speakers selling at several pounds have been completely at a loss.

Make the test for yourself: go to your nearest dealer and ask him to put on the best loud speaker in his stock. Then use the same horn on the Lissenola, and see if you can notice any difference.

THE LISSENOLA is sold exactly as illustrated above, and with every instrument are simple directions and full-size exact patterns which show you clearly how for a few pence to make a horn of proved efficiency to attach to it. Or if you possess a gramophone or any loud-speaker horn—or any horn or trumpet—that will serve admirably.

GET A LISSENOLA for your home—and build yourself a loud speaker fully equal in performance to the finest that money can buy. You can cover the horn with fancy paper, or wallpaper, and paint it to resemble a factory article. Also by using the "Lissen" Reed (sold separately for 1/-) the Lissenola will carry a cone, or any other diaphragm working on the reed principle.

Your dealer will gladly demonstrate and supply—or send postal order direct

BUY THE LISSENOLA and build your own loud speaker

LISSEN LTD. (Managing Director: T. N. COLE), Lissenium Works, 16-20, Friars Lane, Richmond, Surrey.

Phone: RICHMOND 2285 (4 lines).

Grams: "Lissenium, Phone, London."

The "Lissenola" instantly converts any gramophone into a loud speaker.

A cone diaphragm loud speaker can easily be constructed. The illustration shows one method of mounting.

Full directions for making this horn are given with every "Lissenola."

Another way of utilising the cone diaphragm method of construction.

The "Lissen" Reed Attachment (pat. pending) for use with cone diaphragm loud speaker. Price 1/-.
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**THERE'S
FIGHTING SPIRIT**
in
every LISSEN Battery

which stubbornly resists volt drop, which resists the strain of the longest programme—a fighting spirit which never tires, which sustains the energy of the battery throughout the longest period of use, maintaining the electronic emission of the valves always at a high value. And this energy is the result of the free oxygen liberation of each cell, which is copious beyond description because of the new chemical combination and process of making which is known only to LISSEN.

Whenever there is a fine piece of music broadcast, hear it with a LISSEN Battery in your set, and you will appreciate a new power smoothness and a new tone clarity in your loud-speaker which was never there before.

10,000 dealers are now selling the LISSEN Secret Process Battery at a price which has been made low to bring it within the reach of all. Next time you want a good battery take no other than a LISSEN, and your insistence will be rewarded by the vastly improved reproduction of your next radio programme.

LISSEN

SECRET PROCESS

BATTERY

Now 7/11

60 volts (reads 66) 7/11
100 volts (reads 108) - 12/11
9 volts (grid bias) - 1/6

LISSEN LIMITED, 16-20 FRIARS LANE, RICHMOND, Surrey

Managing Director: THOMAS N. COLE

L 416

RADIOGRAMS



ATMOSPHERICS, it seems, are no match for the bagpipes. Reception in Canada of the Empire broadcast from the Albert Hall on November 11 was hindered by bad atmospherics, according to the Ottawa station of the Canadian National Railways. The speech of the Prince of Wales' lost continuity through fading; the trumpeters were heard indistinctly and the fife's got through with difficulty. But the skirl of the bagpipes was heard as though they were being played in a local studio.

For a new revue entitled *The Snow Boat*, by Peter Cheyney, to be broadcast from 2LO and 5XX on November 26, a specially strong caste has been engaged; it includes such well-known names as Arthur Chesney, Ewart Scott, James Whigham, Mary O'Farrell, Alma Vane, and Elsie Carlisle.

On November 24, Manchester and 5GB listeners are to be given a relay of a Halle concert in which Albert Sammons, assisted by the orchestra, will play the Mendelssohn Concerto in the interval. Edward Isaacs will give a piano recital from the Manchester studio.

Cinderella Married, a play by an American authoress, Rachel Lyman Field, will be broadcast from 5GB on December 6. For the first time the British public will be told what happened to the little kitchen-maid after her marriage to the prince.

Kiddielogues is the title of a series of childish impressions from the pen of Eileen De Mancha, with music by H. C. G. Steyens. Miss Lilian Braithwaite will interpret them at the London studio on December 3.

Listeners to the 2LO programme on December 1 will be given an opportunity of studying the methods of two quartets, the first being the Zaaloffs, who are Russians, and the second the Four Admirals, who hail from the other side of the Atlantic.

The Rose of Persia, a comic opera by Basil Hood, with music by Sir Arthur Sullivan, is to be broadcast from 2LO and 5XX on December 2.

For its entertainment on December 6 the Birmingham studio (via 5GB) is to take you back to the Victorian era, when you will be invited to join a party in which old-fashioned parlour games are to be played.

During the Bristol Opera Season, which is being held at the Victoria Rooms, Clifton, the Cardiff station on December 7

will relay an opera, *The Travelling Companion*, by C. Villiers Stanford, the principal roles being taken by Stewart Wilson,

DO YOU KNOW?

1. When the Writtle station first opened?
2. Who made this station famous?
3. What is the modern equivalent of the Leyden jar?
4. What is an antenna?

Puzzle your friends with these queries; the answers will be given in next week's issue of "A.W."

Answers to Last Week's Queries: (1) Dr. Fleming. (2) A description of the Carpentier-Lewis fight. (3) A quarter of the true wavelength. (4) A terminal.

Arthur Cranmer, Johnson Douglas, Louise Trenton, Dorothy D'Orsay, and Leyland White.

Daventry Experimental (5GB) will take from London on December 8 a play entitled *St. Francis D'Assisi*, by J. Vaughan Emmett, based on an English translation of Sabatier's great work. Listeners are to "see" this play as if it were performed by Italian peasants on the hill-side close to the town of Assisi.

The wild and woolly days when gold had



M. Alfredo, whom with his Dance Band we frequently hear from the New Princes Restaurant

just been discovered in the backwoods of America will form the basis of the Newcastle "Wild West" programme on November 29.

Practically the entire play, *Oliver Cromwell*, by John Drinkwater, is to be presented in the Glasgow studio on November 25. The part of Cromwell is to be taken by William J. Rea, and a large number of the Scottish National Players are also in the caste.

5SC's Radioptimists are proving a very popular combination with listeners, and on November 24 they are to continue "to radiate cheerful chants and chatter."

Listeners to the Aberdeen station, and particularly those located on the Moray Firth coast, are complaining bitterly of the extraneous noises that 2BD is suffering badly from with Continental stations. In some parts of the north of Scotland it is now found that the best and clearest broadcasts are obtainable from Frankfurt, Hamburg and Langenberg.

As a new experiment six plays are being included in the schools transmissions from Glasgow during the present term. These will be *Abraham Lincoln*, *Twelfth Night*, *Prunella*, *The Tempest*, *She Stoops to Conquer*, and *Richard II*.

What is perhaps the first public warning to be broadcast was that recently sent out by a gas company in Philadelphia warning customers that the gas supply had been temporarily discontinued owing to an accident to a large gas main.

The Czecho-Slovakian broadcasting authorities have expressed their intention of increasing the power of the Brunn, Kosice, and Bratislava stations; the old transmitters will be transferred to other districts not yet determined. The 1928-9 programme also comprises the construction of a 30-kilowatt transmitter in the immediate neighbourhood of Brandels on the Elbe.

Improvements in the Vienna (Rosenhugel) high-power station are being rapidly carried out, and it is hoped that by Christmas transmissions from this station will be heard at better strength in distant countries.

