

A SET for the NEW SHIELDED VALVES

CHOOSING YOUR L.F. COUPLING

Amateur Wireless

And Electrics

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The "TETRODE
THREE"

Full
Details

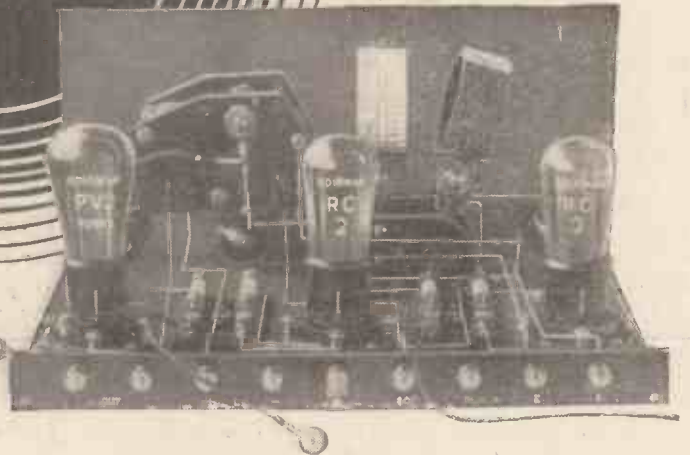
A SET USING THE
NEW SHIELDED VALVE

The illustration shows a man in a dark suit and tie, looking intently at a piece of electronic equipment. The equipment consists of a rectangular box with three circular dials on its front panel. To the right of the box is a large, cylindrical component with a complex internal structure, likely a coil or transformer, and a large, cylindrical shielded valve. The entire scene is set against a light background with some faint lines suggesting a desk or workbench.

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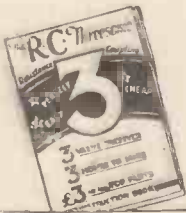
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Amateur Wireless

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The Leading Radio Weekly for the Constructor, Listener
and Experimenter

Vol. XI. No. 274

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

September 10, 1927

The Three-station Set—A Still Brighter Exhibition—The Limit!— For Welsh Listeners—A Good Cause—"Proms." Incidents

The Three-station Set

BY means of three simple switches, the constructor of next week's "Regional" set will be able to select three programmes at will—without retuning the receiver. Our Technical Editor, Mr. J. H. Reyner, A.M.I.E.E., has specially designed this distinctly novel and interesting receiver to meet the new conditions brought about by the advent of regular alternative programmes from 5GB.

For Welsh Listeners

EACH item of the *Footlight Flirtations* programme to be broadcast from Cardiff on September 13 will be an excerpt from a musical comedy bearing a girl's Christian name.

A Still Brighter Exhibition

MANY listeners who are interested in the latest wireless receivers will be pleased to hear that at the forthcoming Exhibition which opens at Olympia on September 24, exhibitors are to be allowed to demonstrate their sets.

A Ballet Broadcast!

LONDON will relay the first act of *Don Quixote* with which the Pavlova ballet season opens at the Royal Opera House, Covent Garden, on September 12.

The Limit!

A MOTOR-COACH, touring in Monmouthshire, has been equipped with a five-valver and loud-speaker. The novelty is said to prove a great attraction to trippers. One cynic says that it's a good thing for passers-by that these chars-a-bancs travel at such express speeds. Our comment is that if the 5-valver *does* oscillate it will need a very smart "D.F. van" to catch the culprit.

USING THE NEW VALVES

There is a distinct possibility that the old methods of high-frequency coupling will undergo a revival owing to the introduction of a new form of valve. One of the most popular circuits some time ago was the tuned anode, but this did not give the full amplification, because of self-oscillation which was set up by the valve. Later a development overcame this defect only by the addition of further adjustments in order to neutralise the valve capacity which was the root of the trouble.

The new 4-electrode valve recently introduced has a screen between the grid and anode which effectively eliminates this capacity, so that the simple circuits can be used to their full extent without any danger of self-oscillation.

Our Technical Editor describes in this issue a simple 3-valve receiver using plug-in coils which incorporates one of these new valves. This set has received between twenty and thirty stations at good loud-speaker strength. It is a receiver which can be built with standard apparatus, the only special feature being the shielded valve. Readers should make a point of trying this receiver.

throughout the country. We have every sympathy with such a cause, despite our gentle leg-pulls about the large number of afflicted Aberdonians, and suggest that those interested should write direct to the Institute at Great Portland Street, London, W.1.

We are Modest, but—

IF we may judge by various advance notices concerning the Olympia Exhibition, there will be a large number of complete sets on show, most of which will have not more than one tuning control. Home constructors will remember that an AMATEUR WIRELESS one-knob set was much in evidence at last year's Olympia.

Statistics!

IT is estimated that the number of receivers in operation throughout the world is between twelve and fifteen millions. Not very many when you consider that London has seven million inhabitants. The world, however, has nine hundred broadcasting stations as compared with London's one!

"Proms." Incidents

BOTH Miss Daisy Kennedy and Miss Isolde Menges have complained that under the new regime the B.B.C. does not give them the opportunity to rehearse for the Queen's Hall concerts. As a result of this lack of opportunity, both these famous artistes have experienced a considerable amount of difficulty during the broadcasting of the "Proms." and have been compelled to stop in the middle of their performances and hastily open music books while Sir Henry Wood gamely continued conducting the orchestra. There is evidently something wrong somewhere!

More "Mussolinism"

IN an attempt to cut out foreign words and expressions from the Italian language, Signor Mussolini has just issued an edict forbidding the use of certain wireless technical terms. "Tuning," "set" and "buzzer" are three words now forbidden to the patriotic Italian.

A Good Cause

GIFTS and donations have enabled the National Institute for the Blind to distribute 796 wireless sets to the blind

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Beam Wireless to India

Particulars of the Latest Link in the System

THE short-wave wireless beam stations which have been built for the General Post Office by Marconi's Wireless Telegraph Co., Ltd., at Grimsby and Skegness, for high-speed wireless communication with India have successfully passed their seven days' official Post Office test, and the Company has been informed by the Post Office that they are issuing the preliminary certificate of acceptance.

The scheme to link up Great Britain with Canada, Australia, South Africa and India, by means of high-speed wireless telegraph services, decided upon by the Government in 1923, has thus been successfully completed; and the British Empire now possesses the most complete, up-to-date and efficient wireless telegraph service in the world. It is well known that during the monsoon period, India is one of the worst countries in the world for atmospheric interference; and the fact that the Indian beam stations have been able to work at high-speed for hours on end during the monsoon period is remarkable testimony to the freedom from atmospherics that is obtained by the use of beam receiving aerials.

Although the erection of the Indian beam stations completes the contract into which the Marconi Company entered for erecting stations for Imperial wireless telegraph communications for the British Government, it by no means completes the immediate prospect of improving communication between Great Britain and her Dominions, experiments having proved the possibility of carrying on wireless telephone conversation by means of the beam stations simultaneously with the operation of high-speed wireless telegraph services.

There is every prospect that before the next year it will be possible for telephone subscribers in England to call up subscribers in any of the Dominions.

Facsimile Transmissions

With the development by the Marconi

Company of a system of facsimile transmission, specially adapted to the beam system, there is also the prospect of written and printed matter, drawings and photographs being transmitted by high-speed wireless telegraphy, and thus not only expediting the transaction of a considerable amount of business but also enabling each part of the Empire to take a greater interest in other parts because of the rapid transmission of photographs of contemporary events.

The English transmitting station of the Indian service at Grimsby, and the receiving station at Skegness, are connected,

of Poona, are similarly linked with the Central Telegraph Office in Bombay, so that the English and the Indian terminal offices are in immediate touch with each other and messages placed in the high-speed signalling instruments at the G.P.O. in London are instantaneously recorded at the Bombay office, and vice-versa.

The receiving station at Dhond in India is identical in design to the Skegness receiving station. There is, however, an interesting modification in the method of automatically controlling the transmitter and receiver of the stations built in India.

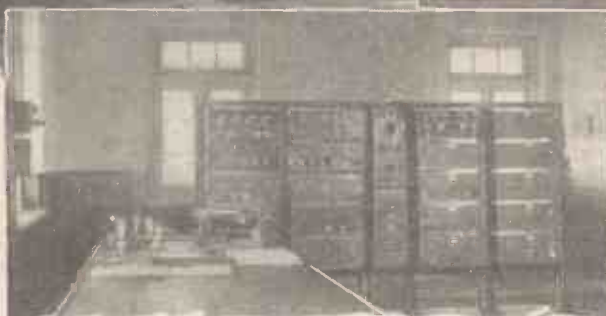
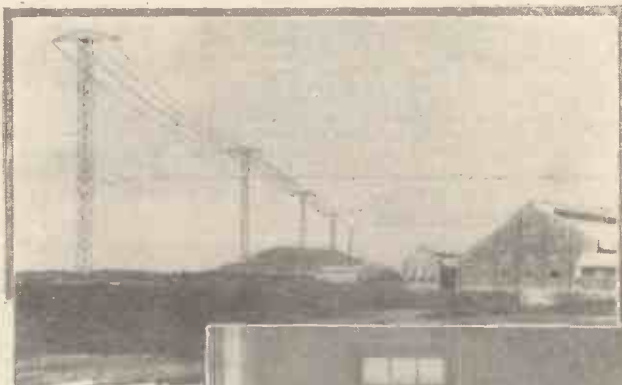
The normal method of controlling the transmitting apparatus of the beam station in England is by means of a high-speed Wheatstone transmitter, installed in the Central Telegraph Office in London, which sends ordinary telegraph signals along the landline to a relay on the beam transmitter, which in its turn keys the transmitting apparatus.

The signals received at Skegness from the Dominions and India pass from the receivers through a relay and are converted into telegraph signals which are sent along a landline to the Central Telegraph Office where they are decoded and written up.

In the case of the stations built in India, however, a system of control known as "wired wireless" has been adopted. That is, instead of ordinary landline telegraph signals being used for the control of the stations, signals of wireless frequency are generated and sent along the landline.

The advantage of using a single landline in this

way for the control of a transmitting and a receiving station, while at the same time telephone conversations are freely conducted between the central office and wireless stations or between the wireless stations themselves along the same line, is obviously of considerable value in regions where there are difficulties in providing additional landlines.



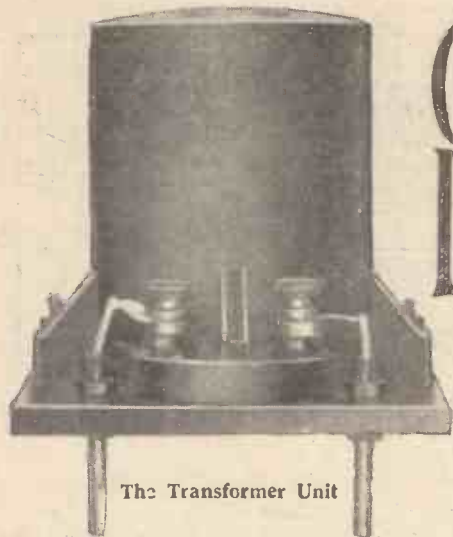
Top : The Marconi Beam Transmitting Station built at Kirkee, India, 75 miles east of Bombay for communication with England.

Below : The Beam Receiving Station at Dhond, India

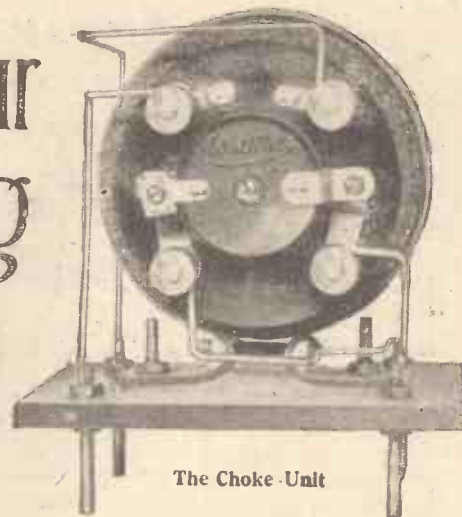
as is the case for the other beam services, by landlines to the Central Telegraph Office at the G.P.O. in London, from which the actual operation of the station is automatically controlled.

The corresponding transmitting station in India, which is situated at Kirkee, near Poona, 75 miles east of Bombay, and the receiving station at Dhond, 48 miles east

Choosing Your L.F. Coupling



The Transformer Unit



The Choke Unit

THE respective claims to superiority of the L.F. transformer, L.F. choke and resistance as a means of coupling together L.F. amplifying valves are well known to readers. Where a large overall amplification is essential, the transformer is still considered the most effective coupling, whereas for purity of reproduction, especially of low notes, there is an increasing demand for resistance or choke coupling. It would appear then, that each system has certain advantages peculiarly its own, and before deciding which particular coupling to use in an amplifier, the constructor should consider which is of paramount importance—volume or purity of reproduction.

It must be added that there are a number of transformers now available which give extraordinarily good reproduction, whilst the advent of the special "R.C." type of high-amplification valve has resulted in a great increase in the over-all amplification of choke and resistance coupling.

The final choice of coupling has therefore

become even more bewildering, and the only way to decide which appeals most to the individual constructor is to try all three systems.

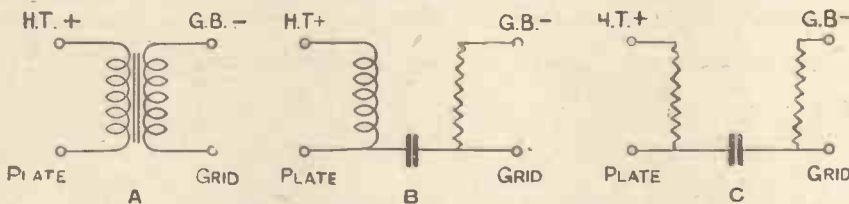
A glance at the three circuit diagrams below will show that at A are given the four transformer connections, and whereas at B and C are shown choke-capacity and resistance-capacity arrangements, it is clear that the terminal connections remain the same for all three systems.

If, then, four suitably mounted terminals are wired up to H.T. +, plate, G.B. -, and grid, it is only necessary to mount a trans-

former, resistance or choke unit on which the four valve sockets are mounted to indicate the relative positions of the terminal connections.

It is assumed that the ebonite panel on which the four valve sockets are mounted is to replace the present coupling in an amplifier, or that it is to be connected when building an amplifier in the same way as a transformer, choke, or resistance unit.

The ebonite base can be mounted on the base-board of the amplifier by passing four wood screws through the ebonite panel and



Diagrams showing Transformer, Choke and Resistance Couplings

stand-off insulating collars. A point to bear in mind is that there is a right and a wrong way of plugging in the units. It will be clear that if the transformer unit is plugged in the incorrect way, then the primary and secondary windings will

former, resistance-capacity, and choke-capacity unit on suitable plug-in arrangements, to make all three couplings readily interchangeable.

The photographs show how this idea was put into practice.

The components used were as follows:

Four pieces of ebonite, 2 3/4 by 3 1/2 by 1/4 in. (Peto-Scott).

Four valve sockets and nuts.

Twelve valve pins and nuts.

L.F. transformer (Lissen).

Choke coupling unit (Watmel).

.005 microfarad condenser (Dubilier).

.25 megohm leak (Dubilier).

Two-megohm grid leak (Dubilier).

Two special mounting clips (Dubilier).

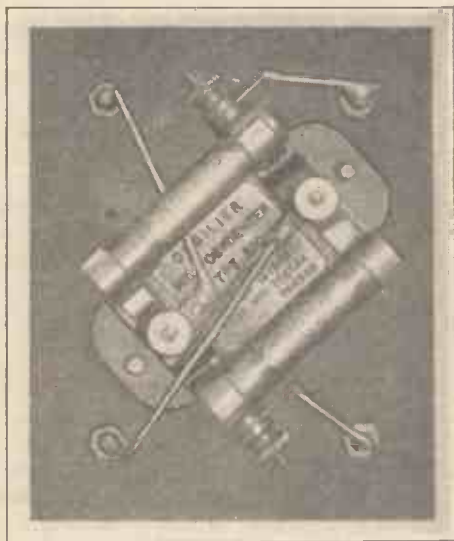
Small quantity of connecting wire.

The first thing to do is to cut the four ebonite panels to size, one being used for the base and the other three for the three plug-in couplings.

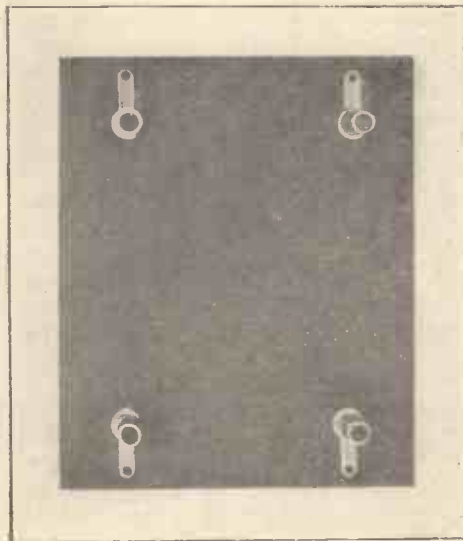
Four valve sockets, under each of which are clamped soldering tags, are mounted on the ebonite base. Sets of four valve pins, spaced as indicated, are screwed to the underside of the plug-in panels, and on the top of the panels are bolted the units.