The Angora (Turkey) broadcasting station is now transmitting nightly on a wavelength of 1,800 metres; its power for the present is the same as that of Stamboul, namely, 6 kilowatts.

The Berlin broadcasting station shortly intends to make an experiment in the transmission of a complete opera in which the principal songs, duets, and quartets will be given from gramophone records, the whole production to be linked together by the station orchestra. By this means it is thought possible to produce a radio version of a famous opera to which both famous dead and living singers will contribute.

*The Old Musician says—
Six-Sixty are best*



There is nothing the old man likes better than to sit before the fire and hear the notes of his beloved 'cello coming through the Wireless Receiver. But it must be a faithful and true reproduction—the slightest flaw jars on his sensitive ear.

For months he tried using different valves, but, NO, there was always some imperfection. Then one day he bought Six-Sixty and the results were marvellous. Now you see him, months later, with a happy smile of satisfaction on his face—for he is listening to music which he knows is a life-like reproduction.

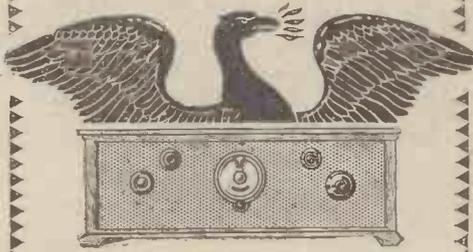
You want your receiver to yield these results, don't you? Well, follow the lead of the old musician and ask for Six-Sixty.

Note.—The Manufacturers will be pleased to forward an attractive brochure which describes the full range of 2, 4 and 6 volt valves in the famous Six-Sixty range. Send a Postcard.

**SIX-SIXTY
GLOWLESS VALVES**

The Electron Co. Ltd., 122-124, Charing Cross Road, London, W.C.2

Unlimited Stations, ONE-DIAL TUNING



The Phoenix Five

A new one-dial-tuning receiver, by J. H. Reyner, B.Sc., A.M.I.E.E. (who, a year ago, designed the SOLODYNE), embodying all the experience gained by him with that famous five. Complete constructional details are given in the "WIRELESS MAGAZINE" for December, now on sale. Full-size blueprint available.

Other Contents include—

CONCORD THREE-FOUR; can be used as a broadcast receiver or Gramophone Amplifier—TUNED-ANODE THREE FOR THE MAINS; worked straight off a Direct-Current Supply—BRITISH BROADCAST TWO; detector with reaction and one L.F. stage. VOLUME CONTROL UNIT—BATTERY ELIMINATOR—HALF-HOUR CRYSTAL SET—"How to get Volume Without Distortion," by Capt. H. J. Round, M.I.E.E.; "What is Wrong with British Broadcasting," by H. de A. Donisthorpe; "Empire Broadcasting on the Way," by B.B.C. Officials; "Those Amazing Short Waves!" by E. H. Robinson (5YM); "The Cat That Hated Radio," a wireless story by Donovan Bayley.

Full-size blueprints of above sets supplied to readers at half-price until December 31st.

WIRELESS MAGAZINE

for December - 1/-
Get a copy from
Your Newsagent Now

"The Three-Continent Three"

(Continued from page 790)

Before finally screwing the components down place the panel temporarily in position and ensure that there is adequate clearance for every component.

Wiring Up

For the wiring up the panel should be screwed definitely in place, but it will be found desirable to remove the second screen (i.e., the one between the detector and the L.F. stages) during the preliminary operations. This allows free and ready access to the coil sockets.

When the detector and H.F. valves have been wired up the second screen may be inserted in position and the reaction circuit wired, after which the L.F. stages may be completed.

The receiver is then ready for test. As stated earlier the principal feature of its operation is the ease with which the stations can be tuned in, and as evidence of this fact, I tested the receiver when it was first completed without slow-motion dials. To attempt to receive America on an ordinary set without a slow motion adjustment would have been almost lunacy, yet I was able, with comparatively little trouble, to tune in America at good strong telephone strength.

[The operation of The "Three-Continent Three" will be detailed in our next issue.—Ed.]

CHIEF EVENTS OF THE WEEK

LONDON AND DAVENTRY (5XX)	
Nov. 27	Military band programme.
" 28	National symphony concert, conducted by Sir Landon Ronald.
" 29	Variety programme.
" 30	Scottish programme.
Dec. 1	Hallé concert, S.B. from Manchester.
" 2	<i>The Rose of Persia</i> , a musical comedy.
" 3	Variety programme.
DAVENTRY (5GB)	
Nov. 27	<i>The Messiah</i> , an oratorio, by Handel.
" 28	<i>Tilly of Bloomsbury</i> , a comedy in three acts, by Ian Hay.
" 29	<i>The Rose of Persia</i> , a musical comedy.
" 30	Symphony concert.
Dec. 1	Music and Shakespeare from Birmingham.
" 2	London programme.
" 3	<i>The Masque of Comus</i> , by John Milton.
BOURNEMOUTH	
Nov. 29	Songs by Richard Strauss and Hugo Wolf.
Dec. 3	A sea programme.
CARDIFF	
Nov. 29	A programme by victors at the National Eisteddfod, Holyhead, 1927.
MANCHESTER	
Nov. 28	<i>Good Hunting Old Chap</i> , a play based on the story by Sapper.
Dec. 1	Hallé concert, relayed from the Free Trade Hall.
" 2	"The Duds" Concert Party.
NEWCASTLE	
Nov. 29	<i>An Evening in the Wild West</i> .
GLASGOW	
Nov. 30	St. Andrew's Day concert.
ABERDEEN	
Nov. 29	An octet concert.
BELFAST	
Nov. 29	<i>La Mascotte</i> , a comic opera in three acts.
Dec. 2	A Post War Cocktail.
" 3	A concert arranged and presented by Madame Drinkwater.

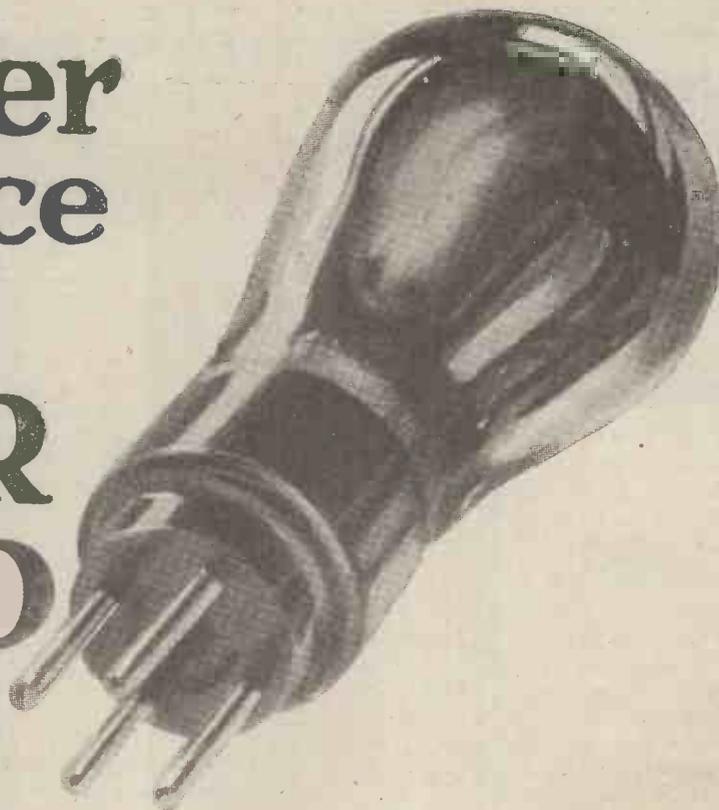
BLUEPRINTS

Full-size Blueprints each one being a photographic contact print, from the draughtsman's original design, and produced on stout paper, are now available of the following sets.