The wiring up of each panel is very simple, and reference to the diagrams will

be transposed. Similarly, the grid leak and choke of the choke unit and the grid leak and anode leak of the R.C. unit might easily be reversed. To avoid this fault, it is a simple matter to make a small white nick in the vicinity of one of the valve sockets on the base.



The Resistance Unit



Photograph of Base



A Set to Receive the Local Station, 5XX and 5GB without Retuning

Specially designed for "A.W." by J. H. REYNER, B.Sc. (Hons.), A.M.I.E.E.

CONSIDERABLE enthusiasm appears to have been aroused by the inauguration of the alternative programmes from 5GB. The punch behind this station has been commented on favourably in many quarters, and the prospect of real alternative programmes, which has been made possible by the advent of this station, has resulted in greater encouragement to listen than before.

As soon as the preliminary tests on 5GB had indicated the satisfactory nature of its transmission from a technical point of view, Mr. Bernard Jones said to me, "Good. Well what we want now is a simple receiver capable of receiving the local station, Daventry and Daventry Junior with the minimum of trouble." I agreed with him at once and we began to examine ways and means of obtaining the results desired.

Automatic Control

It so happened that I had recently completed a special receiver for the *Wireless Magazine*, which incorporated an automatic control whereby a number of stations could be received by simply operating certain switches, and it occurred to me that some very simple edition of this same principle would be just the thing for our present purpose.

We decided, therefore, to aim at a panel containing three switches for the three stations, an on-off switch and perhaps an aerial, earth and loud-speaker terminals, which would give the most automatic receiver that could be obtained, for there would be no knob-twiddling or adjustment of any kind. In order to obtain the stations required one would simply have to operate the appropriate switch.

The question then arose as to how to accomplish the results required. In the majority of cases, all that is necessary is a simple detector circuit with reaction followed by sufficient amplification to enable the signals to be obtained on the loud-

speaker. I decided, therefore, that the use of high-frequency amplification was not necessary in a simple receiver of this kind, for it would only introduce complications into the arrangement. A reaction control, however, is desirable, not only in remote districts but also in localities fairly close to a main station where it is necessary to bring up the strength of 5GB above that of the local station.

Selectivity

The question of interference is also a matter of some importance and a reasonably selective receiver is desirable. In other words, some form of coupled aerial is preferable in order to obtain reasonable selectivity from a single-circuit tuner only, and this makes the use of a reaction control more desirable. Added to these considerations is the important factor of cost, for although there are several ways of achieving the desired results, many of them are too expensive to be really practicable.

I finally decided to use three entirely separate tuned circuits, provided with Reinartz reaction; the reaction coil itself acting as an aerial coupling in order to simplify the connections. Three such circuits involve the use of three variable condensers, but this fortunately is not a serious proposition owing to the production recently of some small compression type condensers known as Formo Densors. They are marketed by the Formo Company at a price of 2s. 6d. each. They are made in various ranges and the pattern employed is one having a maximum capacity of .0005 mfd. and a minimum of .000015 mfd. This, of course, is rather a higher minimum than usual and it limits the actual tuning range which can be obtained on any one coil. I propose, however, to utilise plug-in coils for the receiver so that it is quite an easy matter to choose a coil which will tune to the stations required well within the range of the condensers.

Switching

With this circuit the switching is very simple. There are two points to be switched on each circuit. It is necessary to change the grid connections over from one circuit to the next and at the same time, change the aerial and reaction lead over on to the appropriate coil. Some neat double-circuit push-pull switches have recently been introduced by Messrs. Bulgin and Co. They were originally developed for the *Wireless Magazine* automatic receiver previously referred to, and these were admirably suited to the present purpose. They are fitted with a small die-cast indicator into which the name of the station can be easily and neatly inserted, which gives a very pleasing appearance to the receiver.

It will be noted that a second complete circuit has been used for 5GB. An attempt was made at first to utilise the same circuit as is employed for the local station, but this was not considered desirable on looking into the matter. In the first place it is necessary to use an entirely different value of reaction, with normal circuits at any rate, and it was considered better to have two circuits, each one of which could be adapted to give the best results, so that there would be no question as to the efficiency of any particular station when the appropriate switch was operated. Secondly, owing to the limited range of the condensers in use it might be found impracticable to obtain both the local station and 5GB with the same coil, so that, everything considered, it is probably better and cheaper in the long run to use an entirely separate circuit.

This, therefore, is the general principle underlying the Regional receiver. The arrangement has proved very satisfactory in practice and excellent results are obtainable. Complete constructional details will be given in next week's issue, showing how to build the receiver.

A Compact Tone-control Unit

By G. C. P. BRAUN

A VARIABLE condenser with a maximum capacity of about .01 mfd. is undoubtedly in great demand at the present time. Unfortunately, such a component would probably be either very large in size or very expensive to make. For values of from .001 mfd. upwards, the experimenter usually relies on a number of fixed capacities arranged in parallel with suitable switching, thus approaching as nearly as possible to the variable ideal. Here again, care must be taken if bulky equipment, slow in action, is to be avoided.

A good example of a fixed condenser in general use where a variable condenser is needed is the capacity commonly used in parallel with the loud-speaker. The com-

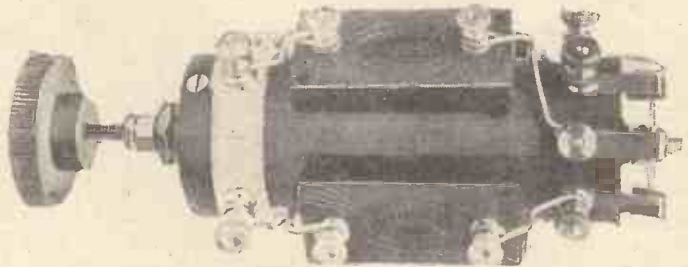
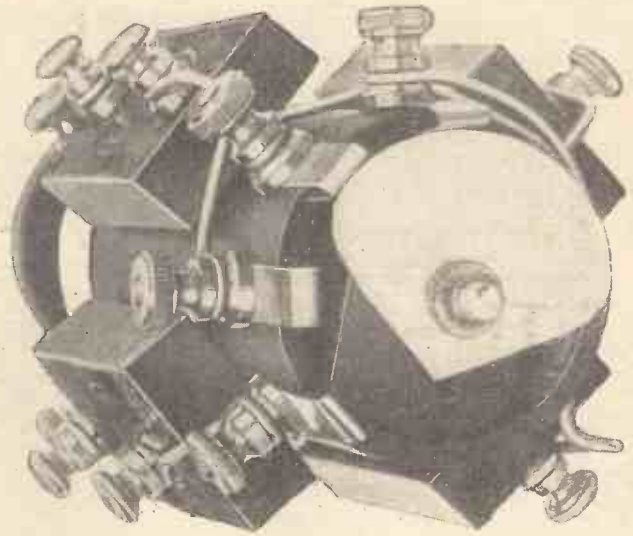
ference of a length of ebonite tube. The bore of the tube will, of course, vary in size according to the number of condensers required.

In the example illustrated four are used, the bore being $1\frac{1}{2}$ in. only. This may be taken as the minimum size. For eight condensers a tube of about $3\frac{1}{2}$ in. is required. The length may be taken as constant at 4 in. All the condensers are connected to terminals on an aluminium band passing round the tube at one end. The remaining terminals are taken to copper springs made from copper tape. A revolving vane of aluminium makes contact with these springs. The vane is fixed to a length of 2 BA screwed rod, which passes through bushes in ebonite cross-pieces at both ends of the tube. One of these bushes is provided with a nut for one-hole fixing.

The zero or "off" position is obtained by two different ways of connecting up. In the instrument photographed one input lead goes to the one-hole fixing bush. The theoretical diagram shows this input lead taken to an extra spring A, to which none or all of the remaining springs may be connected by the vane. The other input lead is taken to the aluminium band in either case. No. 16 wire is sufficiently rigid to hold the condensers in position round the tube.

As terminals are provided to both springs

and band, and, in fact, hold these down on the tube, the condensers are easily changed. A good tone-control would consist of five fixed condensers of .002 mfd. each. The component has a variety of other uses. It may constitute the coupling condenser in an R.C. amplifier. In such a case four condensers of .005 mfd. are a useful basis for experiment.



The Complete Unit

RADIOGRAMS

Although the original constructional programme has not yet been carried out, Russia is already intent on modernising her broadcasting plant, and recently opened at Chabarovsk, on the trans-Siberian railway, a 20 kilowatt shortwave telegraphy and telephony transmitter. This station is the first of a group of twelve high-power "senders" with which the Russian wireless net is to be equipped. The new plant will cover a band ranging from 20 to 100 metres, but it is expected that broadcast telephony transmissions will be carried out on a wavelength of 20 to 30 metres.

Efforts are being made to arrange for the relay of two ceremonies in which the Duchess of York will participate in Glasgow about the middle of September. These are the opening of the Scottish Flower Show in the Kelvin Hall and the presentation of the Freedom of the City to Her Royal Highness.

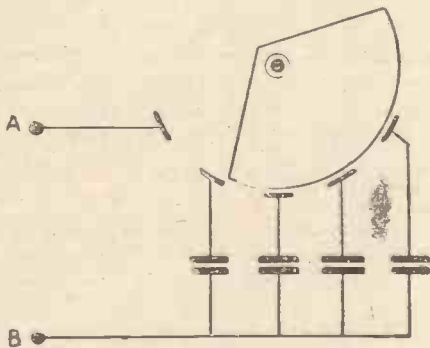
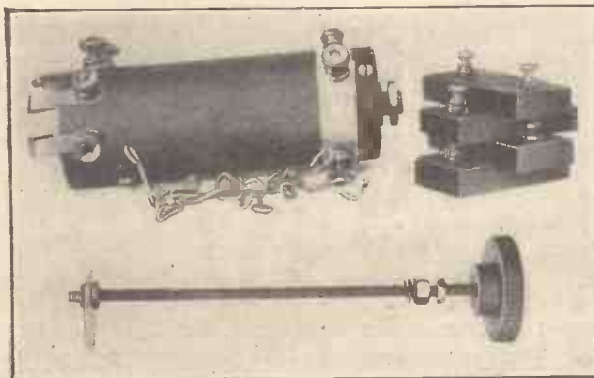


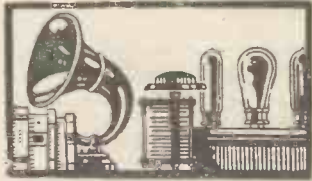
Diagram of Connections

bination of perfect amplifier, loud-speaker, and super-power output valve is attained to by only a fortunate few. In such cases no capacity in this position may be necessary at all. For moderately priced apparatus, however, a condenser is as a rule needed, its value being more critical than is commonly supposed. The optimum value is almost entirely a matter of suiting the ear of the individual listener. About .01 mfd. may not unduly lower the tone of a thirty-shilling loud-speaker, whilst working wonders in other directions. On the other hand, in some cases, half this capacity may change a Kate Winter to a Ruby Helder.

A simple method of arranging condensers so that a change in value may be made with smoothness and rapidity is shown by the [diagram and photographs. This component has the advantage of small size and can be mounted on a panel by "one-hole fixing." The condensers are situated on the circum-



Parts of the Tone-control Unit

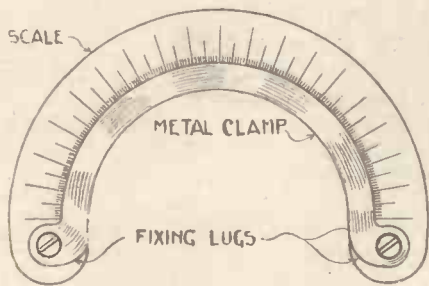


PRACTICAL ODDS & ENDS



Fixing Celluloid Indices Permanently

THE celluloid index is, unfortunately, very apt to break from its moorings at an inopportune moment. The writer has found celluloid varnish, acetone, and even rubber solution practically useless for



Permanently Fixed Index

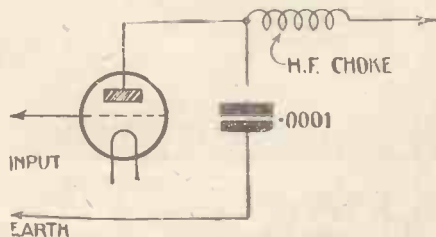
fixing them permanently; and once one of these methods has failed the index is usually too warped to be used again. The following is a simple and clean way of overcoming the trouble permanently.

It consists of a clamp made from sheet brass. The brass should preferably be $\frac{1}{2}$ in. thick which will ensure a rigid grip without being bulky. The brass should be cut from a cardboard template, which can easily be drawn out to suit the particular index, on the lines of the diagram herewith.

The two lugs must be large enough to obtain a secure hold and drilled to take the fixing screws. When this clamp is used no adhesive is necessary. W. B.

A Remedy for Signal Distortion

SUCH troubles as howling and loss of signal strength are very often due to radio-frequency currents getting past the H.F. valve into the detector and L.F.



Remedy for Distortion

stages. The circuit shown in the theoretical diagram given above represents an effective method of preventing this which can be applied to any stage of a circuit, although

it is usually quite sufficient to isolate only the last H.F. valve in this way.

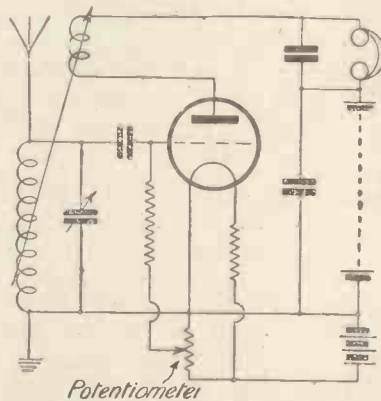
The high-frequency choke connected between the plate of one valve and the grid of the next prevents the passage of high-frequency currents, which find a way to earth through the .0001-microfarad fixed condenser.

Before proceeding to make use of the idea, it is advisable to ascertain that its application will not interrupt the correct functioning of the circuit. A. H.

Improving DX Results

IT will be found a great improvement in any set, whether single or multi-valver, in which 4- or 6-volt valves are used, to connect the grid leak of the rectifier to the slider of a potentiometer as shown in the diagram.

In this way the grid potential can be adjusted to a nicety and the best possible



Circuit with Potentiometer

working ensured. The majority of 4- and 6-volt general-purpose valves in use to-day rectify best with the grid only slightly positive and not given the full available positive potential.

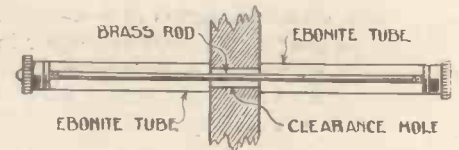
In addition to improving the rectifying qualities of the valve, the use of a potentiometer in this way also enables smooth reaction control to be obtained. A fierce single-valver can often be tamed if the leak is wired as shown in the diagram. R. W. H.

A Lead-in Difficulty

AS most lead-in tubes need a clearance of at least half an inch, and as most amateurs do not possess a bit larger than three-eighths of an inch, the following tip should prove useful.

The window sash, door post, or whatever

the lead-in is to be taken through, is drilled with the $\frac{3}{8}$ -in. bit, and the depth of the hole measured. Then take the lead-in tube and slip the rod out by unscrewing the terminals and clamping nuts. Cut off from the ebonite tube a length corresponding to the depth of the hole, and halve the remaining rod. Slip one half on the rod, put the rod through hole, and slip on the outside half. Then replace the clamping nuts and terminals, and finally tighten up the clamping nuts, taking care that the



A Modified Lead-in

rod is in the centre of the hole and does not make contact with the wood. T. G.

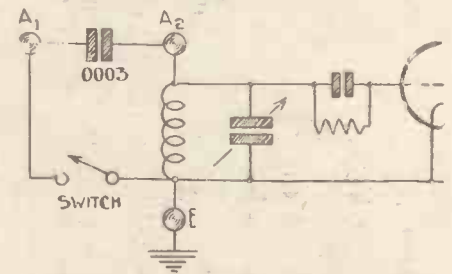
Increasing Tuning Range

WITH any spare fixed condenser, a switch, terminal, and a little time, any amateur can increase the tuning range of his set considerably.

A glance at the theoretical circuit below will make the connections clear. It greatly adds to the convenience if the second aerial terminal is placed next to the existing aerial terminal. The switch can be mounted either on the panel or on the side of the cabinet.

The condenser is connected across the two aerial terminals, and the switch is put between the new aerial terminal and the earth.

A .0003-microfarad condenser will give best results. Closing the switch will increase the wavelength of the tuning coil, while connecting the aerial to A₂ with the switch

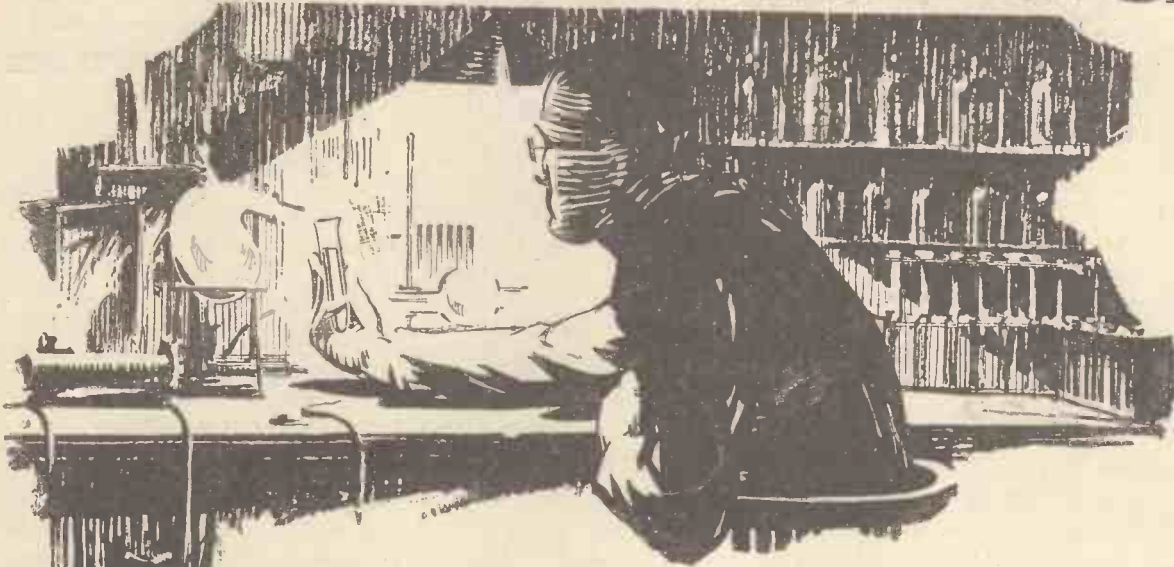


Connections of Condenser and Switch

open will enable lower wavelengths than usual to be brought in.

Incidentally, the addition of the condenser gives increased selectivity. R. H.

FRUITS OF RESEARCH



The B.T.H. Co. have always made good valves, but the new 2-volt series are the "best yet."

They are not valves made in a hurry, much time and money having been expended in the search for the perfect 2-volt valve—and at last it has been discovered. The B.T.H. Co. are now able to offer a complete 2-volt series comparable in performance with the best 6-volt valves.



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B22	G.P.	2	0.1	40 to 100	7.5	14,000 ohms	10 6
B23	Power Amp.	2	0.2	40 to 100	6.0	8,000 ohms	12 6
B8	Res. Coupl.	2	0.1	100 to 150	50.0	180,000 ohms	10 6

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B8	{ (R.C.) }

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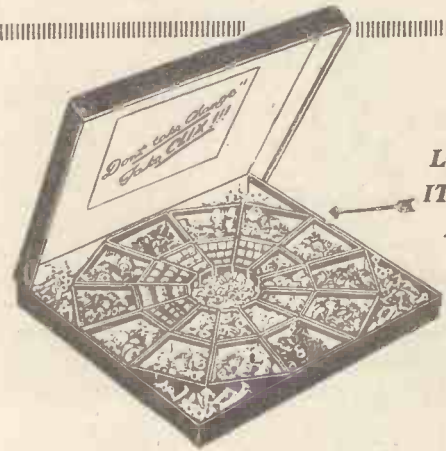
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On Your Wavelength!

Daventry Junior

MY post-bag on the subject of 5GB is so mixed that I made enquiries in official quarters as to whether the reception accorded to the new stations, as judged from correspondence, reflected the same opinion I had formed. It proved to be the case. The large majority are loud in praise of the new station, both on account of its signal strength and for the programmes broadcast from it. There is no doubt that it is filling a large gap.

The other side is not so bright. Many crystal listeners are disappointed. Previously they had received the Birmingham station at adequate strength, but now they complain that for them broadcasting has finished, as, try how they will, they cannot get the new station. If this is correct it will prove a winter of keen regrets for many listeners who have become accustomed to rely for their amusement on radio during the long winter evenings. They quite frankly state that were they able to afford valve sets the difficulty would be solved, but with so many calls on the family exchequer, even a modest valve set is beyond the means of many. As has been pointed out there is bound to be a certain amount of disappointment among listeners who previously have been accustomed to loud signals when they discover that they are on the edge of the service area of a regional station, where previously they had been right up against a low-power main station. The scheme, I fear, is designed for the majority, and owing to the scarcity of wavelengths the minority must conform or compromise. That, I take it, is the official view.

Ring up the Empire

The Empire wireless chain is now complete, and telegraph messages can be "beamed" to all of our great Dominions. It is quite likely that a new development in the service will be heard of before long, for experiments made at the Canadian beam station show that there is little difficulty about imposing telephony circuits upon those in use for telegraphy. Already we can ring up whilst sitting in our own homes anybody who is on the telephone in America; before long we shall be able—to call up subscribers in India, Africa, or Australasia. The great barrier to the progress of long-distance telephony is, of course, the costliness of making calls. It may be well worth while for a business man to spend £5 a minute in speaking across the Atlantic, but the man-in-the-street can hardly indulge in this kind of thing. I believe myself that it would pay well to reduce

very greatly the long-distance fees at present charged.

If you tune in the transatlantic service on either the long or the short waves you will find that it is in constant operation between about midday and 11 p.m. When I say in operation I do not mean that commercial telephone calls are continually passing; far from it. Though there was a rush when the service opened, I believe that the number does not now average more than about half a dozen a day. The expense is practically the same whether there is one call or a hundred each day, for both the transmitting and the receiving stations at either end are kept running continuously, whilst engineers and operators must be on duty during the whole of the hours when the service is open. Thus, fifty three-minute calls at £3 apiece would pay far better than six at £15 each.

A Puzzling Occurrence

I had a very peculiar fault some time ago which puzzled me for several weeks. My normal set which I keep in the house suddenly developed a crackling noise. At first it was not very bad, and being lazy I let the matter slide. Presently, however, it grew too clamorous to be ignored and I armed myself with various testing gadgets and tackled the instrument in order to locate the fault. Careful test failed to reveal any trouble in the set itself, and as I was running on a battery eliminator at the time, I came to the conclusion that the eliminator itself must be at fault.

The poor unfortunate eliminator was therefore rushed away to the workshop and dismantled. I suspected that the condensers had broken down, but there was no trace of any fault that I could find. This was particularly annoying as the eliminator itself was a somewhat fearsome gadget and at the present moment it is still disembowelled, as I have never had the courage to try and re-assemble it again, although I am convinced that it is in perfectly good condition. In order to make quite sure, however, I replaced this eliminator with a second one, and as luck would have it, it appeared to clear the fault. I therefore assumed that there must be some fault in the original eliminator which I had overlooked.

Unfortunately, however, the crackling very shortly developed again. This was during a period which occurred recently when the atmospheric disturbances were exceptionally heavy and I was a little puzzled as to whether the trouble was due to atmospherics or to a fault in the receiver. Disconnecting the aerial sometimes cleared the fault and sometimes it did not. Further

tests on the set *in situ* did not reveal any particular fault, and I was really getting rather puzzled over the whole situation. Then the atmospherics cleared away and the crackling did not, leaving me with no doubt whatever that there was a fault in the set somewhere.

I, therefore, "took the set by the terminals," and carted it off to my workshop and put it through another exhaustive test and still found nothing wrong. I connected it up down there, with dry batteries for the high-tension supply and obtained excellent results without a trace of crackling "Ah, ha!" thought I. "There must have been some fault which has automatically cleared itself." Back again to the house I went, and re-installed the set, only to be treated later in the evening by a series of deafening cracklings coming from the loud-speaker. All this on a set which had given me excellent results in another place. I then took dry batteries up to the house and replaced the eliminator with dry batteries and still obtained this crackling noise.

The Solution

I expect every reader is by now chuckling with glee at the obvious solution to the problem, namely, the valves. Purely by chance I removed the detector valve, which was of a special experimental type and the crackling ceased. Replacing this valve with another cured the fault at once, and I subsequently found a loose contact inside the cap of the valve. When I had tested the instrument in the workshop, of course, I used a different set of valves, and thus the fault was automatically cleared. I suppose, really, I take this year's prize for the real big Boob of radio, but it is painfully easy to overlook a comparatively simple fault of this nature. One automatically looks for the fault in a difficult place first, and the failure of the cursory test rather tended to suggest an obscure fault so that by endeavouring to locate the trouble it gradually became more and more abstruse and complicated, with the result that I was getting farther and farther away from the solution.

Regional Programmes

I feel that it is a pity that 5GB was introduced as an alternative to Daventry, whereas it eventually must become the Birmingham regional station.

Many provincial listeners like to receive the London fare, but as can be seen, at present the 5GB programmes are designed to contrast with Daventry. Now half the material for these programmes is drawn from the Birmingham area; thus, the station

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

is performing two functions, that of giving alternative programmes to Daventry and keeping up a local service to Birmingham listeners. It is again a half-way house and must remain so until the complete regional scheme comes into being. Several of my correspondents state that 5GB cuts out Aberdeen while the functions of Stoke seem to be clearly usurped by the proximity of two high-power stations.

A Lull in Criticism

At the moment there is a great falling-off in adverse programme criticism. The great majority of listeners are pleased with the present programmes, freely stating that they are of a consistently high standard. The promenade concerts come in for unstinted praise.

There is no doubt that the standard has considerably improved, but I feel sure that when the long nights set in, listeners will slowly become accustomed to this excellent level, and will begin to vote for more "high lights." Doubtless they will be forthcoming, but I feel that it will be politic to let the curve of progress move up and down rather than hold on to one level standard. Each fortnight it might be lifted by one of the world's greatest artistes. By such means the listening audience will be kept on its toes. Variety of excellence is as necessary as variety of fare.

Another Puzzle

The most perplexing station this summer has been KDKA's main short-waver, which works upon 62 metres. A few months ago this was one of the strongest of all the transatlantic signals, but on most nights during the summer it has been on the weak and wavering side. Generally, in fact, I have found it better to receive the programmes not upon the fundamental on 62 metres, but upon the third harmonic on 20.6 metres. The authorities at KDKA are clearly not satisfied with things as they are, for recently they have been experimenting on a wavelength a little above 26 metres. This transmission has been pretty well heard though on most nights it was accompanied by a good deal of fading.

In my experience the most difficult of all long range telephony to receive is KDKA's 14-metre transmission. Only on a very few occasions have I been able to get it at all this summer. I understand that the 14-metre plant is not now in regular use and it is quite likely that it will adopt eventually a wavelength in the neighbourhood of 25 metres. For some reason at present not too well understood it seems that wavelengths between about 20 and 35 metres are by far the best for long ranges with comparatively small power behind the transmission

Another "Alternative"—Why Not?

I have never ceased to wonder why 5XX usually sends out the London programmes. The reason given officially is that Daventry serves a very wide area and that there is an insistent demand for the London programmes by listeners in all parts of the country. The demand, I take it, is not especially for the London programmes, but for the best programmes. Then why not make 5XX the star station, sending out the finest possible programme of its very own, and let London transmit a good, but rather less expensive, programme that is quite distinct? Like Daventry, London serves a huge area. If the scheme suggested were adopted, thousands upon thousands of listeners would now have not two, but three, alternative programmes upon any night of the week; and this without the necessity for any increase in the number of stations or any alteration in wavelengths. Another argument in favour of making Daventry the star British station is to be found in the fact that it is by far the best heard upon the continent of Europe.

The Coming Season

Now that Autumn is approaching, many of us are beginning to think of the coming wireless year heralded by the show in September. As we bask in the sun (or grouse in the rain, whichever it may be) it is sometimes hard to imagine ourselves getting down to our radio experiments and constructional work again. From what I can gather some manufacturers are getting out some attractive items for next season, whilst there will be the usual show novelties to attract our attention and make us wonder why such things were not made previously. Although there are rumours of certain really new developments, many people are considering how the normal and most reliable circuit can be made still more reliable and still easier to handle.

Simplicity of Control

I must confess that I like the single-control H.F. receiver, because if suitably designed and adjusted, such a set will give wonderful results in the hands of beginners and experts. The modern expert has not sufficient time to be continually twisting four or five dials and take several minutes to tune each station. The objections to the single-control receiver are gradually being overcome and it is almost safe to say

that with proper design and careful adjustment, a three-tuned circuit receiver can give just as efficient results, when ganged over the majority of the tuning range. By a simple adjustment of the inductance values, we have so arranged matters that the efficient tuning range covered by a gang-controlled receiver embraces all the stations which we desire to receive.

A Special Receiver

Mr. Reyner tells me that he has just completed a very special receiver for the *Wireless Magazine* in which he has concentrated, not so much on the development of radically new circuits, as on the consolidation of information already in our possession. His well-known "Solodyne" receiver solved the problem of gang control for the home constructor, but it has the disadvantage that the sensitivity of the receiver was not constant and the reaction adjustment had to be varied as the tuning dial was rotated in order to obtain the best results, so that the receiver was not really a single-control instrument.

The advent of the Loftin-White circuit suggested a solution, but he tells me that he was unable to obtain the degree of amplification that he required using the pure Loftin-White arrangement. He has, however, solved the problem now by a simple combination of a neutralised circuit with the Loftin-White principle as a result of which he has evolved an actual single-control receiver.

Owing to the congested state of the ether, many of the foreign stations are not worth listening to nowadays, so he has used only one H.F. stage for simplicity. The difficulties here are rather greater than with two stages, although one would expect the opposite, the reason being that any slight lack of balance has more serious effects with two circuits owing to the fact that the amplification is less and also to the fact that the individual circuits have to be more sharply tuned than is possible with three circuits in order to obtain a reasonable selectivity. I am going down to Mr. Reyner's place to hear this receiver shortly, but from what I can gather it is going to be the goods!

Not content with this achievement he has made the set receive the long- and short-wave bands without changing coils and he has an automatic control on it, whereby any one of three stations can be selected by simply pulling out a switch. I am certainly looking forward to an interesting time when I hear this receiver for myself. I believe that a description of it is to be given in the Show Number of the *Wireless Magazine*.

THERMION.

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PERFECTING "SIMPLER WIRELESS"

By J. F. JOHNSTON



LAST week it was explained how, when experimenting with the original "Simpler Wireless" circuit, certain peculiarities were noticed which made this circuit somewhat tricky to operate. The trouble was manifested, in practice, by the interdependence of the various controls—when one of these was varied it called for a re-adjustment of the others in order to maintain good reception.

The cause of the trouble is a simple one. It is due to the fact that the original arrangement (shown in the diagram last week) is an amplifier of D.C. as well as of A.C. In this, of course, it differs from nearly all other wireless amplifiers, a notable example being a certain type of battery-coupled amplifier.

Look at Fig. 1 which shows two valves directly coupled together. Although batteries are here shown as the means by which the potentials of the various electrodes are maintained at suitable relative potentials the principle of the coupling is identical with that used in the "Simpler Wireless" circuits.

The grid potential of the second valve (and the anode voltage of the first) depends upon the total voltage applied between the filament of the first valve and the end of the anode resistance farther from the plate, and also upon the respective values of the anode resistance and the internal resistance of the first valve.

If the various adjustments are so made that all the electrodes of each of the valves are at suitable potentials with respect to each other and if, then, the internal resistance of the first valve is altered (as by altering the grid potential of this valve), the voltage-distribution between the anode resistance and the first valve will be affected. This means that the potential applied to the anode of the first valve and the grid of the second will be different from what it was before.

Of course, in the case of amplifiers the

valves of which are coupled by the transformer, choke-capacity, or resistance-capacity methods, a change in the potential of the first grid alters the internal resistance of the first valve and therefore the potential of the anode of this valve, but this change of potential is not passed on to the grid of the second valve unless the original change was only momentary, as in the case of a half-cycle of alternating or oscillatory current. Permanently altering the potential of the first grid of such an amplifier would, in fact, momentarily alter the potentials of the remaining grids, but these would immediately afterwards resume their previous potentials.

This is due to the fact that the application of pure D.C. to a transformer primary or to a circuit containing a condenser only



of the amplifying action of the first valve. Of course we want the variations in the grid potential of the first valve, caused by the signal impulses, to produce greater variations in the grid potential of the second valve but the point to notice, with the Fig. 1 arrangement, is that a permanent alteration in the first grid potential will cause a permanent alteration in the potential of the second grid.

Let us see how this affects the working of the arrangement in practice. Suppose that the first valve in Fig. 1 is an anode-bend rectifier. In the first place it will be necessary to adjust the grid potential of the first valve critically in order to secure efficient rectification but it must be remembered that every slight alteration of the potential of this grid will alter the anode potential of this valve and the grid potential of the second valve to a greater extent. To be sure a few volts more or less on the anode of even a detector valve makes very little difference, but in the case of the grid potential of the second valve it may be sufficient to stop the valve working altogether. Where three valves are used, as in the original "Simpler Wireless" circuit things are even more serious.

Now suppose we have got the arrangement properly adjusted and are actually receiving signals. These signals are first rectified between the grid and filament of the first valve (acting as a two-electrode valve) and are afterwards amplified by the same valve. As the negative half-cycles are suppressed, the mean potential of the first grid will become positive during rectification by an amount depending upon the amplitude of the signal currents. This alteration of the mean potential of the grid of the first valve will alter the mean potentials of that of the second valve. In the case of more than two valves the mean grid potentials of all the valves will be affected.

(Continued in third col. of page 303)

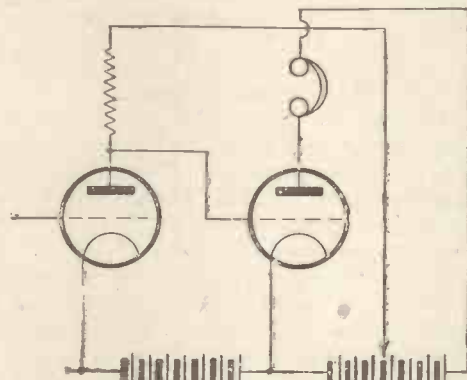


Fig. 1—Two Valves Directly Coupled

causes a momentary current to flow in the circuit containing the transformer secondary or the condenser.