	No.	Price, post free.
ONE-VALVE SETS		
One-valve for Frame Aerial	W.M. 4	1 0
One-valve All-wave Reinartz	A.W. 2	1 0
All-in-all One-valve	A.W. 13	1 0
Hartley DX One-valve	A.W. 27	1 0
Alpha One*	W.M. 26	1 3
Reinartz Plug-in One-valve	A.W. 46	1 0
TWO-VALVE SETS		
All Broadcast Two	W.M. 5	2 3
Safeguard Two	A.W. 3	1 0
Two-valve, embodying K.L.I. Valves	A.W. 5	1 0
One-control Two	A.W. 6	1 0
Wide-world Short-wave Two	A.W. 11	1 0
All-wave Two-valve	A.W. 15	1 0
Loftin-White Two*	W.M. 20	1 3
Reinartz Two	A.W. 21	1 0
Remote-control Two	A.W. 23	1 0
One-dial Two	W.M. 23	1 0
Empire Short-wave Two	A.W. 28	1 0
Screened-trap Two	A.W. 31	1 0
"Next-step" Receiver	A.W. 34	1 0
Girdle Two*	W.M. 30	1 3
Centre-tap Two	A.W. 42	1 0
Mains-fed Two	W.M. 37	1 0
Three-option Two	A.W. 51	1 0
The Rover Two	A.W. 53	1 0
British Broadcast Two	W.M. 44	1 0
General Purpose Two	A.W. 55	1 0
THREE-VALVE SETS		
One-knob Three	W.M. 3	1 0
Continental Three	W.M. 7	1 0
Shielded Searcher	W.M. 8	1 0
Victory Three	A.W. 9	1 0
Regulator Three	A.W. 12	1 0
Hi-mu R.C. Three*	W.M. 9	2 0
M.C.3 Star	A.W. 16	1 0
Wave-catcher Three	W.M. 19	1 0
Excelsior Three	A.W. 20	1 0
Split-primary Three	A.W. 24	1 0
Lighthouse Three	A.W. 29	1 3
Purity Three-valve	A.W. 33	1 0
A Modern Tuned-anode Three	A.W. 35	1 0
Tetrode Three, for Shielded Valves	A.W. 36	1 0
Alternative programme Three	A.W. 38	1 0
A "Mains" Three-valve	W.M. 34	1 0
Screened-grid Three	W.M. 21	1 0
"Simpler Wireless" All-from-the-Mains Receiver	A.W. 41	1 0
"Simpler Wireless" Special Three-valve Station	A.W. 44	1 0
"Home Station" Three	A.W. 45	1 0
The "Economy" Three	A.W. 48	1 0
Five-guinea Three	W.M. 29	1 0
Dominions Short-wave Three	W.M. 39	1 0
Short-wave Three	A.W. 50	1 0
The Ether Searcher Three	A.W. 52	1 0
Three Continent Three	A.W. 54	1 0
Tuned-anode Three for the Mains (D.C.)	W.M. 43	1 0
THREE-FOUR-VALVE SETS		
A Tuned-anode Three-four	A.W. 49	1 6
Concord Three-Four	W.M. 45	1 6
FOUR-VALVE SETS		
Paradyne Four	W.M. 2	1 6
M.C. Four	A.W. 8	1 6
Distance Getter	A.W. 10	1 6
Household Four	A.W. 17	1 6
DX Four	A.W. 18	1 6
Revelation Four	W.M. 24	1 6
Auto-selector Four	W.M. 35	1 6
"A.W." Grammo Radio	A.W. 40	1 6
All-purpose Four	A.W. 43	1 6
All-wave Roberts Four and copy of "A.W."	A.W. 47	0 4
FIVE-VALVE SETS		
1927 Five	W.M. 6	1 6
Two-valter's Five	W.M. 11	1 6
Individual Five	A.W. 25	1 6
Exhibition Five	W.M. 33	1 6
Phoenix Five	W.M. 42	1 6
SIX-VALVE SETS		
Nomad Six	W.M. 31	1 6
SEVEN-VALVE SETS		
Simpladyne Seven (Super-het.)	W.M. 22	1 6
AMPLIFIERS		
All-broadcast Amplifier	W.M. 10	1 0
Two-valve D.C. Mains Amplifier	W.M. 16	1 0
Gramophone Amplifier	W.M. 32	1 0
Range Extender (H.F. Amplifying Unit)	W.M. 38	1 0
PORTABLE SETS		
Springtime Portable (Two-valve)	W.M. 12	1 0
Countryside Four	W.M. 17	1 6
Motorists' Portable Four-valve	A.W. 14	1 6
M.C. Three Portable	A.W. 22	1 0
Handy Three	W.M. 27	1 0
Holiday Portable (three-valve)	A.W. 32	1 0
Club Portable (three-valve)	A.W. 30	1 0
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Crystal Set for the R.C. Enthusiast	W.M. 13	0 6
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MISCELLANEOUS		
Loud-speaker Tone Control & Filter Unit	W.M. 1	2 3
Heterodyne Wavemeter	A.W. 7	1 0
Made-to-measure Wave-trap	A.W. 19	0 6
New Current Supply Idea	A.W. 26	1 0
DX One-valve Unit	A.W. 37	1 0
Volume Control Unit	W.M. 40	0 6
Battery Eliminator for A.C. Mains	W.M. 41	1 0
* With a copy of "Wireless Magazine" complete.		

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Get better performance for a LONGER PERIOD



B 210 H <i>R.C. and H.F.</i>
Fil. Volts ... 2
Fil. Amps. ... 0.10
Max H.T. Volts 150
10s. 6d.
B 210 L <i>General Purpose.</i>
Fil. Volts ... 2
Fil. Amps. ... 0.10
Max H.T. Volts 120
10s. 6d.
B 215 P <i>Power Amplifying.</i>
Fil. Volts ... 2
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Max H.T. Volts 120
12s. 6d.
<i>The above prices are applicable in Gt. Britain and N. Ireland only.</i>

THAT'S the big thing about the new B.T.H. Nickel Filament Valves. They give *better* results in any case than other valves, but, what is equally important, they give those results for a longer period.

The wonderful filament of specially treated nickel possesses certain properties (essential to the perfect functioning of a valve) possessed by no other metal. That is why, when these valves are used, broadcast programmes become uncannily real, and are endowed with an atmosphere which has hitherto been lacking. This re-creation of the transmissions is yours simply by changing over to these modern valves. It is surely good to get these results. It is still better to know that you can keep them. You can, too—for a considerably longer period than with any other valve.

No doubt exists as to the superiority of B.T.H. Nickel Filament Valves, but we ask you to satisfy yourself by trying them in your set. Your ear will do the rest.



VALVES

NICKEL FILAMENT

VALVES

Made at Rugby in the Mazda Lamp Works.

The British Thomson-Houston Co., Ltd.