But in the circuit shown in Fig. 2 on this page there is neither a transformer nor a

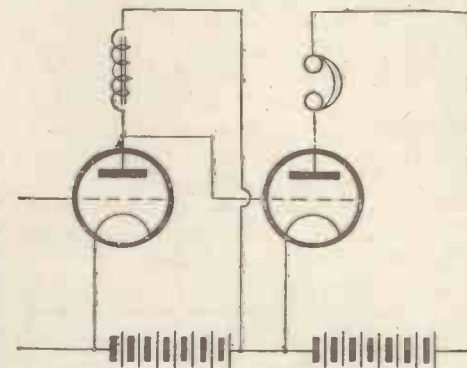


Fig. 2—Two Direct-coupled Valves Using a Choke

condenser between the valves and any alteration of the potential of the first grid will be followed by a greater alteration of the second grid potential—greater because

WITHOUT FEAR OR FAVOUR



A Weekly Programme Criticism by Sydney A. Moseley

THERE were parts of each of the Sunday programmes that I wished to hear, and although one was termed Vesper Music and the other a Ballad Concert there wasn't a big difference in the classical character of the items. There was the Tone Poem "Findlandia" (Sibelius) with one of its haunting melodies. That was sent out from London and it may interest readers to know that I discovered a "combination" which will give me both London and 5GB with the same coils! If this sort of thing goes on I expect the Editor will be asking me to write technical articles (which Heaven forbid!)

I found this attempt to make the most of best programmes a bit difficult because where 5GB gave us the approximate time of each item, London omitted to do this and I trust that this reminder may remedy this in future. For instance, I wanted to hear Alice Moxon sing "Hark, hark, the lark" and "Go not happy day" from London, and Margaret Fairless' violin pieces "Meditation," by Massenet, a waltz by Brahms and a Spanish dance from 5GB. I got the first violin piece and when I switched over to London I found that I had missed Schubert's beautiful song. Then again there was Schumann's "Carnival" (why didn't they give us the whole of this entrancing composition?) from 5GB, and the Prelude to Act 3 of the *Mastersingers* from London. But when I switched back they were on the Epilogue. However, like so many other things in life one has to make a choice and take the inevitable bad with the good.

The Wireless Singers with pieces by Mendelssohn and Schumann were quite good, while the appeal by the Countess of Pembroke on behalf of the National Association for the Prevention of Tuberculosis was business-like rather than sentimental.

Why all this chopping and changing about of announcers? The newcomers appear to be undecided in pronouncing the same word in the same way, and it seems to me there is still too much delay in the announcement of the items.

"Wasn't the Promenade Concert wonderful?" a club member said to me—"I wish we had one every night."

There is too much allusion to booze by some of these comedians from abroad. We are well aware of the dreadful thirsty pass to which they have been reduced across the Herring Pond, but however refreshing it may taste to them, it is in bad taste to be continually suggesting that some artistes spend every two minutes' interval in the studio by partaking of "doubles" and "trebles." Let them keep their thirsts to themselves!

Once more "Hurrah for the alternative programme!" Take this contrast: "A laboured speaker on a boring subject from London and then—a tiny turn of the wonderful little knob and lo! Coleridge Taylor's "Petite Suit de Concert."

How many different musical settings are there to "O Mistress Mine?" Samuel Saul sang a version by B. J. Dale, which was quite new to me.

The noisiest transmission from the hotels comes from the Metropole. One feels almost that the orchestra was interrupting the gossiping of the diners. And yet I often wonder how it is we are spared this continual talk from other restaurants. The

chattering ceased when the pieces were at an end and I noticed they were less boisterous in acclaiming the players.

A "straight" song that seems to have become very popular with wireless vocalists is "Do not go my love,"—and quite justifiably so.

May we ask for more proficient speakers in the coming football season? Names are all right for a two-minute introductory talk, but we don't want these so-called "expert" talks to descend to the level of some of the newspaper articles which pretend to be, but rarely are, the actual contribution of those who sign the articles.

Who was it responsible for the introduction of the "American Wireless King?" King, forsooth! Kid! Wonderful how so many astute cousins of ours get away with it.

I expected to have read more eulogies on Francis Russell's voice than I did. His encores from "Tosca" were rendered with a fulness of tone and dramatic expression which equalled some of the best Italian tenor singing.



WIRELESS ON MANOEUVRES

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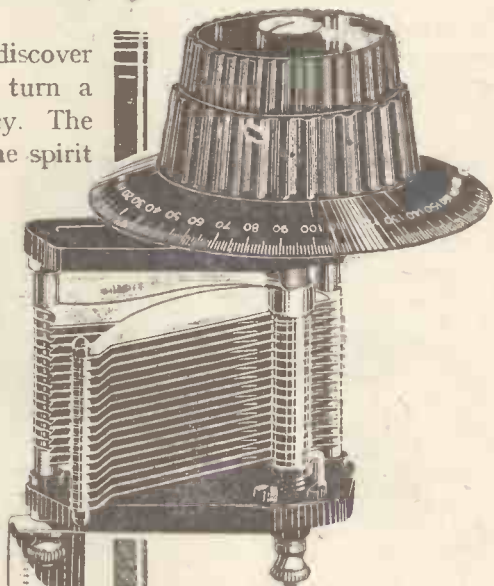
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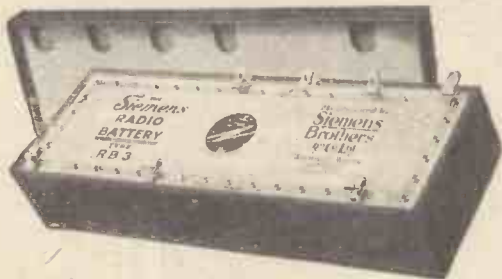
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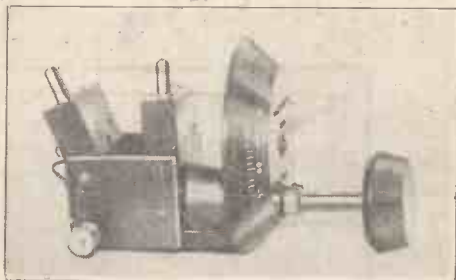
"A.W." TESTS OF APPARATUS

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

L. and P. Two-coil Holder

THE London & Provincial Radio Co., Ltd., of Colne Lane, Colne, Lancs, have sent us an L. and P. two-coil holder. This coil-holder is designed for baseboard or back-of-panel mounting, the spindle which operates the moving coil-holder coming through a hole in the panel. The moving-coil holder rotates on an axis parallel to the panel, being operated by a worm and pinion mechanism. Six complete rotations of the spindle are required in order to rotate the moving-coil block through 90 degrees.

The instrument is soundly constructed, and we are pleased to note that pigtail connections are provided between the moving-coil block and the two terminals. An interesting feature of the instrument is the special dial engraved 0 to 90 over a



L. and P. Two-coil Holder

space of about 340 degrees. By means of the special reduction gear this dial is caused to rotate at one-sixth of the speed of the operating spindle.

It thus gives a definite indication of the actual angular position of the moving-coil block which would normally be obscured by the panel. The whole instrument is cleverly thought out, and we feel sure it will recommend itself to readers.

Cason Toggle Switch

THE Cason toggle switch illustrated is a neat little component intended for switching the valves of a receiver on or off as required. It consists of two springs, one short and the other long, carried in a neat moulded case. A small lever which projects through the front of the case serves to push the longer spring up into contact with the short spring, thereby making a circuit. The design, however, is such that a slight rubbing action is obtained when the contact closes or opens, which serves to avoid the disadvantages usually found with a simple pressure contact.

The moulding itself is of black material,

and mounts on the front of the panel. The toggle is red, and it is interesting to note that no pivot is provided, the toggle carrying two projections which rest in recesses in the moulding, it being kept in position by the action of the spring contact.

On the whole, the component is neat and well finished. It is 1 1/4 in. in diameter



Cason Toggle Switch

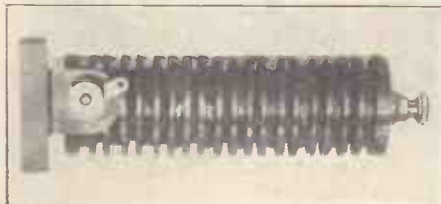
and projects 3/4 in. from the front of the panel, and is quite an unobtrusive attachment. It is made by Cason Mouldings, Chiswick Road, Lower Edmonton, N.9.

Trix H. F. Choke

ATRIX H.F. choke has been sent in for test by Eric J. Lever, of 33 Clerkenwell Green, London, E.C.1.

This component is wound in ten sections, the winding being situated in alternate slots in a barrel-type former, the intervening slots being left vacant. The winding itself is of enamel-covered wire, each section being further covered with a layer of green silk as a precaution against damage.

The connections are brought out at the two ends and a special bracket is provided which carries a small ebonite arm whereby the choke may be mounted on a baseboard



Trix H.F. Choke

or panel, as required. The overall length of the instrument is 4 in., the diameter being 1 in.

On test we found that it choked effectively over a range of 200 to 2,000 metres without any sign of peaks, and it is therefore eminently suitable for use in every type of receiver.

Hydra Mansbridge Condensers

A NUMBER of Hydra Mansbridge condensers have been received from Louis Holzman, 109 Kingsway, W.C.2.

These condensers are constructed in the usual manner except that they appear to be slightly more compact than is normally the case. They are housed in neat metal cases, finished with a frosted surface.

The particular feature of these condensers is that they are tested to high voltages. One of the most common types is tested to 750 volts D.C. and 500 volts A.C., which is a very good test and covers the majority of conditions required by the ordinary constructor with a factor of safety.

We actually received four samples which had been tested at 500, 650, 760, and 1,000 volts D.C. respectively. The capacities ranged from 1 to 5 microfarads, and these



Hydra Mansbridge Condensers

ratings were found to be accurate within the usual limits.

Perfecting "Simpler Wireless"

(Continued from page 299)

Altering the setting of the tuning condenser will alter the mean potentials of all the grids of all the valves and, if this alteration causes the operating point of one of the valves to be moved off the straight portion of its characteristic curve or grid current to flow, distortion will result which can, however be cured by applying sufficient negative bias to the first grid to bring its mean potential to what it was before signals were being received.

This means, with the original "Simpler Wireless" circuit, that the settings of the various potentiometers must be re-adjusted every time signal strength changes. Or, if a certain station is being received late at night, when reception conditions are good, the same potentiometer setting may not hold good the next day.

The means whereby these troubles are simply obviated will be described in the next article.

THE general principle of action of the new shielded grid valve has already been explained in the articles which have appeared in the last few issues of AMATEUR WIRELESS. In order that the valves may be tried out and various effects experimented with, I have made up the simple three-valve receiver described in this article, which can easily be constructed. The valves, it may be remarked, are marketed by the General Electric Co., Ltd. (Osram) and the Marconiphone Co., Ltd.

In order to make the matter as simple as possible, plug-in coils have been used, and no special components of any sort are needed. There is a certain advantage in using astatic coils, and certain other refinements can be introduced, but I propose to disregard these for a moment and simply to give a straightforward circuit.

Shielding

The cardinal principal of the valve is that the capacity between the anode and grid of the valve itself is effectively removed by the presence of the outer or screening grid, which is connected to a positive potential of about 80 volts. This being the case, there is no tendency to self-oscillation due to coupling between the anode and grid circuits of the valve through the inter-electrode capacity.

At the same time, the valve capacity in an ordinary valve is quite small, being less than 10 micro-microfarad, so that stray capacities between the circuits become of

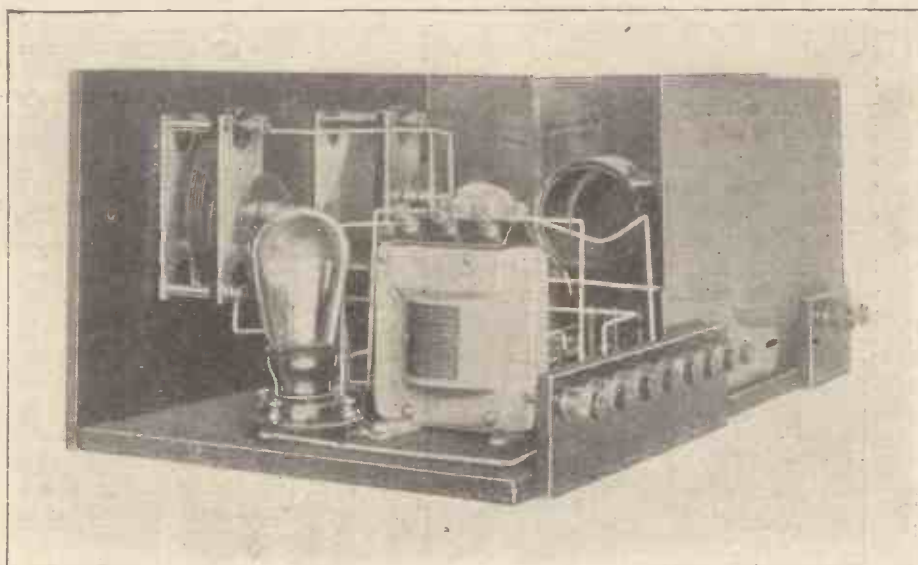
the circuits connected with the grid of the valve and those associated with the anode. This is really the only difficult portion in the construction, and, as was explained last week, it is preferable to arrange this screen so that it really forms a continuation of the screening grid inside the valve.

This can be done quite simply by cutting a slot in the screen and mounting the valve so that it is partly on one side and partly on the other. The screening is made a little more effective if a sort of cradle is formed around the valve at the point where it passes through the screen; and, of course, if the remainder of the screen could be completed by filling in the portion which has been cut even better results will be obtained.

These precautions are really very important where two or more stages of amplification are used employing these valves, but for a single stage the matter is not so



A Receiver Using the
By J. H. Revner, B.Sc.



The Receiver is of somewhat Unconventional Design

appreciable importance. It is obviously no good removing the capacity between the electrodes of the valve itself and still having a considerable coupling between the circuits themselves. In order to avoid any such difficulties, therefore, it is necessary to interpose a static screen between

critical. I have used in this particular case a screen produced by Messrs. Peto-Scott, Ltd., in which a portion of the screen has been cut away to allow for the valve, and a special sliding portion has been arranged to fit in the cut-away portion. To insert the valve, therefore, it is simply necessary

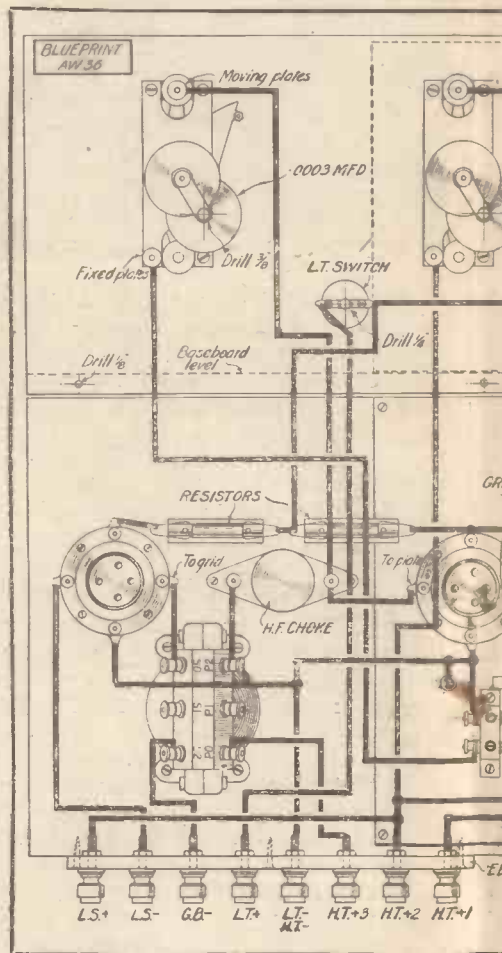
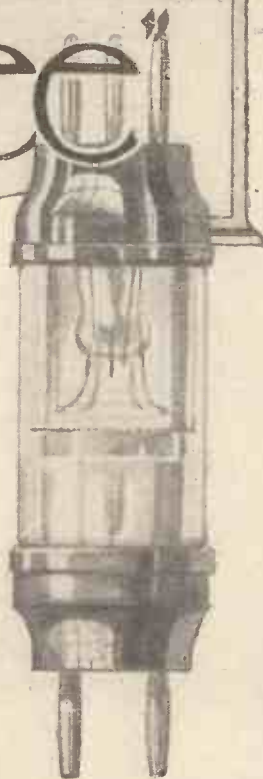
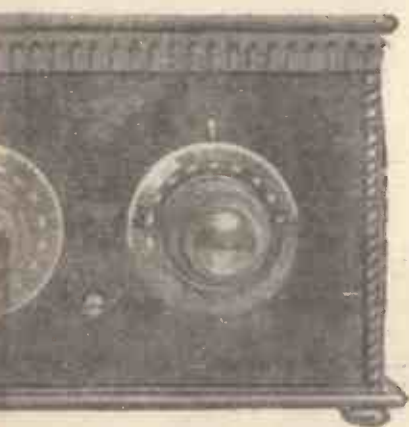


Fig. 4—The Wiring Diagram (B)

e Three



New Shielded Valve
E. (Hons.), A.M.I.E.E.

to pull up this sliding portion an inch or two, insert the valve, and push it down again. To make the screening still more effective a shield has been placed underneath and at the back of the circuits, this giving a very effective arrangement.

No Neutralising

The screen at the back of the receiver is a little unusual, it being more common to place this screen at the front of the receiver, i.e. along the back of the panel. The advantage of this is that it acts as an earth shield and avoids any hand effect. With the particular circuit adopted here, the moving plates of the condensers are at earth potential, and there is

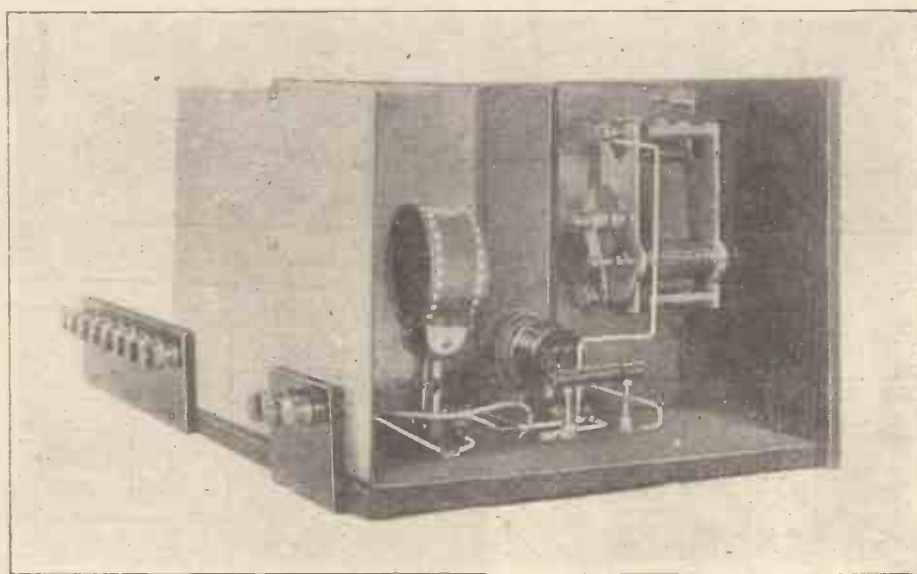
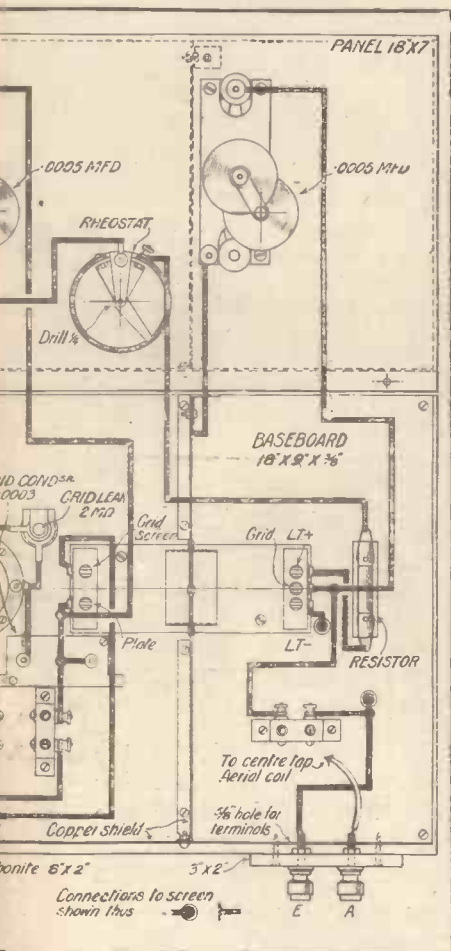
so that I thought it would be preferable to mount the screen at the back. This avoids having to cut away holes in the screen in order to mount the condensers on the panel proper, and generally obviates difficulties which are

The anode circuit contains a simple untapped coil, arranged as a plain tuned anode. The impedance of the valve is very high, so that the effect of the valve on the tuned circuit is small, and it is therefore unnecessary to tap the coils in order to reduce the damping. Nor is any step-up effect required, since the amplification from the valve is all that is needed.

No neutralizing of any sort is necessary, of course, this being the whole feature of the valve. The outer grid is connected to a point on the H.T. battery about 80 volts positive, while the anode of the valve is connected to 120 volts. The tuned-anode circuit is coupled through to a detector valve in the normal manner, and is followed by a transformer-coupled note-magnifier. This portion of the circuit is quite normal and requires no comment.

Volume Control

It is necessary to insert a volume control on some of the stations, owing to the strength at which they are received, and in consequence a rheostat has been connected in series with the fixed resistor for the high-frequency valve. This also enables this valve to be extinguished at will, which allows an interesting test to be carried out, a point to which I shall refer later. Finally, a reaction control is fitted to reduce the effective resistance of the tuned-anode circuit. This is a simple Reinartz arrangement, a coil being coupled to the tuned-anode coil in the right direction. The



The Arrangement of the Screening is clearly shown in this Photograph

experienced in insulating the components from the metal.

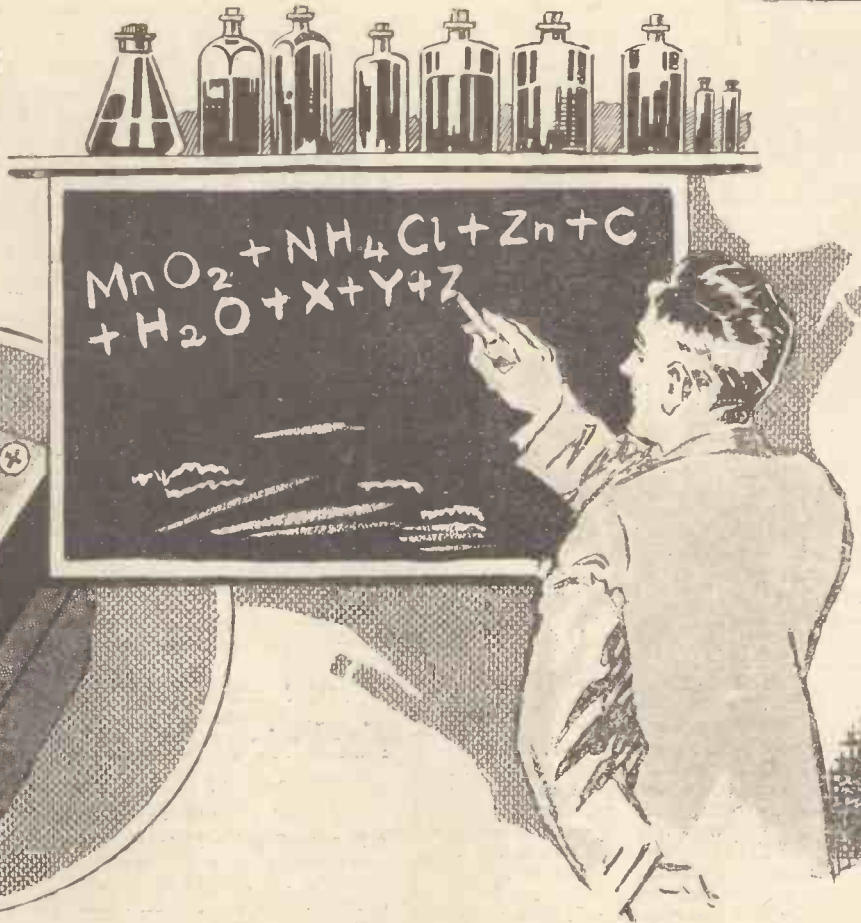
The circuit (shown in Fig. 1) is a simple one, and is merely a development of the one shown in last week's issue. The first grid circuit is a simple X-tapped coil, as is often used with valves of the usual type.

reaction effect is controlled by including a .0003 condenser in the reaction circuit in the usual way.

Components Required

One ebonite panel, 18 in. by 7 in. by 1/4 in. (Ebonart or Peto-Scott).

**THE
FORMULA
IS STILL A
SECRET!**



7/11 (Previously 10/6)

PRACTICAL POINTS ABOUT THE LISSEN NEW PROCESS BATTERY

1. It brings a new power smoothness to your loud-speaker.
2. It offers a stubborn resistance to volt drop.
3. Every battery absolutely fresh when you get it.
4. The price low enough to bring it within the reach of all.
5. You can get it on your way home at one of the 10,000 dealers who handle LISSEN products. Get one for your week-end radio.

Every battery manufacturer knows the first part of the above formula, but only LISSEN knows what the X.Y.Z. part is.

Although the LISSEN New Process Battery has been on the market for six months or more, the formula of the chemical contents is still a secret. Rival manufacturers, realising the astounding success of these batteries, have tried their hardest to analyse the contents, but in vain. The secret formula, and the special process of manufacture known only to LISSEN, constitute the reason for the remarkable power and sustained freshness of the LISSEN New Process Battery.

So great is the energy put into the LISSEN New Process Battery that it would, if necessary, keep intact over a long period of time, and it is this energy which enables it to withstand the longest programme, giving a reproduction as strong, pure, and fresh voiced at the end as at the beginning.

And by reason of the LISSEN policy of distribution, 10,000 dealers throughout the country sell this exceptional battery, at a price which is well within the reach of all—one of these dealers is near you.

Ask for LISSEN New Process Battery next time you want a good battery, and insist on getting it. You will be rewarded with a new power smoothness and a new tone clarity which will agreeably surprise you.

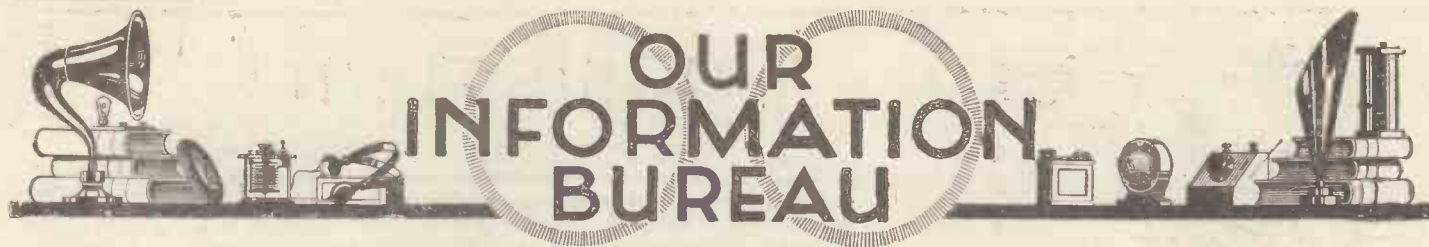
If you meet with any difficulty in obtaining, order direct from factory. No postage will be charged to you, or can be sent C.O.D. by return, upon receipt of postcard.

LISSEN New Process BATTERY

Rated at 60 volts but reads 66 volts.

LISSEN LTD., 16-20, FRIARS LANE, RICHMOND, SURREY. MANAGING DIRECTOR: THOMAS N. COLE. L346.

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



RULES.—Please write distinctly and keep to the point. We reply promptly by post. Please give all necessary details! Ask one question at a time to ensure a prompt reply, and please put sketches, layouts, diagrams, etc. on separate sheets containing your name and address. See announcement below:

Toroidal Coil.

Q.—What is meant by a "toroidal coil"?
—P. L. K. (Taunton).

A.—This type of coil is wound as a solenoid the diameter of which is comparatively small compared with its length. The solenoid is then bent round in the form of a circle so that the two ends nearly meet. The advantage of this method of construction is that the external field of the coil is very weak compared with the total inductance of the coil. In fact, the external field is only as strong as that of a coil consisting of a single turn of the same diameter as the ring formed by the bent solenoid.—T. T.

Lightning Arrester.

Q.—What is a lightning arrester and how is it used?—A. D. (Penzance).

A.—This consists merely of two conducting bodies in close proximity, mounted on a base of insulating material. One is connected to the aerial and the other to the earth. The presence of the earth arrester does not affect reception in any way but should the aerial be struck by lightning the high voltages produced will break down the insulation of the air in the gap between the two sides of the lightning arrester and the current will flow across the gap to earth in preference to traversing the comparatively high inductance of the tuning coils in the set. It should be noticed that a lightning arrester protects the set whether the latter is in use or not at the time the aerial is struck by lightning, whereas the ordinary earthing switch is useless when the set is actually being used.—G. N.

Variometers.

Q.—How is tuning accomplished with a variometer? How does turning the rotor alter the inductance of the variometer?—F. K. N. (Sunderland).

A.—When two coils are joined in series and coupled together, as is the case with the rotor and stator coils of a variometer, the total inductance of the whole arrangement is equal

to the sum of the inductances of the separate coils plus or minus the mutual inductance. The inductance of one coil, of course, depends upon the number of lines of force which cut the turns of that coil. The mutual inductance of two coils depends upon the number of lines of force that cut the turns of both coils. The mutual inductance must be added to the sum of the two separate inductances if the fields of both coils are in the same direction and subtracted if the two fields oppose each other. So that in a variometer, although the two separate inductances remain constant in value, the mutual inductance can be altered from a

is not appreciably affected whichever way the frame aerial is pointing.—R. T. (Rochdale).

A.—A frame aerial is directional in that best reception is obtained when the frame is pointing in the same direction as the waves are travelling when they reach it. But in order to fulfil these conditions the frame aerial will only lie in the same plane as the line joining transmitting and receiving station when the direction of the waves has not altered since they left the transmitting station. There are, however, many ways in which the course of wireless waves can be altered, especially when travelling over land. A large steel structure, such as a bridge or gasometer may change the course of the waves by reflection. It is possible that in your case the waves are being reflected or re-radiated by several conducting bodies so that they actually reach your frame aerial from all points of the compass.—N. F.

When Asking Technical Queries

PLEASE write briefly
and to the point

A fee of one shilling (postal order or postage stamps) must accompany each question and also a stamped, addressed envelope and the coupon which will be found on the last page.

Rough sketches and circuit diagrams can be provided, but it will be necessary to charge a special fee (which will be quoted upon request) for detail layouts and designs.

negative value, through zero, to a positive value by rotating the rotor winding.—C. N.

Frame-aerial Reception.

Q.—I am using a three-valve set, in conjunction with a frame aerial, for the reception of the Manchester Station. Can you explain why my frame aerial is not directional? I always thought that frame aerials were distinctly directional, yet with mine the strength of reception

Phone-Lead Chokes on Short-Waves.

Q.—On page 5, your publication "The Short-Wave Handbook" it is said, "This isolation of the head-set is most easily obtained by putting a small radio-frequency choke in each phone lead. Fifty or sixty turns round on a 1-inch former is all that is required and No. 26 d.c.c. wire is suitable." On page 62 it is said, "They should be wound on ebonite rod or tubing of 1-inch diameter with No. 26 d.c.c. wire. The turns should be put on as closely as possible, and the winding should occupy a length of 2½ inches." I found that the latter method gave me 90 odd turns as compared with the fifty or sixty prescribed on page 5. I should like to know which is correct.—C. F. (Bournemouth).

A.—Both are correct. As is said on page 5 of the work mentioned, "The actual inductance used does not seem critical." The first remark occurs in the course of general remarks based on the experience of several years work on the short waves. The second occurs in the description of the Reinartz circuit, and is the best coil for that circuit, although the other coil would probably be just as satisfactory.—E. H. R.

"EVERYTHING FOR PURITY!" Some Notes on Operating the Special Purity Three-Valver

LAST week we gave the remaining constructional details of the three-valve set first described in AMATEUR WIRELESS, No. 272. A few notes on the operation of the completed receiver will be of value to the constructor.

Tune in the local station by rotating the two dials approximately "in step" until loudest signal strength is obtained. Then switch off the section of the Lorient filament control which is wired in the filament lead of the H.F. valve.

If by chance the neutralising condenser is correctly set, this act should result in the local station becoming inaudible.

In any case, the neutralising-condenser dial should be slowly rotated until practically

no sound from the local station can be heard.

Switching in the H.F. filament resistor will then cause the "local" to be heard at full strength. If this is not so, try slightly readjusting the tuning controls.

A reaction effect can be obtained by "de-neutralising," but this is not a procedure to be recommended.

Rectification

Those who can afford to sacrifice a certain amount of sensitiveness may care to try a different form of valve rectification. Actually, in the original circuit supplied by Capt. Round this unusual rectification was suggested, but as there is no "positive" reaction in the receiver it was thought

advisable to use the more sensitive leaky-grid-condenser rectification.

It was not made very clear on page 241 of AMATEUR WIRELESS, No. 272 that the "anode-bend" rectification referred to was not incorporated in our receiver.

However, the changeover from leaky-grid-condenser rectification to the particular form of anode-bend rectification originally suggested can be made in a very simple way.

Substitute the present .003-grid-condenser for a .001 condenser and transfer the grid-leak connection from L.T.+ to a G.B.—tapping.

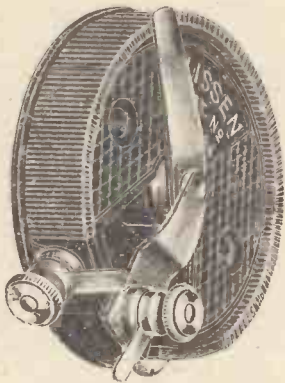
1½-volts negative bias will be about right for a DEH type of detector valve.



WHOSE TURN?