2872

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



JUST over two and a half years ago E. K. Cole, Ltd., started to specialise in the manufacture and production of Ekco "mains" units, designed to replace H.T., L.T. and G. B. batteries.

Fine-wire Windings

In every battery eliminator, whether for D.C. or A.C. mains, there are a number of fine-wire windings, for smoothing chokes, resistances, and, in some cases, power transformers. These windings need careful handling and testing during the assembly of the units, in order to ensure reliable and consistent working "on load."

It was to see just how this was achieved that an AMATEUR WIRELESS representative recently visited the Ekco works at Leigh.

Before inspecting the processes some interesting facts were learned regarding the firm's activities. The present-day Ekco units, he was told, are the result of ten

BATTERY ELIMINATORS IN THE MAKING

A Visit to a "Mains" unit Factory at Leigh-on-Sea

years' intensive research in eliminating "hum" from the mains, and in this connection the firm holds two useful patents, (1) the system of double-choke feed, whereby the units are equally effective whether the positive or negative main is earthed; and (2) the provision of separate resistances to each H.T. plus tapping.

In the factory itself the scene was an animated one. A group of special coil-winding machines were being "minded" by a row of girl operators. All the L.F. chokes and power transformers in the Ekco units have been for the past eighteen months wound on the premises, in an endeavour to avoid subsequent breakdowns.

Assembly

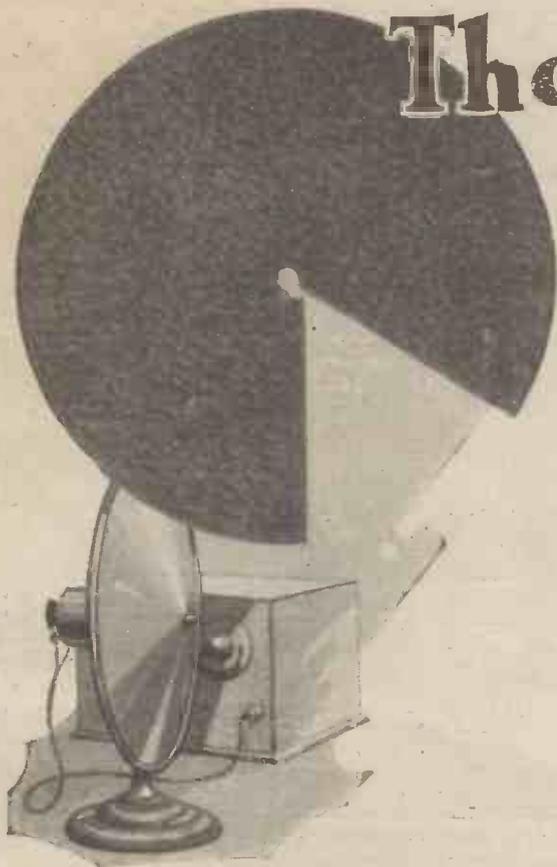
Two units in process of assembly were particularly interesting. There was the little M1 unit, which, it may be remembered, is plugged bodily into the lighting socket. Two small chokes are wound simultaneously on one of the coil-winding machines for each M1 unit which includes, in addition, two resistances and a suitable fixed condenser.

The 3F model for A.C. mains was seen in various stages of assembly; the tapped transformer incorporated to suit all mains

voltages and frequencies was especially noteworthy. This model was seen undergoing tests—and exacting tests they were. The various tappings were tested in conjunction with a meter board for output in milliamperes per so many volts, 5 ma. at 60 volts, 24 ma. at 120 volts, and so on. A Neon-lamp test gave a visual indication of the effectiveness of the smoothing condensers.



A row of M1 Ekco units being filled with black wax



The only perfect Cone material

Perfect because it produces music most naturally and beautifully! Not a note missed or distorted, and you can follow any instrument in an orchestra as if it were playing a solo. This is what you can achieve when your Cone Speaker is equipped with Six-Sixty Cone Speaker Paper. You cannot get these wonderful results with any other material—that is the reason practically all the world-famous Cone Speakers in America are fitted with this material. Its qualities of reproduction are truly amazing.

All you have to do is to purchase one of the well-known loud-speaker units from your dealer, affix it to the Six-Sixty Cone—a job which will take you about ten minutes—and then you can listen-in to wonderful music. In this way you can make a perfect Cone Speaker for less than £1.

Six-Sixty Cone Speaker Paper is made in two sizes, 12 in. diameter and 19 in. diameter, and is sold in a most attractive envelope, with full directions for cutting and mounting.

Don't hesitate to write direct to us if you are unable to obtain it from your local dealer.

Prices: 2/6 (12 in. size) and 3/6 (19 in. size).
Brass Washers, 3d. extra.

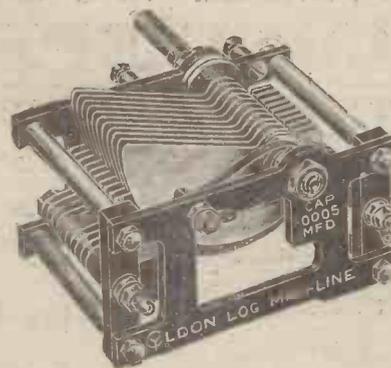
THE ELECTRON CO., LTD., Dept. A.W.
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Build your set with



VARIABLE CONDENSERS

They have been rightly described as "A Supreme Example of Scientific Engineering. There is a type for every purpose, each built to the "Cyldon" standard of perfection, each a means of obtaining better results. Make no mistake, "Cyldon" Condensers are an essential to perfect reception?

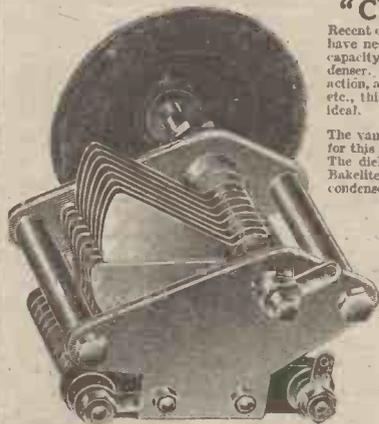


"CYLDON" BEBE CONDENSERS

Recent developments in Radio science have necessitated the use of a small capacity variable air-spaced condenser. For Reinartz circuits, reaction, and balancing stray capacities, etc., this new "Cyldon" product is ideal.

List No.	Capacity	Price
BB1	.0001	7/3
BB15	.00015	8/-
BB2	.0002	8/6
BB25	.00025	9/6
BB3	.0003	11/-

The vanes are shaped true square law, which is the proved best law for this particular type of condenser. The dielectric is outside the electrostatic field. A small graduated Bakelite knob-dial, 2 inches in diameter, is supplied with each condenser.



"CYLDON" LOG-MID-LINE CONDENSER

Is a true Logarithmic Condenser, designed and put on the market by us nearly 12 months ago. To-day it is almost universal, and owing to its numerous advantages over other types must be the condenser of the future: it is fully explained in our free booklet, see below.

List No.	Capacity	Price
D1	.001	19/-
D5	.0005	15/6
D3	.0003	14/6
D25	.00025	14/-
D2	.0002	13/6

With large 4-inch knob dial, 2/- extra.

SYDNEY S. BIRD & SONS, LTD.

Cyldon Works, Sarnes Field Road, Enfield Town, Middlesex.