WRITERS of constructional articles in the radio journals keep one eye on the advertisement columns. Advertisers naturally expect their products to be used and mentioned in turn by these writers. So when you see certain makes of components definitely specified, remember that they are not necessarily the best. Users now know that they can replace every part named in any published circuit with the corresponding part in the LISSEN range. You will use all the energy available if you build with LISSEN parts and get louder, clearer signals from near and far in consequence.

NOW ONLY 1/6



The baseboard type of LISSEN Resistor is now reduced from 2/6 to 1/6. This type has, of course, no knob, dial or pointer, but is provided with two holes for screwing to baseboard. 7 and 35 ohms Rheostats; 400 ohms Potentiometer, each 1/6 (previously 2/6).

QUALITY RHEOSTATS

LISSEN Panel Type Rheostats. The wires do not loosen, the arm keeps in perfect contact, nothing ever goes wrong with this LISSEN Rheostat. Now Rheostats, 7 and 35 ohms ... 2/6 (Previously 4/-) Potentiometer, 400 ohms ... 2/6 (Previously 4/6) Dual Rheostat, 35 ohms ... 4/6 (Previously 6/-)

NEVER LEAK, NEVER VARY

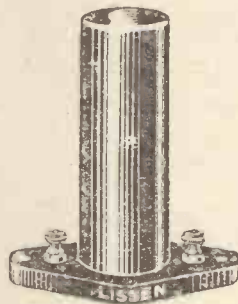
LISSEN Fixed Condensers are accurate to within 5 per cent. of their marked capacities. They never leak, they never vary. You can't buy a finer condenser.



LISSEN Fixed Mica Condensers .0001 to .001, 1/- ea. (much reduced) .002 to .006, 1/6 " " " " A pair of Clips is included free with every Grid Condenser.

HERMETICALLY SEALED WOUND IN 30 SECTIONS LISSEN H.F. CHOKE

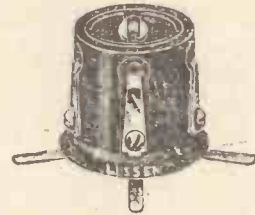
Previously 10/-



NOW 5/6

A new LISSEN H.F. Choke, made in section form, hermetically sealed so that the windings remain unaffected by atmospheric changes. A choke with high inductance value and very low self-capacity suitable for use in every case where an H.F. Choke is specified, and covering all wavelengths up to 4,000 metres, compact and neat in appearance, yet with no attempt made to secure appearance at the cost of efficiency. Here is a choke which upholds the LISSEN tradition of full value to the user.

LOW LOSS, LOW CAPACITY



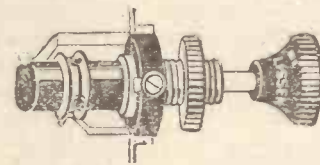
There is not a square inch of superfluous ebonite in this LISSEN Valve Holder. That means low capacity and low loss, and therefore stronger, clearer signals. Shown ready for baseboard mounting, but can also be used for panel mounting by bending springs straight. Patented. Previously 1/8. Now 1/-

ABSOLUTELY SILENT



LISSEN Leaks are absolutely silent in use; their resistances never alter. This was proved some time ago by exposing them to the rain and sun on our factory roof. All resistances. Previously 1/8. Now 1/-

LISSEN SWITCHES



LISSEN 2-way Switch

There is one for every switching need—each one is very neat and easy to fit. Now LISSEN TWO-WAY SWITCH ... 1/6 (Previously 2/9) LISSEN KEY SWITCH ... 1/6 (Previously 2/6) LISSEN REVERSING SWITCH ... 2/6 (Previously 4/-) LISSEN SERIES PARALLEL SWITCH ... 2/6 (Previously 3/9) LISSEN FIVE-POINT SWITCH 2/6 (Previously 4/-) LISSEN D.P.D.T. SWITCH ... 2/6 (Previously 4/-)

LISSEN LTD., 16-20, FRIARS LANE, RICHMOND, SURREY

Managing Director: THOMAS N. COLE

L-319

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

RADIOGRAMS



ON September 12, Myra Hess is to give her second pianoforte recital from the London station, when she will play items by Schumann and Chopin.

Miss Dorothy Street (Soprano), and Miss Ethel Rawlings (violin), both gold medalists in the recent Bournemouth Competitive Musical Festival, will broadcast from the Bournemouth studio, on September 12.

The Metropolitan Works Band, which was formed in 1908, and which claims to be one of the finest works bands in the country, will be heard by listeners to 5GB, on September 12.

Philip B. James will give a lecture on old keyboard instruments, from 2LO on September 14. Illustrations on the harpichord and clavichord will be given by Miss E. Wilkinson.

Listeners to 5GB, the Daventry experimental station, on September 11, will be given the relay of a religious service from St. Martin-in-the-Fields.

Puccini's opera, *Madame Butterfly*, is to broadcast from 5GB, on September 15. The cast will include: Miriam Licette (Madame Butterfly), Dorothy Helmrich (Zuyuki), Vivienne Chatterton (Kate Pinkerton), Parry Jones (Lieut. B. F. Pinkerton), Dennis Noble (Sharples), Sydney Russell (Goro), Bernard Ross (Prince Yamadon and the Bonze).

On September 9, the Bournemouth station will broadcast a short programme of old English folk songs, by the Henstridge Folk Song Singers, under the direction of Rev. G. F. C. Peppin.

Owing to the fact that there must be many listeners in the north of Scotland who speak Gaelic, the Aberdeen station has inaugurated a *Gaelic Corner*, which is to be broadcast on September 16. Mary Orr (soprano), will sing Gaelic songs, and Neil Orr will render Gaelic poems and stories. Should the transmissions prove successful, a similar concert will be given at fortnightly intervals.

A programme which will appeal to listeners who camp out with portable sets, is to broadcast from the Cardiff station, on September 23. It is entitled, *The King's Highway*, and will include Percy Fletcher's suite, *Greta Green*, and two songs, *The Vagabond* and *The Roadside Five*, which will be sung by Kenneth Ellis.

The Liars, is the title of an original comedy in four acts, by Henry Arthur Jones which will be broadcast from the London studio on September 21.

Z - O, is the title of a one-act play by John Drinkwater, to be performed by members of the Newcastle Repertory

DO YOU KNOW?

1. Which station issues weekly "tear off" programmes to listeners?
2. Which broadcasting concern has an arrangement with Austria for the exchange of programmes?
3. What is the frequency of 2LO in kilocycles?
4. Which is always known as Marconi's basic patent?

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

Last Week's Queries: (1) An instrument used by H.M. the King on such occasions as the opening of Wembley, Liverpool Cathedral and the R.A.F. Pageant at Hendon. (2) The Indian Broadcasting Co. (3) The Croix d'Hins station near Bordeaux. (4) Nearly 95,000.

Company, and broadcast from 5NO, on September 14. The play deals with the adventures of two Greek and two Trojan soldiers at the time of the Trojan War.

The Belfast station, on September 13, will broadcast a musical cross-word puzzle, the clues for which will be provided in acrostic form by the orchestral music to be played.

A Shakespearean programme will be broadcast from the Bournemouth station on September 12. It will include scenes, from *As You Like It*, and *The Merchant of Venice*, also the Scherzo and Nocturne, from Mendelssohn's *A Midsummer Night's Dream*, played by the station octet.

A light nautical programme entitled *Spindrift*, will be relayed to 5GB, from the Birmingham studio, on September 16 and will include songs and shanties by Harold Casey, Mendelssohn's Overture, *A Calm Sea and a Prosperous Voyage*, and a sprightly hornpipe, by Granville Bantock.

The new French PTT transmitter at Grenoble now broadcasts regularly every Wednesday and Saturday, from 8.30 p.m. onwards, on 278 metres. As these transmissions are still in the nature of tests, a local programme is not provided, the station taking its entertainments from either Lyons or Marseilles PTT. For the present the power is roughly 500 watts, but it is proposed to increase it to 1½ kilowatts.

The old Moscow Popoff transmitter has recommenced daily broadcasts on 675 metres. It usually provides an alternative programme to Komintern, on 1,450 metres.

Listeners to the high-power Komintern (Moscow) station have frequently been puzzled by transmissions which appear to be dictations or lessons given out in a slow monotonous voice. They are, as a matter of fact, news bulletins broadcast for the benefit of the working men's clubs, and rest houses. These are transmitted slowly with a view to allow the transcription of the news—even punctuation marks are given, where necessary.

Following the closing down of the all-German Radio Exhibition at Berlin, the Reichsfunk intends to start work without delay on the reconstruction of the Witzleben broadcasting transmitter. Its power is to be increased to 8 kilowatts. Whilst these alterations are being carried out, it is also proposed to erect in the centre of the German capital, a special radio building to house all the studios and general offices required by the Reichsfunk personnel, for the working of the three Berlin stations.

Classical music, selections by old-time fiddlers and a revival of old American songs will be broadcast through the network of the National Broadcasting Company, New York, under the auspices of the Ford Motor Company, to advertise the new Ford car. The famous car-maker has before consistently refused to use wireless for advertising purposes, because he "saw little merit in it," and so the announcement caused quite a stir in radio circles. The programme will be instructive as well as entertaining.

It has been suggested that loud-speakers should be installed in dentists' operating rooms, and in the waiting rooms of railway stations and police stations—in fact, everywhere where Man is liable to become morbid.

It is rumoured that the Canadian Pacific Railway Co. may purchase a substantial interest in the Canadian Marconi Co. This is not unlikely, and it is suggested that the Mackay and C.P.R. Companies will combine to handle the trans-Pacific and Atlantic business.

In all probability the New York-London "beam" service will be put into operation by the Radio Corporation of America before the end of this month. The speed of the transmission will be 250 words per minute—as against the 50 per minute of the existing service; greater secrecy is also claimed.

A proposal has been put forward by the Reich Post and Telegraph authorities, to increase the power of the Gleiwitz (Germany) transmitter in order to counteract, if necessary, any propaganda which they anticipate may be broadcast by the new Cattowitz (Poland) station to the germanised Silesian provinces.



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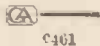
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NOTE.—In the following list of transmissions these abbreviations are observed: *con.* for concert; *lec.* for lecture; *orch.* for orchestral concert; *irr.* for irregular; *m.* for metres; *Kc.* for kilocycles and *sig.* for signal. Unless otherwise stated all times are p.m. (B.S.T.).

GREAT BRITAIN

London (2LO, 361.4 m. (830 Kc.). 1-2, con.; 3.15-4.0, transmission to schools; 3.30-5.45, con. (Sun.); 4.15, con.; 5.15-5.35, children; 6, dance music; 6.30, time sig., news, music, talk; 8.10, music; 9.0, time sig., news, talk, con. Dance music daily (exc. Sundays) from 10.30 until midnight.

Aberdeen (2BD), 500 m. (600 Kc.) Belfast (2BE), 306.1 m. (980 Kc.) Bournemouth (6BM), 326.1 m. (920 Kc.) Cardiff (5WA), 353 m. (850 Kc.) Glasgow (5SC), 405.4 m. (740 Kc.) Manchester (2ZY), 384.6 m. (780 Kc.) Newcastle (5NO), 312.5 m. (960 Kc.) Much the same as London times.

Bradford (2LS), 252.1 m. (1.190 Kc.) Dundee (2DE), 294.1 m. (1,020 Kc.) Edinburgh (2EH), 288.5 m. (1,040 Kc.) Hull (6KH), 294.1 m. (1,020 Kc.) Leeds (2LS), 277.8 m. (1,080 Kc.) Liverpool (6LV), 297 m. (1,010 Kc.) Nottingham (5NG), 275.2 m. (1,090 Kc.), Plymouth (5PY) 400 m. (750 Kc.) Sheffield (6FL), 272.7 m. (1,100 Kc.) Stoke-on-Trent (6ST), 294 m. (1,020 Kc.) Swansea (5SX), 294 m. (1,020 Kc.) Daventry (25 kv.), high-power station, 1,604 m. (187 Kc.) Special weather report 10.30 a.m. and 10.25 p.m. (weekdays), 9.10 (Sun.); relays 2LO from midway onwards. Time sig.: 10.30 a.m., 4.0 and 10.0 p.m. (5GB). Daventry Experimental, 491.8 m. (610 Kc.), 30 kw., from 3.0 onwards.

IRISH FREE STATE

Dublin (2RN), 319.1 m. (940 Kc.) Daily 7.25 Sundays, 8.30 until 10.30 p.m. Relays Cork.

Cork (6CK), 400 m. (1 kw.). (750 Kc.) Relays Dublin (exc. Sundays).

CONTINENT

AUSTRIA

Vienna (Radio Wien), 517.2 m. (5 kw.) and 577 m. 7.30, con.
Relays: Graz, 356 m. (750 w.); Klagenfurt, (750 w.) 272.7 m.; Innsbruck, 294.1 m. Linz (under construction).

BELGIUM

Brussels, 508.5 m. (1.5 kw.) 5.0 orch. (not daily), 8.30, talk, 9.0 con., news.

CZECHO-SLOVAKIA

Prague, 348.9 m. (5 kw.). Con., 8.0 (daily).
*Brunn, 441.2 m. (3 kw.). 7.0, con. (daily).
*Bratislava, 263.2 m. (500 w.).
*Kosice, 1,870 m. (5 kw.). 7.30 con., testing.
*Relays Prague

DENMARK

*Copenhagen, 337 m. (700 w.). Sundays, 10.0 a.m. sacred service; 8.0, con. Weekdays: 8. lec., con., news; dance to midnight (Thurs., Sat.).

*Relayed by Gisselore (7 kw.) 1,153 m.

ESTHONIA

Reval, 408 m. and 285.7 m. (2.2 kw.). 6.0, con. (daily).

FINLAND

Helsingfors, 375 m. (1.2 kw.). 8.0, con.

FRANCE

Eiffel Tower, 2,650 m. (8 kw.). 6.30 a.m., markets (exc. Sun. and Mon.); 10.15 a.m., time sig., weather; 6.0 talk; 7.0 weather, con.; 8.15 lec. Relay PTT, Paris, Sat., 9.10-11.0, and weekday afternoons.

Radio-Paris (CFR), 1,750 m. (about 5 kw.). Sundays; 12.0 sacred service; 12.45, con.; news; con.; 8.15, news, dance, Weekdays; 10.30 a.m., news, con., 12.30, con., markets, weather, news; 4.30, markets, con.; 8.0 time sig., news, con.

L'École Sup. des Postes et Telegraphes (PTT), Paris, 450 m. (5 kw.). 1.15-3.0 relay of Sorbonne University; 9.0 con. (daily).

Le Petit Parisien, 340.9 m. (500 w.). 9.15, con. (Tues., Thurs., Sat., Sun.).

Radio L.L. (Paris), 370 m. (250 w.). Con. (Mon., Wed., Fri.), 9.30.

Biarritz (Côte d'Argent), 200 m. 7.0, con. (irr.).

Radio Vitus (Paris), 321 m. 9.0, con. (Mon., Wed., Fri.).

Radio-Toulouse, 391 m. (3 kw.), 5.30 news (exc. Sun.); 8.45, con.

Radio-Lyon, 291 m. (1.5 kw.). 8.20, con. (daily); 4.0 (Sun.).

Strasbourg (8 G.F.), 268 m. (0.1 kw.). Con., 9.0 (Tues., & Fri.). (Irr).

Radio Agen, 310 m. (500 w.). 8.30, con. (Tues., Fri.).

Mont de Marsan, 400 m. (300 w.). con., 8.30 (irr.).

*Lyon-la-Doua, 476 m. (1 kw.). Own con., 8.0 (Mon., Wed., Sat.). Relays Paris or Marseilles.

*Lille, 286 m. (500 w.). Own con. (Tues., Fri.)

*Marseilles, 309 m. (500 w.).

*Grenoble, 278 m. (500 w.). (Wed. and Sats.).

*Toulouse, 260 m. (500 w.) (exc. Sun.).

*Rennes, 320 m.

*Limoges, 326 m.

*Relays of PTT, Paris.

Montpellier, 252.1 m. (1 kw.). 8.45 (Wed., Fri.). For news, relays Marseilles.

Beziers, 158 m. (700 w.). 9.0 (weekdays only).

Juan-les-Pins, 230 m. 9.0, con.

Bordeaux (Radio Sud-ouest), 238 m. (1 kw.). 7.25, con. (Thurs.), also on 25 m. (Sun.).

Bordeaux (Lafayette), 270 m. (1½ kw.). Con., 5.0, 9.0 (weekday), 2.30 (Sun.). Relays PTT, Paris, 8.30 (Sat.). No trans. on Mon.

GERMANY

Berlin, on 483.9 and 566 m. Throughout day. Relayed by Stettin (236.2 m.).

Königswusterhausen (LP), 1,250 m. (8 kw.) 11.30-12.50 a.m., con. (Sun.); 3.0, lec. (daily). 8.30, relay of Berlin (Vox haus) con., or from other German Stations (daily).

Breslau, 322.6 m. (4 kw.). 7.0 lec.; 8.30 con. Relay, Gleiwitz, 250 m.

Dortmund, 283 m. (1½ kw.). See Langenberg.

Frankfort-on-Main, 428.6 m. (4kw.). 6.0 to 6.15 a.m. (exc. Sun.), physical exercises; 8.30 a.m., sacred con. (Sun.); 4.30, con.; 8.0, lec., con., weather. Relay: Cassel, 272.7 m.