Contractors to the B.B.C., H.M.R.A.F., H.M.O.W., and all the leading manufacturers of quality receivers.

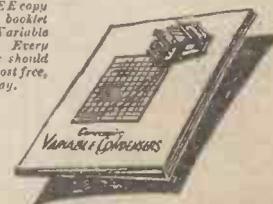
Sole Australian Agent: E. V. Hudson, 55-7, Charlotte Street, Brisbane, Queensland.

Sole Indian Agents: Bombay Radio Co., 73/75, Queens Road, Marine Lines, Bombay, 2.

Telephones: Enfield 2071 (2 lines).

Telegrams: "Capacity, Enfield."

Write for a FREE copy of this useful booklet "Concerning Variable Condensers." Every keen constructor should secure a copy, post free, without delay.

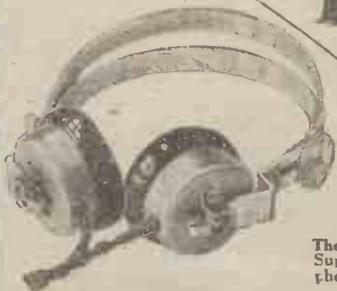


Goodall Ad.

WERE

NOW

12/6



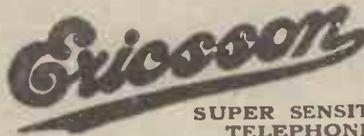
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Accepted by the B.B.C. for use in their studios. Used by all the DX experimenters. Adopted as standard in 1909 by the Admiralty and in 1917 by the Air Board. Three resistances, 120, 2,000, and 4,000 ohms—only price 12/6. Get your pair to-day!

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At all our agents or direct from the Company.

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SUPER SENSITIVE TELEPHONES.

DOES YOUR H.T. BATTERY LAST 9 MONTHS?

Provided you have chosen the proper type of battery to suit the circuit and valves used in your set you should get 9 months' service from it.

Ripaults Ltd. have produced a series of H.T. Batteries, and an easily read chart, which will enable you to select the correct one to suit your set.

RIPAULTS SELF REGENERATIVE DRY BATTERIES also give you 50% longer life with smooth, silent, and powerful loud-speaker results.

Help yourself and do your friends a good turn by writing now for one or more copies of the "right choice" and "long life" charts and all details of

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Obtainable through your local Dealer

RIPAULTS LTD.
King's Road, St. Pancras, London, N.W.1

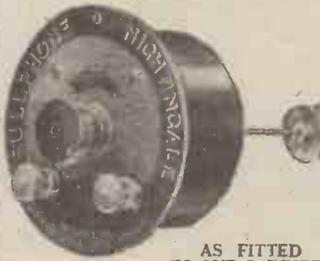
Advertisers Appreciate Mention of "A.W." with Your Order

MAKE YOUR OWN CONE SPEAKER

TWO WONDERFUL
UNITS AT ONLY **15/-** EACH

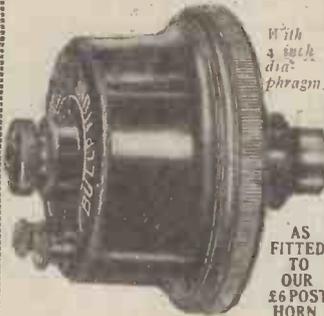
YOU'LL BE SURPRISED!

The New Wonder "Nightingale"
CONE UNIT
With Balanced Armature



AS FITTED
TO OUR CABINET
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GRAMOPHONE
ATTACHMENT.



With
4 inch
dia.
phragm.

AS
FITTED
TO
OUR
£6 POST
HORN.

From a 3 ply board, 3ft. square cut out a 12" circle then cut a strip of wood



16 x 34" and make a hole 2 1/2" dia. in centre, this will carry the unit. Fix strip to board as shown.

**BULLPHONE
DOUBLE
PAPER
CONE** **2/-**

Postage 3d. extra

Exactly as fitted to our own Speakers.

Reduced from 32/6 to 15/- solely as an advertisement for the famous Bullphone Nightingale Speakers. Cobalt magnet guaranteed for all time.

ASTONISHING RESULTS, equal to the most expensive Loud Speakers yet made, are guaranteed with either of these Units.

10/- DEPOSIT BUY ON EASY TERMS 5/- DEPOSIT



CABINET CONE

Size 17 ins. high by 15 ins. in Mahogany, Walnut or Rosewood finish.

77/6 CASH, OR EASY TERMS. 10/- deposit, and 12 monthly payments of 6/-.

21 ins. high with 14-inch Bell Mahogany finished, with plated arm and stand.



DE LUXE

57/6 CASH, OR 5/- DEPOSIT and 12 monthly payments of 5/-.

SEND DEPOSIT NOW—NO REFERENCES—SPEAKER BY RETURN
SATISFACTION GUARANTEED
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Obtainable from your Local Dealer or direct from :-





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Are but a few of the eminent musicians who use

HART BATTERIES

FOR BETTER WIRELESS RECEPTION

The Choice of the Critical!

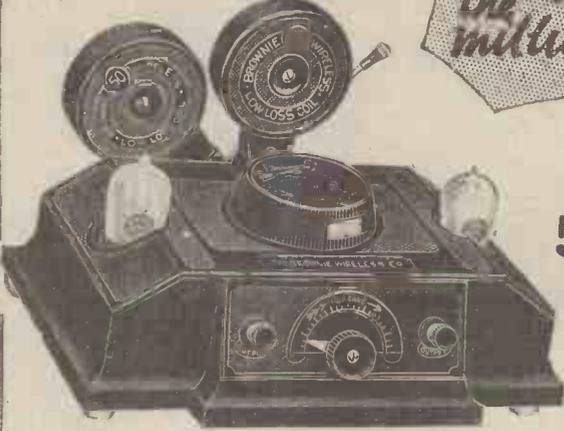
You want to improve your results too! Write Dept. 'A.W.' for price list, and FREE Booklet of interest to all wireless users.

HART ACCUMULATOR CO. LTD. STRATFORD, LONDON E.15.

Branch Offices:
 BIRMINGHAM: 165 Edmund Street. BRISTOL: 37 Victoria Street.
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Something NEW!

** a 2 valve set for the million!*



at **50/-**

Complete with two coils but without valves. Marconi Royalty extra

Brownie 2-Valver! Remember the name. Amazing loud-speaker clarity within 30-35 miles main B.B.C. Stations or 120 miles Daventry. Brownie's greatest achievement. See and hear it at your local radio retailers.

The BROWNIE WIRELESS 2-VALVER

BROWNIE WIRELESS COMPANY (G.B.) Ltd.
NELSON ST. WORKS, MORNINGTON CRESCENT, LONDON, N.W.1

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

THE "GENERAL-PURPOSE TWO"

(Continued from page 774)

Before testing the completed receiver, it is advisable to check very carefully the battery connections. If these and the rest of the wiring appear to be correct, the H.T., L.T. and G.B. batteries, aerial, earth, and loud-speaker can be connected up. In the detector-valve socket insert an "H.F." valve such as the Cossor 210H.F. and in the L.F. valve socket an "L.F." or power valve such as the Cossor 210L.F. or Cossor 220P. For the guidance of readers we have tabulated suitable alternative valves which we have tried at various times and therefore consider as suitable for the purpose required.

Coils as specified, should be inserted in the coil-sockets, such as Igranic, Lissen, Lewcos or Atlas.

Set the reaction condenser (on the right) at zero, and rotate the tuning-condenser dial (on the left) until the local station is heard. Adjust the Lorientat filament control, and the H.T. and G.B.appings until the maximum volume and purity are obtained.

5GB is always receivable under any conditions, whilst on favourable nights, more distant stations, such as Langenburg and Dortmund, can be tuned in. The aerial and earth system will have a great bearing on the results which can be obtained with this two-valver, and we strongly advise constructors to see to it that the aerial and earth are as efficient as possible.

If the long-wave stations are required, a No. 150 or 200 tuning coil and No. 100 or 150 reaction coil should be used. Radio Paris, Daventry, 5XX and Hilversum have all been heard at fair loud-speaker strength with this receiver.

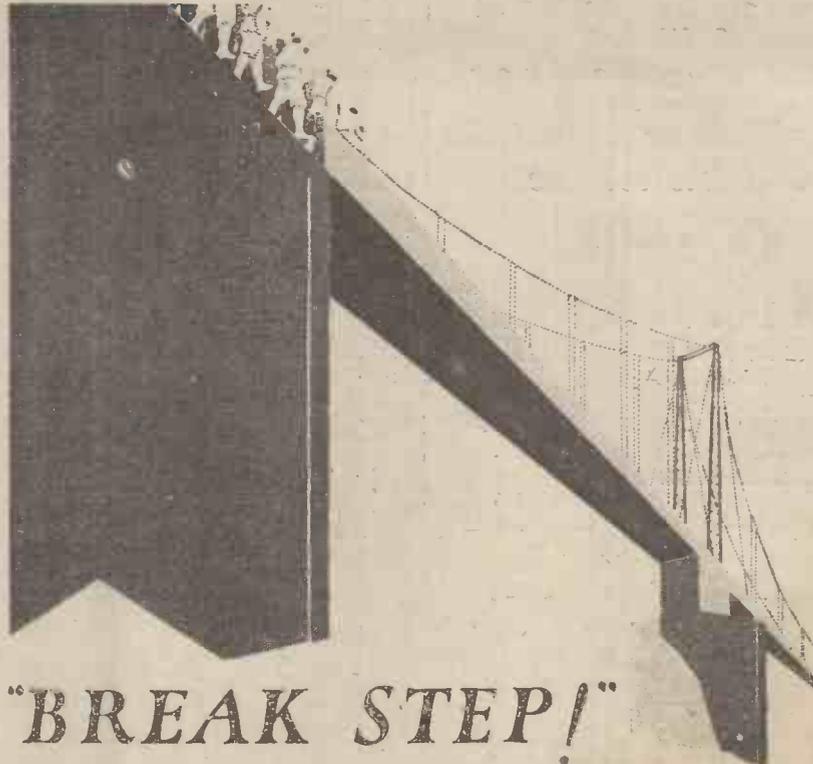
Finally, we would advise readers to use the best components possible, and also the best accessories in the way of valves and batteries.

The valve table accompanying this article was compiled with a view to assisting constructors to obtain good results with the General-purpose Two.

2-VOLT VALVES FOR THE "GENERAL-PURPOSE TWO"

Make	V1	V2
B.T.H.	B21	B23
Cosmos ...	SP18/G	SP18/RR
Cossor ...	210H.F.	Stentor2
Ediswan ...	DR2	PV2
Marconi ...	DEH210	DEP215
Mullard ...	PM1H.F.	PM2
Osram ...	DEH210	DEP215
Six Sixty ...	SS210H.F.	SS215P

N.B.—4- or 6-volt valves in the corresponding classes to those specified above will in all cases be equally suitable,



"BREAK STEP!"
—else the bridge might be wrecked



- These five features are exclusive to BENJAMIN Valve Holders:
- 1 Valve sockets and springs are made in one piece with no joints or rivets to work loose and cause faulty connections.
 - 2 Valves are free to float in every direction.
 - 3 Valves can be inserted and removed easily and safely.
 - 4 Valve legs cannot possibly foul the baseboard.
 - 5 Both terminals and soldering tags are provided.

BENJAMIN BATTERY SWITCH
 For sheer simplicity, usefulness and reliability the BENJAMIN Battery Switch has not yet been equalled. Nothing to get out of order. Nothing to break. Measures only 1 1/2" top to bottom. The metal parts are nickel-plated, of course, and soldering tags are built in. It's off when it's in.
 Price 1/-

IT JUST shows you how serious vibration can be. Soldiers marching across a bridge are given the order to break step. If they kept in step their marching would create a regular vibration that might wreck the bridge!

Yet there are still thousands of radio men who mount their valves in old-fashioned or inefficiently sprung valve-holders, so that the rhythmical street vibration reaches the delicate filaments. And then they wonder that their valves have short lives!

Only BENJAMIN anti-microphonic Valve-holders will effectively prevent every quiver of vibration, every shock from reaching the vital filament. Bring your set up-to-date, make your reception purer and treble the life of your valves by fitting BENJAMIN anti-microphonic Valve-holders in every stage.

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 Anti-Microphonic
VALVE HOLDERS

2/-
 each

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Immediate Delivery
(To approved accounts)
of complete or partial Kit
of Parts for the

COSSOR MELODY MAKER

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- COILS (ready wound) - 7/6
- CABINET - - - - - 30/-
- BASEBOARD - - - - - 2/-
- RED TRIANGLE PANEL
(drilled) 9/6
- TERMINAL STRIP do. 2/3

Delivery from stock
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WE ALSO SUPPLY SETS, LOUD
SPEAKERS, H.T. ACCUMULA-
TORS and MAINS ELIMINATORS

Write to:—Desk "A"

New Times Sales Co.

56, Ludgate Hill, E.C.4

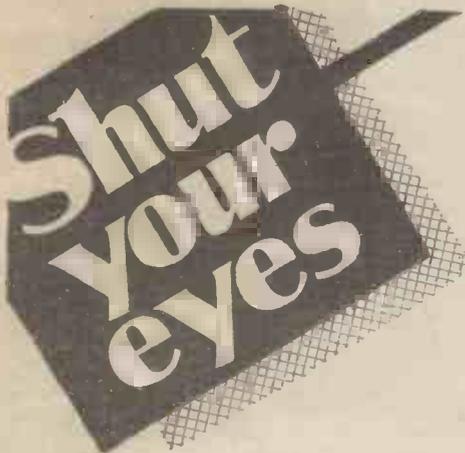
P.S. 0793

BROADCAST TELEPHONY

(Broadcasting station classified by country and in order of wavelengths).