Hamburg, 394.7 m. (4 kw.). Relayed by Bremen 252.1 m., Hanover (297 m.). Kiel (254.2 m.). Sundays: 6.50, relays Berlin; 9.15 a.m., sacred con.; 6.0 con.; 7.0 con., Weekdays: 5.45 a.m., then from 9.0 a.m. throughout day.

Königsberg, 329.7 m. (4 kw.). 8.0, con. Relay: Danzig, 272.7 m.

Langenberg, (Rhineland), 468.8 m. (25 kw.). Relays Muenster, Dortmund, Cologne or Dusseldorf (daily). Throughout day.

Leipzig, 365.8 m. (4 kw.). Relayed by Dresden (275.2 m.). 8.15 con. or opera; weather, news, dance music.

Munich, 535.7 m. (4 kw.). Relayed by Nuremberg, 303 m. (4 kw.) and Augsburg (566 m.) 11.30 a.m., lec., con. (Sun.); 6.30, con. (weekdays).

Muenster, 241.9 m. (1.5 kw.). See Langenberg.

Norddeich (KAV), 1,100 m. 11.15 a.m., 10.30, weather.

Stuttgart, 379.7 m. (4 kw.). 11.30 a.m., con. (Sun.); 6.30, time sig., news, lec., con. (daily); Relay: Freiburg, 577 m. (1½ kw.).

GRAND DUCHY OF LUXEMBURG

Radio Luxemburg, 217.4 (250 w.). Con. 2.0 (Sun.), 9.0 (Tues.). (Irr.).

HOLLAND

Hilversum (ANRO) 1,600 m. (5 kw.). Sundays: 9.40 a.m., sacred service; 12.40 and 2.10, con.; 6.25, church service; 7.40, weather, news, con. Weekdays: 4.40, con.; 7.50, con.

Scheveningen-Haven, 1,950 m. (2½ kw.). Throughout day. Markets, Stock Ex.

Eindhoven (PCJJ), 30.2 m. (Tues., Thur.) 6 p.m.—midnight.

Huizen, 1,870 m. (5 kw.). Testing.

HUNGARY

Budapest, 556 m. (3 kw.). 8.0 con.

ITALY

Rome, (IRO), 449 m. (3 kw.). 8.30, news, weather, con.; 10.15, late news.

Milan, 315.8 m. (1 kw.). 8.15-11.0, con.

Naples, 333.3 m. (1½ kw.). 8.30-11.0, con. Como, 500 m. (5 kw.) 8.0-11.0 (temp.).

NORWAY

Oslo, 461.5 m. (1.5 kw.). 7.15, con.

Bergen, 370.4 m. (1 kw.). 7.30, news, con.

*Fredriksstad, 434.8 m.

*Porsgrund, 502 m. (1½ kw.).

*Tromsø, 500 m.

*Relays Oslo.

RUSSIA

Moscow (RDW), 1,450 m. (15 kw.). 5.30 p.m. con. News, 11.0 chimes from Kremlin.

Moscow Popoff, 675 m. (5 kw.), 5.30 daily.

Leningrad, 223.9 m. (10 kw.). 6.0.

Kharkov, 487 m. (6 kw.). 9.0 daily.

SPAIN

Madrid (EAJ7), 375 m. (1.5 kw.). Con., daily. 8 or 10 con.,

Madrid (Radio Espana) 400 m. (2 kw.). irr.

Barcelona (EAJ1), 344.8 m. (1½ kw.). 6.0-11.0 (daily).

Barcelona (Radio-Catalana) (EAJ13), 462 m. (1kw.). 7.0-11.0, con., weather, news.

Bilbao (EAJ9), 434.8 m. (500 w.). 7.0 con.

Bilbao (Radio-Vizcaya) (EAJ11), 420 m. (500 w.). 8.0-12.0, con. (daily).

Cadiz (EAJ3), 400 m. (550 w.). 7.0-9.0, con., news. Tests daily (exc. Sun.), midnight.

Cartagena (EAJ15), 335 m. (500 w.). 8.30-10.0, con. (daily).

Seville (EAJ5), 357 m. (500 w.). 9.0, con., news, weather. Close down 11.0.

Seville (EAJ17), 400 m. (500 w.). 7.0-10.0 con. (daily).

San Sebastian (EAJ8), 297 m. (1.5 kw.). Relays Madrid (EAJ7).

Salamanca (EAJ22), 405 m. (1 kw.). 5.0 and 9.0 con. (daily). Closes down 11.0.

Almeira (1 kw.), testing 300-400 m.

Saragossa, 566 m. (500 w.) 9 p.m.

SWEDEN

Stockholm (SASA), 454.5 m. (1½ kw.). 11.0 a.m., sacred service (Sun.); 6.0 sacred service; 7.0, lec.; 9.15, news, con., weather.

Dance (Sat., Sun.), 9.45. Relayed by Motala, 1,320 m. (40 kw.).

Relays.—Boden (SASE), 1,200 m.; Eskilstuna, 250 m.; Falun (SMZK), 357.1 m.; Gothenburg (SASB), 416.7 m.; Gefle, 204.1 m.; Joenköping (SMZD), 201.3 m.; Kalmar (SMSN), 252.1 m.; Karlskrona (SMSM), 196 m.

SWITZERLAND

Lausanne, (HB2), 680 m. (600 w.). 8.0

Zurich, 588 m. (600 w.). 11.0 a.m., con. (Sun.); 6.15, lec., con., dance (Fri.).

Geneva (HB1), 760 m. (750 w.). 8.15, con.

Berne, (411 m. (1.5 kw.). 8.30, con.

Basle, 1,100 m. (250 w.). Relays Berne.

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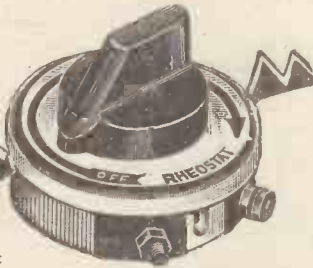
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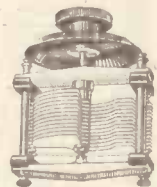
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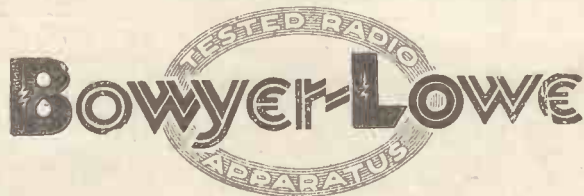


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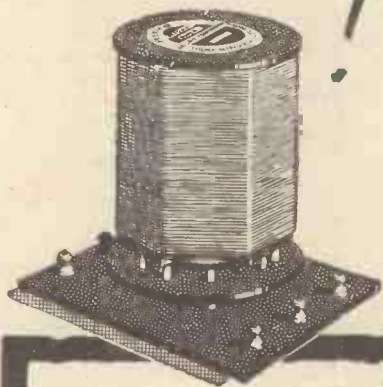
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CHIEF EVENTS OF THE WEEK

- LONDON & DAVENTRY (5XX)**
- Sept. 11 Military Band and Vocal Concert.
 - " 12 Opening performance of Pavlova Ballet Season *Don Quixote*.
 - " 13 Emilio Colombo's Orchestra.
 - " 14 B.B.C. Promenade Concert, relayed from the Queen's Hall, London.
 - " 15 *Early Birds*, a sketch in one act by Roland Pertwee.
 - " 16 *Madame Butterfly*, a Japanese tragedy, music by Puccini.
 - " 17 Variety programme.
- DAVENTRY (5GB)**
- Sept. 11 Gems of Oratorio.
 - " 13 "Prom" Concert relay from the Queen's Hall, London.
 - " 14 *Ranee*, a musical comedy.
 - " 15 *Madame Butterfly*, a Japanese tragedy, music by Puccini.
 - " 16 *Captain Cook and the W dow*, a comedy by Stuart Ready.
- BOURNEMOUTH**
- Sept. 12 A Shakespearean programme.
- CARDIFF**
- Sept. 13 *The Perfect Marriage*, a comedy in one act by Leonard White.
 - " 15 "Prom" Concert, relay from the Queen's Hall, London.
 - " 17 The Blacksmith's programme, by a Blacksmith.
- MANCHESTER**
- Sept. 12 "Prom" Concert, relay from the Queen's Hall, London.
- NEWCASTLE**
- Sept. 14 "X-Q", a play in one act by John Drinkwater.
- GLASGOW**
- Sept. 15 *Heroes and Heroines*, a musical programme.
- ABERDEEN**
- Sept. 14 *Aunt Janet*, a humorous Scots play in one act, by Alexander Falconer.
 - " 15 "Prom" Concert, relay from the Queen's Hall, London.
- BELFAST**
- Sept. 12 Ballad and Orchestral Concert.

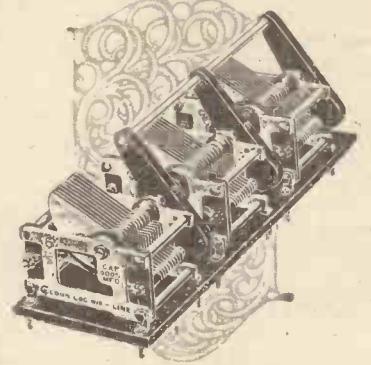
The lines on which the B.B.C. intend to run the new Daventry's programmes for the present, at any rate, are as follows: Broadcasting will begin at 3 p.m., the children's hour will occupy forty-five minutes from 5.45 p.m., and news bulletins will be given out at 6.30 and 10 p.m. On Mondays, Wednesdays, and Fridays there will be dance music from 10.15 until midnight, and on Tuesdays, Thursdays, and Saturdays music and variety until 11 p.m.

Paxolin Tubes and Panels.—The Micanite and Insulators Co., Ltd., inform us that they have appointed Wright and Weaire Ltd., of 740, High Rd., Tottenham, distributors for Paxolin tubes and panels to both home constructors and the trade.

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General Correspondence is to be brief and written on one side of the paper only. All sketches and drawings to be on separate sheets. Contributions are always welcome, will be promptly considered, and if used will be paid for. Queries should be addressed to the Editor, and the conditions printed at the head of "Our Information Bureau" should be closely observed. Communications should be addressed, according to their nature, to The Editor, The Advertisement Manager, or The Publisher, "Amateur Wireless," 58/61, Fetter Lane, London, E.C.4.

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The "Cyldon" Log Mid-line is the condenser of to-day and the future. It spreads all the stations evenly over the whole dial. It prevents any "falling out-of-step" at the beginning or end. It simplifies tuning in multi-tuned circuits when individual condensers are used, by making all the dial readings exactly the same. It is the only condenser you should fit to your set now. Experts insist on using them—and recommending them.

PRICES:

.001 - 19/- .0005 - 15/6 .0003 - 14/6
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With 4" knob dial 2/- extra.

GANG CONDENSERS

Twin Gang - - - £2 : 10
Triple Gang - - - £3 : 10
Four Gang - - - £4 : 10

Thick aluminium plates. Large adjustable non-wearing bearings. Pigtail rotor connection. Precision finish and electrical efficiency.

Be sure to see "CYLDON" products at Stand No. 121 National Radio Exhibition.

IMPORTANT NOTICE.

The products of the world's best brains and manufacturing resources in any trade or profession have always interested the "Cheap-Jack" Imitator, the worthlessness of whose products can only be compared with his lack of originality. "Cyldon" products, unfortunately, have not been spared this form of unwelcome flattery. Every genuine "Cyldon" Condenser bears our registered trade-mark on the end plate. Insist on seeing this before purchasing.

CYLDON products can be obtained from stock by return, and do not believe any statements to the contrary. If any difficulty 'Phone: Enfield 0672; Wire Enfield 0672, or use the C.O.D. system.

Sole Australian Agents

E. V. Hudson, 55/7 Charlotte Street, Brisbane, Queensland.

SYDNEY S. BIRD & SONS,
Cyldon Works,

Sarnesfield Road, Enfield Town

Contractors to B.B.C., H.M. R.A.F., H.M. Office of Works, and all manufacturers of quality receivers.



The "Tetrode Three"

(Continued from page 306)

available (price 1s. od.). Fortunately, no wires have to pass through from one compartment to another, with the exception of the filament lead. The screen itself is used as the negative filament connection, but the positive filament lead has to come from the fixed resistor through the screen on to the panel-mounting rheostat. Holes should be drilled in the screen at the back also, to allow the connections to come through from the aerial and earth terminals and from the high-tension terminals. If desired, the screen can be cut away round about these terminals instead of drilling holes, as this will not affect the efficiency of the receiver.

The anode of the H.F. valve and one loud-speaker connection are taken to one high-tension terminal. The outer grid is taken to a second separate terminal and the detector H.T. is provided from the first terminal so that it can be adjusted to give smooth reaction. The wiring is then quite straightforward, the only difficulty being the possibility of accidental contact between the screens and any of the wires. This particularly applies to the valve-holders. One of the filament connections from each of the valve-holders is definitely connected to the screen, but the others must all be kept clear, and this must be borne in mind in making the connections. The same applies to any of the other connections, care being taken to ensure that no soldering tags rest on the screen or are otherwise in contact with it, unless they are definitely intended to be.

Valves

The S625 is only made as a 6-volt valve at the moment, and it is therefore necessary to use a 6-volt accumulator. It is not essential to use 6-volt valves for the detector and L.F. stages. If 4- or 2-volt valves are to be used, then a suitable fixed resistor can be inserted to cut the voltage down from 6 to 4 or 2 as required. In the present instance the valves have been chosen to suit all 6-volt valves, 4-ohm

resistances being used throughout. A medium impedance detector should be employed, followed by a low-impedance power or super-power valve for the last stage.

As regards the operation of the receiver, I shall deal with this more particularly next week. For those who complete the receiver before the article appears, however, some few words may be given. The only critical adjustment is that of the high-tension voltage, although this is not unduly troublesome. Eighty volts or so should be placed on the outer grid connected to H.T.2. H.T.1, which is connected to the anode of the H.F. valve, should be taken to a point between 100 and 120 volts. There will be found to be one particular voltage at which the signal strength is best. Below or above this voltage the amplification from the valve begins to fall off. The detector voltage on H.T.3 should be adjusted to give smooth reaction control, and a value of 60 to 70 volts is usually satisfactory.

Tuning in to the various stations is accomplished by setting the dials approximately to the same reading. The test report which accompanies this article will assist in obtaining one's bearings. The receiver should be set fairly near the reaction point, although a number of stations will be received at good strength without the application of such reaction. The reaction control itself will be found to be very smooth, and the receiver will often slide into oscillation before one is aware of the fact.

No oscillation will be found, provided the reaction condenser is right out, indicating that the H.F. valve is perfectly stable; but the sensitivity of the receiver will be markedly improved by the application of a small amount of reaction in order to reduce the damping in the set, and so increase the voltage to which the signals will build up.

The stations given in the test report were obtained during a straightforward run from top to the bottom of the scale in about half an hour, and only those stations which were at good powerful loud-speaker

strength were marked as good. Readers will, no doubt, have little difficulty in obtaining many others. No telephones were used, and several other stations would have been audible if telephones had been substituted for the loud-speaker. The receiver is particularly good on the long waves, and I shall give a test report next week with the setting of some of the long-wave stations which can be obtained.

Test Report

Coils in use, 60x, 60, and 50 for reaction. The readings are given for the H.F. dial. The aerial dial is a few degrees different; in my case being about three degrees higher at the top of the scale and about 30 degrees higher at the bottom of the scale.

Dial Reading.	Station.	Remarks.
169	Munich ...	Weak
163	Brussels ...	Good
160	Daventry Junior ...	Good
155	Langenberg ...	Good
152	Oslo ...	Weak
149	Ecole Superieure ...	Good
142	Frankfurt ...	Good
135	Radio Berne ...	Good
130	Hamburg ...	Good
129	Radio Toulouse ...	Fair
125	Stuttgart ...	Interference from London
115	London ...	
105	Barcelona ...	Fair
90	Bournemouth ...	Good
84	Newcastle ...	Good
80	Belfast ...	Fair
78	Nuremburg ...	Good
60	Two badly heterodyned stations	
52		
42	Unidentified ...	Good
30	Unidentified ...	Good
20	Muenster ...	Good

Lewcos Coils.—The London Electric Wire Co. & Smiths, Ltd., manufacturers of Lewcos six-pin coils, advise us that in their advertisement on August 27 incorrect prices were inadvertently inserted. The prices of the following styles should be:—

SPA 12	Wavelength	600-1,200 ...	6/-
SPT 12	"	600-1,200 ...	10/-
RTA 20	"	1,000-2,000 ...	14/-
MRT 20	"	1,000-2,000 ...	14/-
SSTP 15	"	1,000-2,000 ...	14/-

You MUST have the

"Wireless Magazine"

Every Month Price 1/-

REDUCED TO 5/-



Owing to the increased production facilities afforded by our new Works, we are now able to offer the Imperial WatMel H.F. Choke at 5/-.

Nothing has been sacrificed in order to bring about this reduction. The double silk covered wire wound in four accurately balanced sections ensures required constant impedance, very low capacity and small external field.

Transparent case and ebonite base:

WatMel See WATMEL Products at STAND No. 1, National RADIO EXHIBITION Sept. 24-Oct. 1

Please note new address:

WATMEL WIRELESS Co., Ltd.
Imperial Works, High Street, Edgware, Middlesex.
Telephone: EDGWARE 0323

Lancs, Yorks, and Cheshire Representative: Mr. J. B. Leves.
23 Hartley Street, Levenshulme, Manchester.
Telephone: 475 Heaton Moor.