GREAT BRITAIN				DENMARK				Station and Power			
Metres	Kilo-cycles	Station and Call Sign	Power Kw.	Metres	Kilo-cycles	Station and Call Sign	Power Kw.	Metres	Kilo-cycles	Call Sign	Power Kw.
24	—	Chelmsford (5SW)	20.0	337	890	Copenhagen (Kjobenhavn)	0.7	272.7	1,100	Danzig	0.75
252.1	1,190	*Bradford (2LS)	0.2	1,153.8	260	Kalundborg	7.0	272.7	1,100	Cassel	0.7
272.7	1,100	*Sheffield (6FL)	0.2	375	800	FINLAND		275.2	1,090	Dresden	0.7
275.2	1,090	*Nottingham (5NG)	0.2	1,428	—	Helsingfors (Helsinki)	1.2	283	1,060	Dortmund	1.5
277.8	1,080	*Leeds (2LS)	0.2	—	—	Lahtis (under construction)	5.0	297	1,020	Hanover	0.7
288.5	1,040	*Edinburgh (2EH)	0.2	158	1,899	FRANCE		303	990	Nuremberg	4.0
294.4	1,020	*Stoke-on-Trent (5ST)	0.2	200	1,590	Beziers	0.6	332.6	930	Breslau	4.0
294.1	1,020	*Swansea (5SX)	0.2	222.2	1,350	Blarritz (Côte-d'Argent)	25	329.7	920	Koenigsberg	4.0
294.1	1,020	*Dundee (2DE)	0.2	238.1	1,260	Strasbourg	1.0	305.8	820	Leipzig	4.0
297	1,010	*Hull (6KH)	0.2	252.1	1,190	Bordeaux (Radio Sud-Ouest)	1.5	379.7	790	Stuttgart	4.0
306.1	980	*Liverpool (6LV)	0.2	260	1,150	Montpellier	3.0	394.7	760	Hamburg	4.0
312.5	960	Belfast (2BE)	1.5	268	—	Toulouse-Pyrénées (PTT)	0.5	400	730	Aachen	0.75
326.1	920	Newcastle (5NO)	1.5	273	1,095	Strasbourg (8GF)	15	428.6	700	Frankfort-Main	4.0
353	850	Bournemouth (6BM)	1.5	278	1,079	Limoges (PTT)	0.5	470	678	Langenberg	25.0
361.4	830	Cardiff (5WA)	1.5	279	1,075	Grenoble (Poste des Alpes, PTT)	1.5	483.9	620	Berlin	4.0
384.6	780	London (2LO)	3.0	287	1,050	Rennes (PTT)	0.5	535	560	Munich	4.0
400	750	Manchester (2ZY)	1.0	291.3	1,030	Bordeaux (PTT)	1.0	566	530	Augsburg	1.5
405.4	740	*Plymouth (5PY)	0.5	297	1,010	Lille (Poste du Nord, PTT)	0.5	577	520	Freiburg	0.75
491.8	610	Glasgow (5SC)	1.2	305	995	Radio Lyon	1.5	1,250	240	Koenigs-wusterhausen	8.0
500	600	Davenport (5GB)	16.5	309	970	Radio Agen	0.6	1,829	164	Norddeich	
1,604	187	Aberdeen (2BD)	1.5	340.9	880	Radio Vitis (Paris)	1.0	1,060	283	HOLLAND (KAV)	5.0
		*Davenport (5XX)	25.0	370	811	Marseilles (PTT)	0.5	1,840	163	Hilversum (ANRO)	5.0
		IRISH FREE STATE		391	767	Le Petit Parisien, Paris	0.5	1,950	154	Huizen (after 6.20 p.m.)	5.0
319.1	040	Dublin (2RN)	1.5	400	759	Toulouse (Radio)	3.0	555.6	540	Schevingen-haven	2.5
400	750	Cork (5CK)	1.5	406	759	Mont de Marsan	0.3	577	540	HUNGARY	
		AUSTRIA		463	644	Paris (Ecole Sup., PTT)	3.0	585.6	540	Budapesth	3.0
272.7	1,100	Klagenfurt	1.5	476	624	Lyons (PTT)	1.0	315.8	950	ITALY	
294.1	1,020	Innsbruck	3.5	1,750	171	Radio Paris (CFR)	3.0	333.3	960	Milan (Milano)	4.0
357.1	840	Graz	0.5	2,650	113	Eiffel Tower (FL)	8.0	450	666	Naples (Napoli)	1.5
517.2	580	Vienna (Rosenhugel)	5.0			GERMANY		515.6	690	Rome (Roma)	3.0
577	520	Vienna (Wien)	7.5	263.2	1,270	Stettin	0.75	370.4	810	Como	5.0
		BELGIUM		300	1,000	Muenster	1.5	423	709	NORWAY	
508.5	590	Brussels (Radio-Belgique)	1.5	318.9	860	Prague (Praha)	5.0	434.8	697	Bergen	1.0
		CZECHO-SLOVAKIA		441.2	680	Brunn (Brno)	3.0	448	670	Notodden	0.7
263.2	1,110	Bratislava	0.5			ESTHONIA		461.5	650	Fredriksstad	1.1
300	1,000	Kosice	3.0	408	735	Reval (Tallinn)	2.2	314.8	870	Rjukan	1.5
318.9	860	Prague (Praha)	5.0					422	711	Oslo	1.5
441.2	680	Brunn (Brno)	3.0					500	600	POLAND	
								1,111	270	Poznan (Poznan)	1.5
								1,600	187.4	Cattoiwitz	4
										Cracow	4.0
										Warsaw (Varschava)	10.0
										Bucharest	5.0
										RUMANIA	

(Concluded on page 804)



IF, some evening, you lie back in your chair and, soothed by the music from your Brown Cabinet Loud Speaker, you shut your eyes, you will have a thrilling experience. The broadcasting will no longer be broadcasting, and the loud-speaker will be transformed—to your ears—into the singer himself. Soon, because the realism of it is so uncanny, you will rouse yourself and come to earth again to make sure that you are not dreaming. Then, when you are satisfied that you are still alone, you will sink again into oblivion, to capture the thrill once more.

Any Wireless Dealer would be proud to demonstrate the Brown Cabinet Loud Speaker. £6 6s. is its cost.



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VALVE HEATING

from

Air depolarising "A.D." PRIMARY CELLS

Operating EMF 1 volt or higher per cell, perfect simplicity; charged at home with sal-am-moniac. Most economical cell yet produced as the following examples will show.

No.	Output Not to Exceed	Life per Zinc when used 3 hours daily:	Price per complete cell, with salt:
222	1 amp. 3-5 hrs. daily	350 days with 5 valves (each 100 m/a.)	30/-
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240	120 m/a. 3-5 hrs. daily	330 days with 1 valve (100 m/a.)	5/6

Pro rata life for other types of valves 1 volt per cell, 2 volts 2 cells in series, etc.

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For Country Sets or anywhere where attention to battery recharging is troublesome.

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Typical Sets

complete with Batteries, Battery Cable, Phones, Aerial Equipment, P.M. Valves and Puravox Loud Speaker, including Royalties.

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2 Valve £13-0-0 Cash
or
£1-0-0 Deposit and
12 Monthly Instal-
ments of £1-1-0

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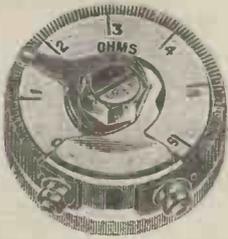
3 Valve £15-13-6
Cash or
£1-5-0 Deposit and
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A unique feature lies in the scale calibrated in ohms, which indicates the exact amount of resistance being used at any particular setting. This is invaluable when it is desired to calculate the amount of current taken by the valve. Send for List No. D72, for particulars of the complete range of Igranic Radio Devices.

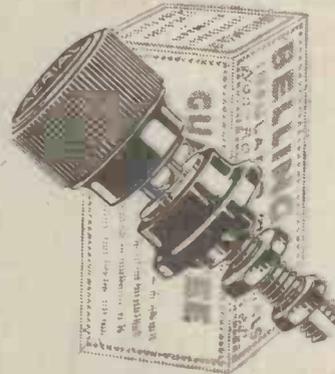
149, Queen Victoria Street, LONDON, E.C.4

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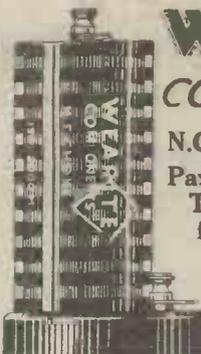
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Both types supplied in 30 different engravings. Obtainable from all dealers, but in case of difficulties send your order to us, enclosing your dealer's name and address.

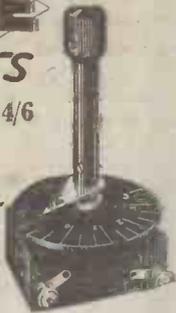
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- N.C. Condenser - - 4/6
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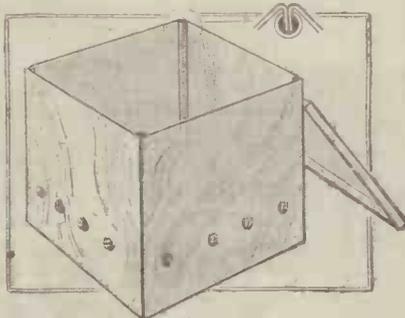
Complete with lid and base

ALUMINIUM
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11" x 6" x 7"
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COPPER
6 1/2" x 6 1/2" x 6"
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Price - 10/6

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3 VALVES
20 Stations ON SPEAKER

One-dial Tuning—Razor-sharp selectivity—Real Music—Cost of Components £5 10 0

That's what you're looking for, isn't it? And it's a straight quick job for any beginner.

This amazing simple circuit is becoming the rage of the season, and is already the envy and despair of H.F. screening and neutralising devotees.

Circuit and wiring diagram FREE in every box containing the L. & P. Two-Way Coil Tuner. Obtainable from all good Wireless shops or direct from:

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Zero to 10 ohms. Sealed, with off position. 4/-

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THE IDEAL PATENT Balance Armature Unit

complete (as illustrated) with 2 dished washers to hold cone

A REALLY EFFICIENT UNIT THAT ENABLES YOU TO BUILD A CONE TYPE LOUD-SPEAKER CAPABLE OF FINE PERFORMANCE

Every item has been given most careful thought, special steel is used for the magnet which enables a very powerful flux to be obtained making the unit extremely sensitive. The armature is carefully damped to obviate all resonances liable to distort reception.

The ideal basis for the construction of the home-made cone type loud-speaker

AND ITS LABELLED
BLUE SPOT

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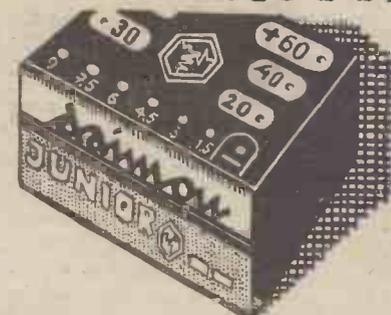
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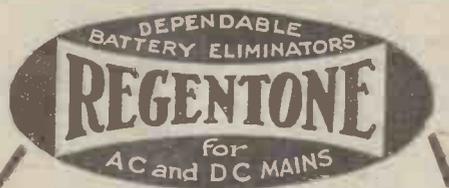
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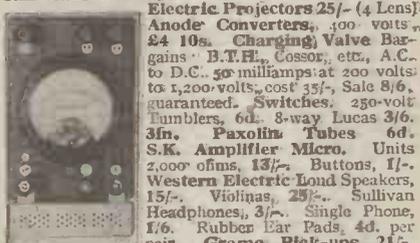
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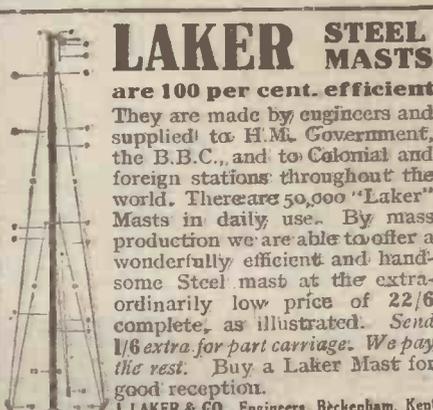
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Other items of interest in the same issue include A. PERFECT POWER PLANT IN MINIATURE, HOW TO DO CANE SEATING AND PANELLING AT HOME OBTAINING YOUR H.T. FROM ELECTRIC LIGHTING MAINS, A VALVE SET IN A GLASS BULB, MICROSCOPY, ASTRONOMY, GRAMOPHONE NOTES, Etc.

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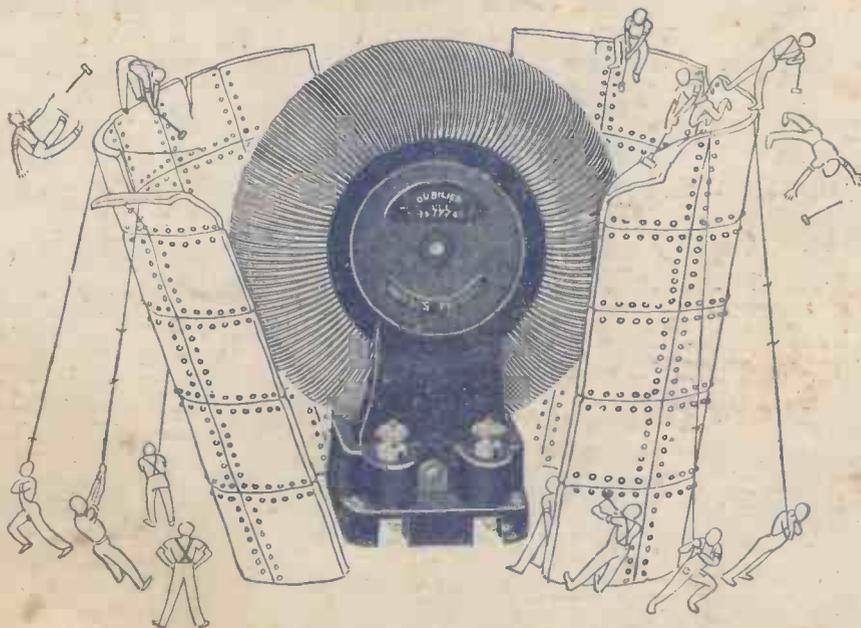
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In addition, you will confer great stability on your set because Dubilier Toroids cannot "pick up" even powerful local oscillations. There is thus no risk of your fine tuning on distant stations being upset by direct pick up in the coil windings.

There is a wealth of information upon these products in the booklet shown here. In addition there are full instructions on how to make up five different valve circuits each possessing unique advantages. Don't be without your copy. Your dealer will hand you one, or, if he is out of stock, we shall be pleased to send you one, post free 3d.



Dubilier Toroids, Long Wave 750 to 2,000 metres, Broadcast 230 to 600 metres, supplied with detachable terminal and solder-tag base, each

10/6



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DUBILIER DICTA



No. 1.



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Probably she had seen on our Stand one of the "Toreador" Sets and, with unerring feminine instinct, had come to the conclusion that that was what everyone, including herself, really needed.



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A K.C. condenser shunted across the secondary in such cases gives true straight line frequency tuning independent of the constants of the aerial employed.

We shall have more to say on the Toroids next week.



TC78