Please Mention "A.W." When Corresponding with Advertisers

PERMANENT BEAUTY



The Parthenon of Athens
442 B.C.

An architectural miracle. The design, the inspiration of genius; its execution incredibly perfect to the smallest detail. So perfect indeed that to this day it is not possible to insert a fine blade where marble rests upon marble.

Correct choice of material enters largely into the success of every construction, so it is that more and more wireless constructors and electrical engineers are learning the qualities of Trolite, its adaptability, lifelong service and permanent beauty.

INSULATION

- (1) Trolite is ideal for panels and dials and its unique insulating properties commend it for use in every branch of electrical construction.
- (2) Trolite is easily drilled, sawn, and machined, and being soluble in acetone a perfect and permanent joint can be made in a few minutes without the labour and disfigurement of screws.
- (3) Trolite does not fade or discolour.
- (4) Trolite panels are distinctive and many varieties of beautiful finishes can be obtained.
- (5) In spite of the mirror-like polished surface there is no surface leakage.
- (6) The price of Trolite is within the reach of all constructors. After all, the panel and dials are the most conspicuous part of your set. Remember, you do not sacrifice efficiency for effect by using Trolite—you have both in the Panel de Luxe.



F. A. HUGHES & Co., Ltd.,
204-206 Great Portland St., W.1.
Telephone: Museum 8630. (3 lines)
Telegram: Distancing, Wesdo, London

Manchester Office: 6, Booth St. East,
C. on M., Manchester.

LIFELONG SERVICE



2LO's Piano Transmissions

SIR.—Some time ago I wrote to the B.B.C. with regard to the distortion of piano music which was apparent in the transmissions of Dr. Walford Davies' musical talks and was informed that the distortion emanated from 2LO and was being investigated.

Since that time I think there has been an improvement, but in judging matters of this kind one must be sure that one's set is not the culprit. "T. B.," in No. 271, suggests that if he had not been using R.C. coupling he would have thought it was his set at fault, and it seems that this may be the case, as for the best reproduction resistance coupling should never be used except in the first stage, and then only with anode rectification, and high values of anode resistance and grid leak should be avoided. J. B. (Manchester).

Oscillation

SIR.—Judging by the amount of oscillation still heard on the broadcast waveband, it is obvious that the G.P.O. "sleuth vans" have not a great enough deterrent effect. May I suggest that a small transmitter should be installed on these vans, with a range of only a few hundred yards, and used by the operators to warn a located oscillator. The warning could be transmitted on the wavelength of the station interfered with, during a lull in the programme.

I think that the mere mention of the oscillator's name, or even only his address, in full hearing of the neighbourhood would have good results and the possibility of such an occurrence would act as a strong deterrent. A. V. I. (W.C.).

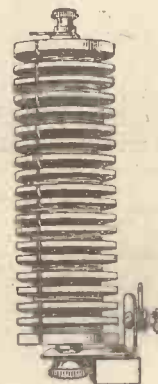
Transformer Saturation

SIR.—"Incredulous" has, I fear, a lot to learn. The term "saturation" in regard to transformers is usually taken to mean that point at which the direct current in the windings commences to affect the inductance seriously. Of course any D.C. current will have some effect on the inductance. The better the transformer the more easily is this effect obtained, owing to the very high primary inductance—60 to 70 henries in the case of one or two of the best makes.

I did not state that the transformer in question (the best obtainable) was only guaranteed to pass 3 milliamps. I stated that the makers recommend that this current should not be exceeded if the high primary inductance is to be maintained. Complete saturation in the sense used by "Incredulous" would, I agree, be impossible, but if it were possible, the trans-

(Continued on page 320)

The tested choke
for every set



THIS new TRIX H.F. choke will give you perfect results on both high and low wavelengths. A copy of the FARADAY HOUSE TEST REPORT is enclosed with each choke and certifies an inductance of 58.700 microhenries and a self capacity of only 0.000072 mfd. The choke can be mounted either vertically or horizontally.

Obtainable from all good dealers or, if any difficulty, from the Manufacturers

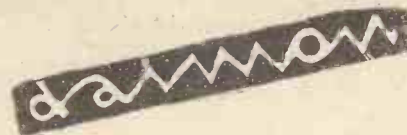
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London E.C.1
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No. 553

5/6

BRITISH MADE

TRIX



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Daimon H.T. Batteries have the lowest internal resistance of any battery of equal size.

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give the quietest working background, last longest. Have the greatest recuperative power.

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they are made by the oldest battery manufacturers in Europe.

Use them and improve your reception

- 60 volts - - 10/6 each
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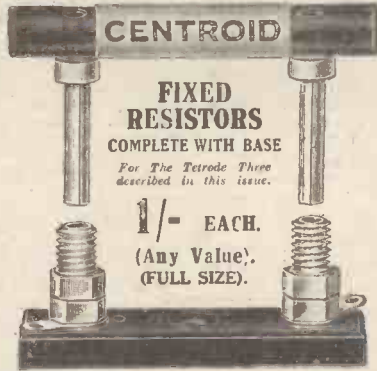
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Single - 10/-
Dual - 21/-
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Three ,, 33/-



CENTROID FIXED RESISTORS COMPLETE WITH BASE
For The Tetrode Three described in this issue.

1/- EACH.
(Any Value).
(FULL SIZE).

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M.C. Three Star Coils - - pair 10/6
H.F. Choke - 6/6
N.C. Con- denser - 4/6

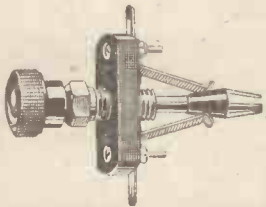


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1. Smooth yet positive action.
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3. Specially designed for Metal or Ebonite, panels.
4. Genuine Phosphor-bronze contacts.
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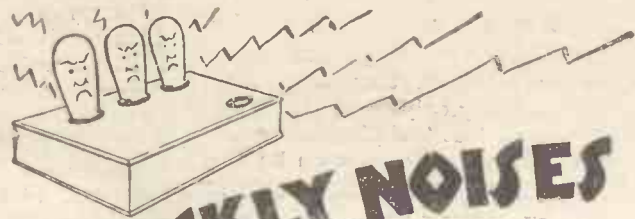
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A fully illustrated, well compiled work on the construction and uses of Formo components, including Blueprint, of two sets, etc. Special test reports, etc. by J. H. Reyner and H. J. Barton Chapple.

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Phone : Heaton Moor 475

See Stand 81 Olympic Exhibition, Sept. 24—Oct. 1

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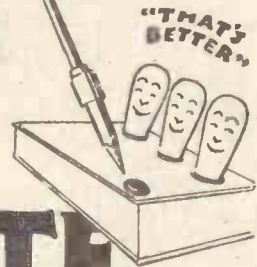


CRACKLY NOISES IS RADIO'S WARNING THAT YOU NEED

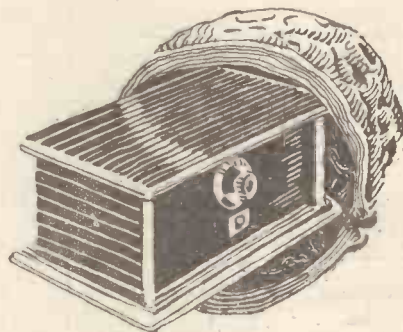
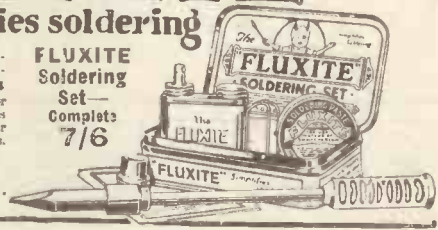
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it simplifies soldering

All Hardware and Ironmongery Stores sell FLUXITE in this price 8d., 1/4 and 2/8. Another use for Fluxite—Hardening Tools and Case Hardening. Ask for the sheet on improved methods.

FLUXITE Soldering Set—Complete 7/6



"THAT'S BETTER"



In a nutshell

In a nutshell, complete elimination of every superfluous feature, retaining only that mechanical construction necessary to perfect reproduction of a loud speaker range of European extent.

This describes the Orchestra 2 Valve Set, its marvellous simplicity one dial one switch and the variety of programme, with facility of control that is made possible by its original design.

Handsome cabinet model finished in mahogany, oak or selfcolour, the Orchestra 2 Valve Set is fully guaranteed and marketed at a price that defies competition. Price £4 plus Marconi Royalty 25s.



The Orchestra Radio Manufacturing Co.
Station Road, Warminster, Wilts.

CORRESPONDENCE

(Continued from page 318)

former would be rendered quite useless, as the inductance would then be a small fraction of a henry only.

But "Incredulous" displays an extraordinary lack of knowledge when he asks

D-XELLENT!

DX PLUG-IN COILS

From 1/- DX COILS, LTD., London, E.8

*Spend 4^d.
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1,000 BARGAINS

Are Listed and hundreds
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**EVERLASTING
FIXED
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Approved and recommended by the leading Set Designers. It's everlasting, stays fixed, sensitive as the catwhisker type functions just the same whether dropped on the floor or put in a bucket of water. More permanent than a valve. Guaranteed a lifetime. (See test report "Amateur Wireless" Aug 27th). Makes other detectors obsolete. From dealers 2/6, by post 2/8. A.W.GRIFFIN & Co., Manufacturers, REDDITCH

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1, 2, 3, 4, 5 or 6 valves perfectly and independently controlled by one unit.

A multiple unit superseding the fixed Resistor can be used in any circuit to control any number of valves. For downright efficiency use a LORIOSTAT in your set.

1 way 2/- 4 way 7/3
2 " 3/9 5 " 9/-
3 " 5/6 6 " 10/3

A. W. STAPLETON, 19a, Lorrimore Buildings, Lorrimore St., Watworth, S.E.17.

AMPLIFIERS: 1-VALVE 19/-, 2-VALVE 30/-

2-VALVE ALL-STATION SET £4. APPROVAL WILLINGLY

Wet H.T. Batteries, Jars, zincs and sacs complete, 3/6 per doz. (18 volts), post 9d. extra. Sample 6d. 3 doz. upwards in divided cartons. **Bargain List Free**

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TRANSFORMERS REWOUND

Transformers, Phones, Loud-speakers repaired to maximum efficiency. All one price 4s. post free. A 12 months guarantee accompanies each repair. Your transformer can also be rewound to Multi-Ratio type. Write giving particulars. Trade invited. Service, 115 Links Road, Tooting, London, S.W. 17.

**BANISH
H.T.
BATTERY
TROUBLE
THIS
WINTER**

what receiving valve will pass 25 milliamps without a large positive bias. Any respectable super-power valve will do this. I have a DE5A valve which has been passing this amount for about six hours daily for the last three months, with over 40 volts negative grid bias and only about 250 volts on the plate. An LS5A will pass far more than this with double this amount of negative bias and suitable H.T. voltage.

A transformer which will pass 50 milliamps through its primary winding without burning out would be of no use for smoothing rectified A.C., as the inductance would be far too small with this current passing.

F. G. S. (Birmingham).

MODEL ENGINEERS' EXHIBITION

THE Tenth Annual Model Engineers' Exhibition is announced to take place in the Royal Horticultural Hall, St. Vincent's Square, Westminster, from September 17 to 24 inclusive. This annual event is exceedingly popular and is visited regularly by some 30,000 model engineers from all parts of the country.

R.I. and Varley, Ltd.—In our test report last week of the R.I. and Varley resistance-capacity coupler the address of the makers was incorrectly stated. All communications to Messrs. R.I. and Varley, Ltd., should be addressed to Kingsway House, 103 Kingsway, W.C.2.

English and Amateur Mechanics

Contents for Sept. 9th

"Electrifying the Gramophone" is the title of an absorbingly interesting article (showing how gramophone records are made by the new electrical recording process, and how they are reproduced electrically) in this week's *English and Amateur Mechanics* (3d.). Other interesting items include "HOW TO CHARGE YOUR ACCUMULATORS FROM A.C. MAINS," forming a complete series on the subject; "A WONDERFUL NEW A.C. RECTIFIER"; "A CANOE YOU CAN CARRY IN YOUR HANDS" (details of the construction are given); "HOW TO DO YOUR OWN BRAZING"; "THE LATEST INVENTIONS ON THE MARKET"; "PHOTOGRAPHIC JOTTINGS"; "PRACTICAL IDEAS FROM READERS"; "LETTERS, QUERIES, AND REPLIES"; "TECHNICAL INFORMATION BUREAU, etc., etc.

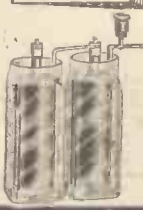
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WITH DETACHABLE TERMINAL ... 25/1
Trays for above ... 7/-

Free booklet and advice given as to Best Battery for your Set on Learning number and type of valves.

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FOR USE
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As the Publishers cannot accept responsibility for the bona fides of advertisers in this publication they have introduced a system of deposit which it is recommended should be adopted by readers when dealing with persons with whom they are unacquainted. It is here explained.

Intending purchasers should forward to the Publishers the amount of the purchase money of the article advertised. This will be acknowledged to both the Depositor and the Vendor, whose names and addresses must necessarily be given. The Deposit is retained until advice is received of the completion of the purchase, or of the article having been returned to and accepted by the Vendor. In addition to the amount of the Deposit, a Fee of 6d. for sums of £1 and under, and 1s. for amounts in excess of £1, to cover postage, etc., must be remitted at the same time. In cases of persons not resident within the United Kingdom, double fees are charged.

The amount of the Deposit and Fee must be remitted by Postal Order or Registered Letter (Cheques cannot be accepted), addressed to

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ADVERTISEMENT DEPARTMENT,
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PATENTS.—Trade Marks, Advice Handbook free—B. T. King Redg. Patent Agent, 146, Queen Victoria Street, London.

1928 NEW MODEL "ALLWOODORN." Any gramophone unit will fit. Mahogany 14 in. bell. Aluminium neck. Polished. Wood base. Cheapest and best wood horn on the market. List—Maddison, 2a Ronalds Road, N5.

EASY PAYMENTS

We supply, by easy payments, components, accessories and sets. Any make. 10% down, balance spread over 10 months. Send list of requirements to **LONDON RADIO SUPPLY CO., 11, OAT LANE, LONDON, E.C.2.**

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S.L.F. CONDENSER**

With ebonite ends
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"005 5/9 "003 5/6
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PANELS**

7 x 5, 1/-	6 x 6, 1/-
7 x 6, 1/3	8 x 5, 1/2
8 x 6, 1/4	9 x 6, 1/7
10 x 8, 2/1	11 x 8, 2/3
10 x 9, 2/4	12 x 8, 2/6
12 x 10, 3/-	12 x 9, 2/10
14 x 12, 4/-	14 x 10, 3/5
14 x 7, 2/2	16 x 9, 3/6
16 x 8, 3/2	1 1/2 in. thick Post Free

have a higher electrical resistance than ebonite. Compare these prices! Why pay more for a less efficient article?

"AMATEUR WIRELESS" says: "It is not affected by heat or damp. Its electrical properties are good. The surface leakage and the insulation resistance were both found to be infinite and the material, therefore, can be used without hesitation as an insulating panel."

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First-class workmanship only. That is just the vital difference. We are specialists with almost 30 years' experience in every form of intricate and accurate coil winding, and we guarantee that work entrusted to us will be returned to you as good as new, if not better. This is no idle claim, but the unsolicited opinion of scores of satisfied clients.

THE VARLEY MAGNET COMPANY
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Telephone: Woolwich 0528.



Amateur Wireless

COUPON

Available until Saturday,
Sept. 17th, 1927



RED BUCHANAN

"PLAYERS ONLY THIS SIDE, SIR."

"YES, THAT'S RIGHT - A LARGE PACKET, PLEASE!"



**The
New
Dubilier
Mansbridge
Condensers—**

**1 mfd.
3/-**

**—and their
prices!**

Type B.B.
Dubilier Mansbridge.

YET another new Dubilier Product—a handsome moulded bakelite case for the Dubilier Mansbridge Condenser in its most popular capacities, still of the familiar maroon colour, still the product of our unique experience in condenser manufacture, and still, in the matter of design and electrical efficiency, as far ahead as ever. The fractional microfarad condensers will continue to be supplied in metal cases as before at the reduced prices shown.

Dubilier Mansbridge Condensers are made in a wide variety of types and capacities. The type B.B. shown above represents one of such types and is suitable for a working voltage of 150 volts D.C., and this should not be exceeded if long life for the condenser is desired. Other standard types of Dubilier Mansbridge Condensers can be supplied for working voltages of up to 600 volts D.C. Write for particulars of our full range.

**STANDARD CAPACITIES
AND PRICES.**

In Metal Cases.

0.01 mfd.	2/-	0.125 mfd.	2/3
0.02 "	2/-	0.2 "	2/3
0.03 "	2/-	0.25 "	2/5
0.04 "	2/-	0.3 "	2/5
0.05 "	2/-	0.4 "	2/7
0.1 "	2/-	0.5 "	2/10

In Bakelite Cases (as shown).

ONE Microfarad 3/-
TWO Microfarads 4/-



Advt. of The Dubilier Condenser Co. (1925) Ltd., Ducon Works, North Acton, W.3.

T.C.25